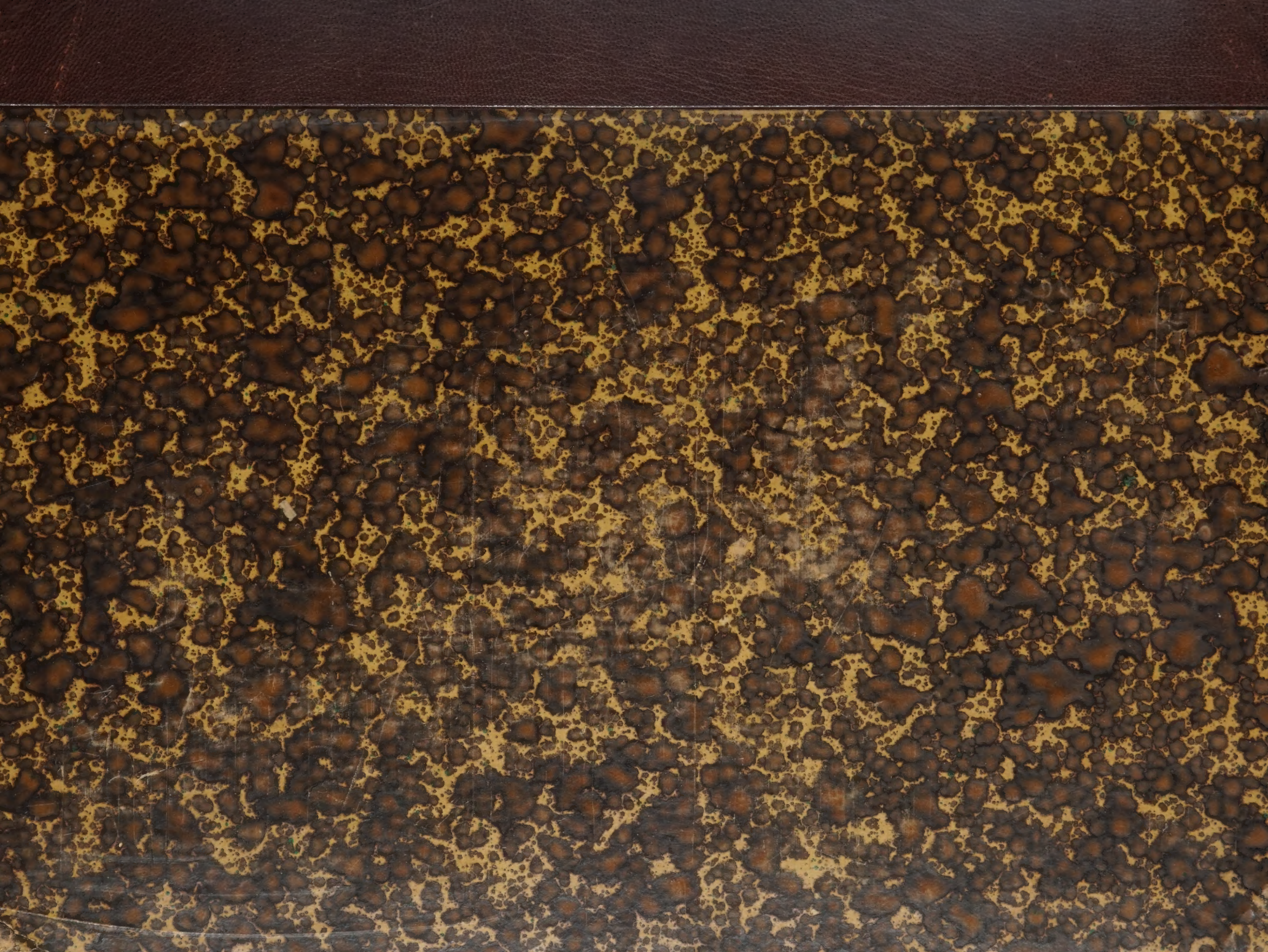

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THE

CHEMICAL TRADE JOURNAL

AND

CHEMICAL ENGINEER.

A WEEKLY NEWSPAPER DEVOTED TO

THE COMMERCIAL AND TECHNICAL ASPECTS OF THE CHEMICAL AND ALLIED INDUSTRIES.

(Founded in 1887 by the late George E. Davis).

Edited by

GEORGE KEVILLE DAVIS, M.Sc.,

Chemical Engineer and Consulting Chemist.

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CONTENTS.

	PAGE
Current Topics:—	
The Alkali Report	1
Lower Prices for Sulphate	2
A Standard Contract for Chemicals	2
Patent Office Procedure	2
The Alkali Inspectors' Reports	3
Safeguarding of Industries Act	6
Chemistry in the Irish Free State	8
The Month in Engineering	8
Notes on the Italian Chemical Industry	10
Brunner Mond & Company	11
The Position of the Public Analyst	11
British Chemical and Dyestuffs Traders' Association	11
Legal Intelligence	12
Standardisation of Disinfectants	12
Our Bookshelf	12
Items of Interest	13
Parliamentary News	14
South Wales Notes	14
Trade Inquiries	14
Fertiliser News	15
Imports of Chemicals and Allied Products in May	16
Reports of Companies	17
Gazette News	17
New Companies	17
The Patent List:—	
Applications for British Letters Patent	18
Complete Specifications Accepted	18
Complete Specifications Open to Public Inspection before Acceptance	18
Abstracts of Latest Complete Specifications	18
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	19
Cumberland Coking and By-product Industries	20
Publications Received	20
Thirty-five Years Ago	20
Market Reports:	
London "Open Market" Report	20
Italian Chemical Market	22
London Metal Market	22
Manchester Chemical Market	22
Swansea Market Report	23
Liverpool Chemical Market	23
West of Scotland Chemicals	23
Imports of Chemical Products	24
Exports of Chemical Products	26
Prices Current	30

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CURRENT TOPICS.

THE ALKALI REPORT.

THE annual reports of the chief inspectors under the Alkali Works Regulation Act are assuming an ever-increasing importance. From the outset they have been highly valued as reliable sources of statistical information on the British heavy chemical industry, but within recent years the considerable developments in the functions of the alkali inspectorate have contributed to make the reports documents of exceptional technical interest. The alkali inspectors and their staffs are indefatigable workers. Not content with acting as "technical policemen," they are ever ready to suggest means whereby offending works can so modify and adjust their processes as to bring them into satisfactory operation, even when such advice entails a good deal of experimental work on the part of the advisors themselves. The most recent activities of the inspectorate include the investigation of problems of fundamental interest to the industry as a whole. In last year's report the chief inspector described the work that had been done on the problem of the disposal of effluent spent liquors from the ammonia-distillation process. It may be remembered that the phenols were found to be largely responsible for the objectionable nature of the effluent, and that a method was devised whereby they could be eliminated to a great extent by blowing the liquors with boiler-fire gases under suitable conditions. An experimental plant has been erected at the Hornsey gasworks, and has been functioning continuously since February, 1921, decolourising and dephenolating the whole of the effluent liquors produced in the manufacture of 2½ to 3 tons of sulphate of ammonia per 24 hours. Although the percentage purification effected by this plant has not equalled the results obtained in the laboratory, yet it has been highly satisfactory, and further progress in the solution of the problem is now recorded. The treatment referred to above, whilst removing the bulk of the phenols, does not affect the thiocyanates and thiosulphates in the effluent, which, indeed, cannot be economically removed by any method of chemical treatment. Bacterial treatment in suitably prepared filter beds has, however, been investigated, and holds out high promise of success when applied to the dephenolated effluent. Filter beds are being erected for the purpose at Hornsey, and the practical results of the trials will be awaited with interest. In

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yet another direction have the alkali inspectorate been active. At the Cromwell House laboratories detailed experiments have been made on the pickling process in tinplate manufacture. The rather vague ideas that have hitherto been current regarding the restraining action of certain colloids on the pickling process have, as the result mainly of the work of Mr. H. J. Bailey, been replaced by concrete and fairly detailed knowledge, not only of the mechanism of the process, but of the relative merits of the various restrainers that have been proposed. Much of the data obtained in this investigation is already in the hands of tinplate manufacturers, and has led in many instances to considerable economies. So far as the general routine work of the alkali inspectors is concerned, there is little to comment upon. Contravention of the provisions of the Act by registered works has, on the whole, been negligible, both in England and Wales and in Scotland. The diminution of the number of works registered—from 1,283 in 1921 to 1,240 in 1922—is not perhaps so great as might have been expected in view of general trade conditions. It is interesting to note that the saltcake stage of the old Leblanc process is likely to be carried out for many years yet, the growing demand for sodium sulphide meaning a constant call for the sulphate.

LOWER PRICES FOR SULPHATE.

Contrary to the action of the producers of Chilean nitrate, makers of sulphate of ammonia in this country have reduced prices to a much lower level than those operating during the past year. The problems facing each of these industries differ considerably, but the much lower price of sulphate, calculated on the nitrogen content, is a factor which should influence for good the position of that material, both at home and in the world's markets. The lower cost of raw materials, principally acid, and certain other considerations affecting production, would certainly have permitted of some reduction being made in the price to the home consumer, though it would hardly have been thought possible to record so large a decrease. It is well known that the home consumer is obtaining cheap sulphate at the expense of our foreign customers, and the profits accruing from the excellent exportation of the past season are doubtlessly helping to compensate manufacturers. There is every reason why the domestic demand should be stimulated, for the Federation will have to meet a constantly increasing competition from American producers, and from the nitrate industry. Coincident with this competition is the heavy production in this country, consequent on the activity in the coking plants, and the promise of a supply of synthetic nitrate, amounting this year, in all probability, to about 50,000 tons. According to the Alkali Inspector's Report, production of sulphate from all sources in Great Britain reached over 350,000 tons in 1922, compared with 250,000 tons in the previous year. It is not too much to hope that low prices, combined with a high standard of excellence, will result in a widespread demand for sulphate of British manufacture.

A STANDARD CONTRACT FOR CHEMICALS.

Some six weeks ago, when discussing this subject, we mentioned that the Salesmen's Association of the American Chemical Industry was engaged in drawing up a standardised form of contract for chemicals. The task proved of considerable difficulty, and the criticisms of the Committee of the American Chemical Manufacturers' Association, who worked in co-operation with the Salesmen's Committee, necessitated the revision of the draft form four times. After three months' work, however, complete agreement has been arrived at, and we have now had the opportunity of studying the final report of the Joint Committee and the uniform contract note that is to be submitted to the American chemical industry. The latter is a particularly simple document, with only six items under the heading of "Terms and Conditions," and is evidently intended for American internal trade only. One of the main points upon which emphasis has been stressed in the report is the necessity for maintaining the principle of a fixed price as the only one compatible with absolute fairness between buyer and seller, and with ensuring stability in the chemical trade. Although many American chemical manufacturers possess highly complicated and individualised contract forms of their own, the Joint Committee states that practically all the leading companies are prepared to adopt a standardised contract. The proposed contract form does not contain an arbitration clause, but as the movement in favour of arbitration as a means of settling commercial disputes is at present making great headway in the United States, it is not improbable that such a clause may, in the near future, be inserted. If the project does prove successful in America, the British chemical industry will be unable to neglect the lesson, and the standardised contract introduced by the British Chemical Trade Association over three years ago should arouse wider practical interest than it has done in the past.

PATENT OFFICE PROCEDURE.

According to the President of the Chartered Institute of Patent Agents, a change is taking place in the routine of the Patent Office which is likely to prove prejudicial to the interests of many inventors in the chemical field. The question of whether an alleged invention contains good subject matter, or, in other words, involves sufficient inventive ingenuity to support a patent, has hitherto been one left to the law courts to determine. Within the last few months, however, it has been observed that examiners in the Patent Office are themselves claiming the right to reject patent applications if they consider there exists an insufficiency of subject matter—a claim unjustified by any change in the British Patent Acts. With regard to chemical inventions in particular, the examiners have not the necessary evidence before them to decide the point equitably, and the President of the Chartered Institute has proposed that the Institute of Chemistry should co-operate with the patent agents in protesting against this undesirable change in practice.

THE ALKALI INSPECTORS REPORTS.

SATISFACTORY OPERATING CONDITIONS DURING 1922.

THE reports of the alkali inspectors for England and Wales and for Scotland for the year 1922 have just been published. In his report, the chief inspector for England and Wales (Mr. T. Lewis Bailey) states that the total number of works registered was 1,240, which entailed the inspection of 2,005 separate units (processes). Compared with the previous year this is a reduction of 43 in the number of works, and of 64 in the number of processes.

Although there has been a distinct improvement in some sections of the heavy chemical trade, what may be called normal conditions have not yet been re-established. The introduction of new methods of manufacture is, however, a hopeful sign for the future of the country, and it calls for increased vigilance on the part of the alkali inspectors. This year again several works have been found, where operations, registrable under the Alkali, etc., Works Regulation Act, 1906, were being carried on without previous registration, viz.: 2 bisulphite works, 1 chemical fertiliser works, 1 salt works, and 2 tar distillation works. It seems strange that even yet it should be necessary to call the attention of chemical manufacturers to the penalties prescribed for such contravention of the Act.

The total number of inspections made during the year was 3,837, in the course of which 2,457 quantitative estimations of the noxious constituents of chimney and other gases escaping from the processes in operation, were made. Details as to the average amounts of gases escaping are given below:—

I.—Average Amounts of Acid Gases Escaping.

Expressed as Grains per Cubic Foot.

—	General Average.		
	1922.	1921.	1920.
1. *Muriatic Acid*:—			
Condensed in alkali works per cent.	98.6	98.5	98.5
In gases of chimney or final outlet:—			
(*a*) Alkali and copper (wet process) works	0.069	0.073	0.088
(*b*) Salt works	0.044	0.040	0.061
2. *Acidities of Chimney and Other Gases in terms of* SO_3:—			
Escaping from sulphuric acid chambers	1.22	1.06	1.13
Final outlets from sulphuric acid concentration processes	0.65	0.68	0.71
Chimneys of smelting works	3.17	1.73	2.34
Chimneys of other works	0.70	0.66	0.73
All chimneys	1.00	0.75	0.95
3. *Condensers of Chemical Manure Works*: (SO_3 equivalent of H_2SiF_6)	0.08	0.06	0.09

A considerable number of visits were paid to unregistered works, concerning which complaints had been received from local authorities or from individuals. In practically all instances it was ascertained that the complaints were not due to emission of noxious or offensive vapours from registrable processes, but from operations concerning which the alkali inspector has no jurisdiction. Registered operations, on the whole, have been conducted satisfactorily. Complaints of a serious character have been few, and in all cases prompt remedial measures were adopted. Two works in particular, however, have given considerable trouble, but a steady application of pressure has secured better working and greater attention to detail, with the result that much improvement has been effected in the atmospheric condition of the neighbourhood of the works in question. It is confidently anticipated that the improvement is of a permanent character.

Alkali and Copper (Wet Process) Works.

A considerable amount of salt-cake continues to be made; large quantities are employed for the production of sodium sulphide, a manufacture which has extended considerably of late years; heavy consignments, too, have been used in the wood pulp industry. It is a logical sequence of the disappearance of the older alkali process that the synthetic manufacture of hydrochloric acid from chlorine and hydrogen, obtained by electrolysis of brine, is showing signs of extending. During the past year, however, the acid position has been easy, owing to idleness in the fibre separation trade, which trade is usually responsible for a fairly large consumption of hydrochloric acid. The employment of gas firing in connection with salt-cake furnaces has unfortunately shown no progress as yet.

The district inspector had occasion to complain of the conditions prevailing at one alkali works, where exits generally were so near the statutory limit that occasional excessive escapes became inevitable. The repacking of one of the towers proved to be necessary: moreover, it was considered necessary to ask for additional condensing plant, and this has been provided; the method of working the final scrubbers has been altered also. As a result a considerable improvement has been effected. Apart from this instance of inefficiency, there has been little difficulty with works of this class, occasional temporary disorganisation only occurring at several works. Percentage condensation has been quite good, and exits have been satisfactory.

Cement Works.

The most serious nuisance that is likely to occur at these works is due to dust. Good depositing chambers are usually sufficient to obviate any serious trouble, but much more satisfactory is a system of filtration, such as is attained by passing the dust-laden gases through bags of suitable material. At one works, where dust trouble has been particularly acute, a good bag-house has effected the collection of many tons of dust weekly and at the same time an almost entire cessation of the nuisance. Any reduction in fuel consumption is, of course, financially beneficial to the manufacturer, and at the same time it improves atmospheric conditions in the immediate surroundings of the works, and so improvements in vertical kilns with this end in view are welcome. It would appear that the introduction of a rotating grate has given encouraging results—whether the patentee's claim of a 50 per cent. reduction is substantiated remains to be seen.

Smelting Works.

The deposition of dust from smelting-furnace gases continues to receive attention; cooling is a very efficient aid to the deposition of flue dust, and more use might be made of this—draught conditions do not necessarily form an insuperable barrier. In connection with the electrostatic removal of dust from furnace gases more attention is necessary to humidity than is usually given. The highest acidities of chimney gases are usually obtained in the calcination of zinc blende, and the problem of dealing with these gases is receiving at our hands such attention that one may look for further improvement at no very distant date. Mechanical calciners are somewhat handicapped by the amount of lead contained in the concentrates so largely imported into this country. The essential difficulties are twofold: (*a*) the production of a partially calcined product of a resistant nature, which gives trouble with the mechanical rabbles, causing breakage of parts; and (*b*) insufficient removal of sulphur unless a high-temperature final roast is included in the operation. Furthermore, if the calciner gases are employed in the manufacture of sulphuric acid, volatilised lead compounds are apt to cause considerable trouble in the Glover towers, where they collect and form obstructions.

Experiments are in progress, however, with a view to simplifying the method of procedure. It is hoped that we are on the way to superseding such methods of calcining blende as are not accompanied by conversion of the sulphur gases into sulphuric acid. Hitherto either the low sulphur-dioxide content of the gases from many smelting operations, or the very variable composition of such gases, has precluded any idea of satisfactorily and economically converting the sulphur constituents into sulphuric acid. Reference to the averages table, given above, shows that the gases of smelting works chimneys have a much higher acidity than all others; and this becomes more marked as the activity of blende calcination works increases.

Sulphuric-acid Works.

The outstanding feature has been the rapid extension of the use of sulphur, from which now quite an appreciable proportion of the acid of the country is being produced. At several works rotary sulphur burners have been in successful operation. Electrostatic deposition of dust from burner gas is receiving more attention, but one feels constrained to remark that each case should receive special consideration according to the nature of the material to be deposited. Concerning lead chamber systems there is little that calls

for remark. Leakage of sulphur dioxide at the point of entry of the burner pipe into the Glover tower is frequently a cause of annoyance to both inspectors and works managers; a water-jacketed collar, burnt on to the side of the tower, has been used for some time at one works with great advantage. Plant has been kept generally in good condition, and exists, with one or two exceptions, have been very satisfactory. The average of tests made at all the sulphuric-acid (class II.) works is satisfactorily low; there has been a steady reduction each year since 1917. One works has caused some anxiety during several months of the year, complaints of excessive emission of acid fumes being received on two occasions. At this works sulphuric acid is concentrated in glass bottles, and it transpired that on both occasions there had been breakage of several bottles, which were almost new. These bottles proved to be heavier, and consequently thicker, than those hitherto employed; they were, therefore, less able to withstand such temperature variations as might occur at periods of stoking. A strong letter of warning was sent to the owner of the works, who promptly removed all the bottles of the type which had been responsible for the trouble; since that was done, no similar occurrence has been reported. The Calder-Fox scrubber has been further modified in detail, and the need for the introduction of a damper before the scrubber has been obviated. The results recorded during operation of this newer type have been very gratifying.

With regard to contact processes, some improvement is to be chronicled in the working of Grillo plants, but more is needed. At the outset dust, and subsequently acid mist, are essentially to be guarded against, if conversion efficiency is to be maintained. In each case electrostatic deposition can play a very important part in attaining the end desired. Attention has been drawn to this in previous years, and it is gratifying to report that this year such means have been introduced at one works with apparently excellent results. At one installation exit gases are to be scrubbed with a solution of sodium carbonate, with resulting production of bisulphite. It should not, however, be necessary to have recourse to any such means of recovery simply for the purpose of bringing the acidity of the exit gases within reasonable limits.

Fertiliser Works.

The average acidity of gases from the condensers at these works has now for three years been under 0.1 grain per cub. ft., reckoned as the SO_3 equivalent of hydrofluosilicic acid. It must be understood that this figure by itself is insufficient as an indication of the efficiency of any one plant; percentage removal of gases must be taken into account, and this runs to a figure usually approaching 98 per cent. and frequently 99 per cent. I would remind manufacturers of the remarks made in last year's report concerning the designing of scrubbing plant. During the year just ended considerable trouble has been given by several newly-erected plants for which the scrubbing system had been quite badly designed. Tower space must be ample and fan speed must not be excessive. In several instances during the past year it has been necessary to ask for a reduction of fan speed, and in each case, where such reduction has been effected, the result has been satisfactory in all respects. The introduction of excessive volumes of cold air into the system is neither necessary nor desirable. Mr. Sutton, in his district report, states that further experience of the use of high-pressure water sprays confirms the advantage of this method of scrubbing as compared with the old shower-and-drip method.

Sulphate-of-Ammonia and Gas-liquor Works.

The outstanding feature at present is the general tendency towards the production of neutral sulphate. This is usually effected by neutralising the fished acid salt and then drying, but an interesting departure from this method is the "Bedford" process, in which a primary and a secondary saturator are employed, the liquor in the main (primary) saturator being taken to neutrality, so that the salt, as fished, is already neutral and requires drying only.

It is not edifying in these days of scientific control to reflect on the somewhat haphazard methods prevailing in so many sulphate-of-ammonia works; by-products ought surely to be manufactured under as economical conditions as possible, compatible with quality of the article produced. the whole process of the treatment of ammoniacal liquor seems to be worthy of more attention at the hands of manufacturers than it receives; but two points in particular are worthy of special consideration—first, on the ground of economy and secondly, by reason of the present-day difficulty, so frequently experienced, of getting rid of spent liquors. I refer here to the quantities of lime and steam used in the still: the one is a case of the amount of alkali actually required to bring about the setting free of the "fixed" ammonia, the other is a question of the heat units required in the distillation process. It is a fact that these two items show very great variations, and both are frequently in far greater excess than there is any need for. These points are considered in some detail in that portion of the present report which deals with effluent spent liquors.

II.—Amount of Ammonia Products Manufactured in England and Wales, 1922.

Expressed as Sulphate (25¾ per cent. NH_3)—Tons.

From Liquor Produced in—	1922.	1921.	1920.
Gasworks	144,817	129,431	143,979
Iron works	83	167	718
Shale works	—	—	—
Coke oven works	125,679	54,184	143,391
Producer-gas and carbonising works (bone and coal)	4,722	4,446	10,005
Total	275,301	188,228	298,093

Chlorine and Hydrochloric Acid Works.

The production of liquid chlorine has simplified the manufacture of chlorine compounds by doing away with the older and less convenient methods, which entailed the making of chlorine on the spot, and consequently users of chlorine are on the increase. In every instance plants have been operated satisfactorily and precautions have been taken to prevent escape of chlorine into the atmosphere.

The conditions existing at tinplate flux works in the previous year have been more than maintained this year, and chimney exits have been highly satisfactory. Work of an investigatory character has been commenced this year with a view to further improving general conditions. Now that scruff treatment methods have so far advanced as to render the neighbourhood of tinplate works reasonably free from any annoyance due to noxious vapour, the point of attack has been shifted to an earlier stage of the tinplate operations, with a view to improving the pickling process and to ascertaining how far such may affect the character and quantity of the scruff; this, it is hoped, may lead to still further improvement of the atmospheric surroundings of the works. The laboratory work carried out thus far has given excellent results, so far as details of the pickling process are concerned, and Mr. H. J. Bailey's assiduity at the works themselves has had the effect of inducing the tinplate manufacturers to consider important points which have been ignored in the past. (The work referred to is summarised later in a special section of the report.)

Sulphide Works.

A number of complaints were received, alleging emission of sulphuretted hydrogen from new processes, which are not registrable under the Act. This gas is both unpleasant and noxious. There should be no serious difficulty in preventing its getting into the air from any process that has so far come under notice. Sulphuretted hydrogen is easily removable by absorption, using such materials as hydrated oxide of iron or slaked lime. These may be used either in what may be termed a dry state or suspended in water, and, where considerable quantities of the gas have to be dealt with, it is quite possible to recover sulphur from the absorbent directly. The latter point is worthy of more consideration than is usually accorded to it. No sulphide works registered under the Alkali Act has given rise to complaint this year, although inspectors have found it necessary to take exception to a lack of adequate supervision in regard to sulphuretted-hydrogen escape from several works of other classes, viz.: sulphate-of-ammonia works and tar works.

Tar Works.

The most recent innovation in tar distillation is the use of a molten metallic alloy for heat transference in the still.

In each section of the plant the tar is fed in below the surface of a molten lead alloy, maintained at the desired temperature. Successful development of this variation from the usual plan of direct heating of the tar may have quite a number of advantages, including prevention of the separation of carbon. Practically the only cause of complaint this year has been due to want of attention to pitch coolers at some works. Leaky pitch coolers are a distinct source of nuisance in the neighbourhood of the works, and it has been necessary in a number of instances to require either immediate repair or entire renewal of faulty pitch coolers. Fume pipes from pitch coolers, too, are frequently neglected. There is no difficulty in providing and maintaining in good order a pipe from the top of the pitch cooler to ground level, which is lightly sealed in oil or even water. Other methods are in use, but that just mentioned is perfectly simple and quite efficacious. Neglect permitted in the matter of details in manufacturing operations leads inevitably to neglect regarding even more important points, and this in turn leads to general inefficiency both of plant and worker.

III.—Amount of Tar Products Manufactured in England and Wales, 1922.

—	Gas and Coke Oven Works.	Other Works.
	Tons.	Tons.
Tar distilled	1,176,610	9,384
Pitch produced	448,595	4,288

Where serious corrosion of the still is experienced, owing to the presence of tarry emulsions of an acid character, it is possible that considerable advantage may be obtained by the use of aluminium oleate, which may be prepared from oleic acid and such an aluminous material as alumino-ferric. This has been used at one works with considerable success.

The next section of the report is an account of the continuation of the experimental work on the problem of disposing of the effluent spent liquors from the ammonia distillation process as carried on at gasworks and coke-oven works. An abstract of this section of the report will appear in our next issue.

Then follows a very detailed account of the work carried on by the alkali inspectorate on the chemistry and technology of the pickling process in the manufacture of tin-plate. An account of this will also appear in an early issue.

The Alkali Regulation Act in Scotland.

Mr. J. W. Young, in his report to the Scottish Board of Health on the working of the Alkali, etc., Works Regulation Act, 1906, in Scotland during 1922, states that the number of works registered was 165, in which were operated 315 scheduled processes as follows:—6 alkali (saltcake), 1 alkali (wet copper), 1 cement, 2 smelting, 20 sulphuric acid, 16 sulphuric acid (Class II.), 27 chemical fertiliser, 14 gas liquor, 7 nitric acid, 111 sulphate and muriate of ammonia, 2 chlorine, 3 muriatic acid, 14 sulphide, 1 alkali waste, 11 lead deposit, 1 arsenic, 6 nitrate and chloride of iron, 1 carbon bisulphide, 5 paraffin oil, 7 bisulphite, 58 tar, and 1 zinc extraction. I made 511 visits to these works, and 27 to others not on the register. There were 295 chemical tests, in one of which acidity was measured exceeding the limit prescribed by the Act. Generally operations continued to be restricted, but during later months in some branches there was increased activity. No legal proceedings were taken under the Act.

Vegetation in neighbourhood of a sulphuric acid works was injured severely. There were novel features in the construction of chemical plant, raw material differed from previous supplies, and the management lacked experience to overcome these difficulties. In result acid gas, which should have been manufactured into sulphuric acid, escaped at times freely into the atmosphere. I was visiting as usual, but saw and heard nothing of these outbursts. Inspectors can best perform their duties when incidents occurring between their visits are communicated to them and their advice if necessary, sought. Several changes have been made, so that there is reason to expect lasting improvement.

By the courtesy of manufacturers, I am able to present the usual summary of raw materials and of products.

Alkali Works.

No salt was converted into alkali, and less than usual into saltcake; although demand for the latter from abroad improved. Conditions were good throughout at the works, and also at deposits of alkali waste. An old landmark, the great chimney of St. Rollox, has gone. Through distrust of its stability, demolition was in progress, but the shortened stem collapsed spontaneously, causing the loss of four lives. The general average amount of muriatic acid discharged into the air was in each cub. foot of chimney gases, 0.055 grain, the highest and lowest averages for any one work being 0.164 and 0.02 respectively. In no test was measured an amount of acid exceeding the Act limit of 0.2 grain.

—		1922.	1921.
		Tons.	Tons.
Pyrites and spent oxide burned		97,919	71,416
Phosphates and bones dissolved		69,301	51,796
Salts of ammonia (expressed as pure sulphate):—			
From gasworks	19,046		
,, iron works	2,996		
,, shale works	15,860		
,, coke, producer gas and carbonising works	7,939		
		75,841	62,343
Tar distilled:—			
At gasworks and coke ovens	138,385		
,, other works	34,786		
		173,171	148,608
Pitch produced:—			
At gasworks and coke ovens	41,978		
,, other works	19,375		
		61,353	58,833

Sulphuric Acid Works.

Spent oxide has been burned in greater quantity; inadequate retention of dust has caused frequent trouble. Unavoidable diminution of chimney draught caused a short period of disorganisation at one works, so that my test of the exit gases from the plant slightly exceeded the statutory limit of 4 grains of acidity. Processes comprised in Class II. have been rather busier than in 1921 and without incident. The general average acidity in each cub. foot of residual gases discharged was 0.59 grain of sulphuric anhydride; the highest and lowest from any one work were 2.29 and 0.22 respectively.

Chemical Fertiliser Works.

Good results of an improved system of condensation of the corrosive gases emanating from this process were mentioned in last year's report, and have continued. These are so destructive to the steel and ironwork of the modern type of den that repair or even renewal is needed in a few years. Some time ago I had suggested at one such works that the old-fashioned paint of slaked lime mixed with skim milk would surpass any oil paint in durability of coating and protective action towards the metal it covered. The manager has informed me that his trial was entirely satisfactory; his experience may be useful elsewhere. At another works, lately installing new plant, an irritating back rush of gas was noticed from the charging hole, although all was apparently in good order. Explanation was simple; the makers' designs were at fault. So long as mineral containing little carbonate was used, dissolving was easy; but with change to another material, richer in carbonate, reaction in the mixer was so vigorous that the charge overflowing into the flue choked the passage of gas to the wash-tower. The general average of the total acidity in each cub. foot of gases escaping finally was 0.09, expressed as the SO_3 equivalent of silico fluoric acid; the percentage condensation varied from 94 to 100.

Sulphate and Muriate of Ammonia and Gas Liquor Works.

At some works it was thought advantageous to run gas liquor to waste rather than to recover the contained ammonia. A few instances of leaking joints were observed in saturators; on my complaint they were quickly repaired. Drying of neutralised salt tends to be over elaborated and at too high a temperature, so that afterwards it is necessary to crush down or grind the lumps. None is so effective as the simpler plants, wherein an ample and steady current of warm air is led through the agitated salt. It is seldom necessary now to comment on oxide purifiers as kept too long in use. At the coke ovens of the Plean Colliery Company, near Stirling, fluorine is found in the gas liquor as a regular constituent. By reason of its corrosive properties on metal it is thought advantageous to remove it before recovering the dissolved ammonia. I am not aware that such presence of fluorine has been previously observed.

SAFEGUARDING OF INDUSTRIES ACT.

COMPLAINT AS TO FORMALDEHYDE UNDER PART I.*

THE further hearing of the application for the removal of formaldehyde from the Board of Trade List took place at the offices of the Board of Trade on Thursday and Friday, June 28 and 29, and was then adjourned until Monday, July 2. On June 28 the whole of the proceedings were private, evidence being given on behalf of Synthite, Ltd., with regard to their particular process of making formaldehyde. Such importance did Sir Arthur Colefax, K.C., attach to this evidence being *in camera* that even all the witnesses of this firm who were not actually required to give evidence as to the process were excluded from the room, as also was the official shorthand writer.

Evidence of Dr. Ormandy on Oxidation Syntheses.

On Friday, June 29, when the proceedings were resumed in public, there was some cross-examination of the evidence previously given *in camera*, but this cross-examination was on general lines, and did not disclose the details of the process. Dr. Ormandy, who had given evidence the previous day, was cross-examined by Mr. Swan, for the complainants, and said that the plant had either to be worked continuously night and day or completely closed down. On the subject of what constitutes a real synthesis, Dr. Ormandy's view was that formaldehyde, as manufactured from the products of the distillation of wood, is a synthetic product. He considered the process of converting methyl alcohol into formaldehyde, *per se*, a synthesis. He agreed it was a degradation, but only in the sense that it was used in thermodynamics, which had nothing to do with chemistry. The sense in which it had been put forward in this case was a common mis-use of the term degradation. His view was that if the chemical re-action was controlled then the process was synthetic.

Cross-examined with regard to oxidation as a synthetic step, Dr. Ormandy said that only when the step was a controlled oxidation, resulting in the production of another body which they desired to get, was it a synthetic step. Mere oxidation without any conditions whatever was not a synthesis; otherwise the burning of coal would be synthetic. He could not give a better illustration of controlled oxidation than the conversion of methyl alcohol into formaldehyde.

A discussion then took place as to the various methods mentioned in Richter for forming acetic acid, in which a differentiation was made between synthetic methods and other methods. Dr. Ormandy said that Richter nearly always dealt with nuclear synthesis, and arguments based on multi-carbon bodies seemed to him quite irrelevant in regard to the case of formaldehyde. Moreover, he did not by any means accept Richter as a man to be blindly followed.

Dr. Ormandy was again questioned by the Referee, and said he drew a distinction between the scientific and commercial meaning of synthesis. If he brought carbon dioxide and hydrogen over a catalyst, and actually isolated methane, he contended he would be entitled to say scientifically that it had been synthesised, but from the commercial point of view it was not a synthesis of a substance which could be produced in any quantity. It was, therefore, necessary to distinguish between a synthesis carried out commercially and one which was merely a scientific possibility. The process which had been described to the Referee *in camera* was so far from being automatic that if the operations were not watched most carefully, it would all go wrong. He agreed with Sir Arthur Colefax, from his knowledge of the process in Germany, that the product was usually water-white, unless there had been an accident in manufacture.

Mr. S. A. Brashier, a director of the firm of Walter H. Brown and Co., Ltd., chemical merchants, of London, gave evidence from the trade point of view, and said that during his many years' experience of the trade, formaldehyde had always been regarded and traded in, as a fine chemical. Of the sales of his firm of formaldehyde, 95 per cent. were used for disinfectant purposes. Cross-examined, Mr. Brashier said his firm dealt mainly with pitch and coal-tar derivatives, and had only been dealing with formaldehyde since the war, and he imported the material he had been selling.

The Referee asked whether his firm would expect formaldehyde to be water-white and free from impurities, even when this was not specified; and witness replied that he would. This concluded the evidence, and Counsel made their respective speeches.

Summing-up by Sir Arthur Colefax.

Sir Arthur Colefax, for the opponents, submitted that formaldehyde was rightly included in the list on three grounds—(1), that it is an analytical re-agent; (2) that it is a fine chemical; and, (3), that it is a synthetic organic chemical. In regard to the first, there was no question, on the evidence, that it was an analytical re-agent. He agreed that its use for this purpose was extremely small, and he did not wish to overstate his case in this respect. On the second point, he submitted that no case had been made in favour of formaldehyde not being a fine chemical. Formaldehyde was largely included under the heading of "Industrial Chemicals" because it had admittedly a very large industrial use, and he did not distinguish between its industrial uses. It was used as a disinfectant, and it had a much larger use for that purpose than the complainants had any conception of. He was not going to put formaldehyde forward as a pharmaceutical chemical, but such use as formaldehyde had in pharmacy, at any rate, was quite consistent with its being a fine chemical. The fact that formaldehyde was listed under "industrial" chemicals did not decide the point whether it was heavy or fine. Discussing the factors which made it a fine chemical he put, first and foremost, its extraordinary purity; it was not that it happened to be pure, but it was demanded pure, and only that which was pure had a normal sale. It was a fact that the material which was sold was of B.P. quality, both here and in the United States. It was incredible that the manufacturers would strive to produce this extremely pure substance for sale if it were not demanded.

The Decision Should not Depend Upon the "Synthetic" Point.

With regard to the process of manufacture: this was a very important matter. The Act was not cut to protect a particular body simply because it happened to be that body; it was out to protect British industry, and, therefore, essentially this question of manufacture must lie at the root of the definition of a fine chemical. Evidence had been given by everyone—and, he believed, he had called all the manufacturers, and they had all said the same thing—that this was a process of a most delicate character. It could go wrong within the brief space of a few minutes, and could end, in fact, in an explosion. Continuous control must be exercised, and the purpose of the skilled chemical control given to it was to guard against the process going wrong, and the consequences. Here was a process which could not possibly be conducted without *continuous* chemical supervision, and it was perfectly obvious, from the evidence, that the bulk of the cost was in respect of skilled chemical supervision. Counsel was most anxious that no decision should be given on this synthetic organic chemical point which, in his submission, would be seriously wrong. He, however, submitted definitely that this was a synthetic organic chemical, and he was particularly anxious to persuade the referee not to give any decision which would in any way conflict with its being such. Richter alone had defined "synthesis," and he had defined it in words which he (Sir Arthur) had always adopted. He repeated the definition:—"By the synthesis of a carbon derivative is understood its formation from the elements, or from such carbon derivatives which can be obtained from the elements." Sir Arthur said he had never sought to extend "synthesis" beyond that, and it fitted this case absolutely. Thorpe's definition was wider than Richter's. It was stated by Thorpe that, in its widest sense, the term "synthesis" meant the building up of carbon compounds either from their constituent elements or from groups of differently constituted molecules. Sir Arthur suggested that the difference between Richter and Thorpe was that Richter was definite and Thorpe was not. It was perfectly clear that the attempted use of Thorpe, that it was a *sine qua non* of synthesis that they should have a successive building up in the sense that they added brick to brick, was wrong, and it was not the way in which Thorpe used the term. After referring in detail to Mr. Parry's evidence, which, he said, he could not make head or tail of, and after referring to the definition of a synthetic organic chemical which was given in a United States Treasury Minute, for Customs purposes (which absolutely fitted this case), he said the point was that if they had a body which was

* For the previous hearings of this case see *The Chemical Trade Journal and Chemical Engineer*, June 22 (page 756) and June 29 (page 785).

naturally-occurring, and they passed from that to another body of a different molecular constitution by a chemical step, they had got a synthesis, provided that the natural body was one which could be synthesised.

On the afternoon of Monday, July 2, the final stage of the hearing was reached, and Mr. Kenneth Swan summed up on behalf of the Chemical Merchants' and Users' National Vigilance Committee.

The Delay in Hearing the Case.

Mr. Swan referred, first, to the delay which had occurred in the hearing of these cases. If formaldehyde were wrongly in the list, he said, the community had been losing, assuming importation to be about 1,800 tons, something like £20,000 per annum. It was clearly against the interests of the manufacturers to move in the matter at all, but counsel suggested that no blame could be attached to the importers for not actually bringing this case on. The fault lay in having the article in the list, if it were wrognly included. The importers could not be blamed for not rushing immediately into this enormous expense before they could see what they had to meet.

The Referee said that when he had raised this matter he was thinking not so much of this particular case as of the 350 or so articles in respect of which complaints had been made but no step had been taken. He was not suggesting ill faith anywhere, but they saw where it led; people might give notice of objection to hundreds of these things, but would not proceed, so that rival manufacturers would hesitate to manufacture these substances because in the end they might be taken out of the list. He considered that the position ought to be made clear.

Mr. Swan agreed that it was in the public interest that these cases should be brought on as rapidly as possible, but it could not be expected that an individual importer would incur this huge expense hurriedly. The Referee said there was no need to incur this large expense. The parties might easily come themselves (without counsel), and they should stick to the chemical under discussion. Mr. Swan asked whether the Board of Trade would instruct counsel in that case. The Referee replied that they would not; they had always said they would not. Mr. Ronca (Board of Trade) confirmed this. Mr. Swan pointed out that the Referee could not prevent the opponents from instructing counsel. The Referee said he thought he could, but he was not quite sure; he doubted very much whether opponents would get permission to be represented by counsel if the complainants and the Board of Trade were not instructing counsel.

Summing-up by Mr. Swan.

Mr. Swan then dealt with the question of synthesis in connection with formaldehyde. Sir Arthur Colefax had based his arguments upon grounds which were entirely different from those which Dr. Ormandy had adopted. There were the two divergent views, and they were to some extent contradictory. Sir Arthur Colefax's argument was that, because formaldehyde was a derivative of a body which could be synthesised, it was, therefore, a synthetic organic chemical. Dr. Ormandy had said that formaldehyde was a synthetic body, because the oxidation of the methyl alcohol was a synthetic reaction; that transition from methyl alcohol to formaldehyde, *per se,* was a synthetic reaction, and it was that which made formaldehyde a synthetic chemical.

The Referee said that Dr. Ormandy did not mean that the step from methyl alcohol to formaldehyde was synthetic, unless the raw material could be synthesised. Mr. Swan maintained that Dr. Ormandy was in direct conflict with Sir Arthur Colefax, and referred to the questions he himself had put to Dr. Ormandy in cross-examination

After some argument and denial on the part of the other side, Mr. Swan said the point he wanted to make out was that Sir Arthur's argument was based upon the statement that because it was a derivative of a body which could be synthesised, *ergo* it was a synthetic chemical. Dr. Ormandy, on the other hand, had based his view on the contention that the oxidation step was synthetic. This view, if accepted, would involve a recantation of the referee's decision in the camphor case, in which this question of degradation or decomposition was dealt with. His (Mr. Swan's) case was based upon Thorpe's definition and upon Richter's definition; he submitted that the two were absolutely consistent, and he had no qualification or alteration to suggest.

The Referee said that if the step from methyl alcohol to formaldehyde was not synthetic, and if they were using methyl alcohol which everybody agreed had not been obtained synthetically, he could not quite see how the formaldehyde could be synthetic in that case; yet, if Richter's definition were grammatically interpreted, it was. Mr. Swan said the confusion was due to the contention that because a thing could be synthesised it was necessarily a synthetic product. Sir Arthur had said that the method of production did not affect the question, and that was the root of his case. In the camphor case, for instance, it was held that because camphor could be synthesised it was synthetic. To say that because a chemical had been synthesised, or could be synthesised, that chemical was synthetic whether actually synthesised or not, involved them in the most utter contradiction. The Referee, after further discussion, said he understood Mr. Swan's case was that if the final step were a synthetic step, then formaldehyde was a synthetic body, whether synthetic methyl alcohol had been used or not. Mr. Swan agreed, and said that that was why he attached so much importance to Dr. Ormandy's evidence.

Another consideration which supported his view was that in the only two cases before the Referee in which synthesis had been considered, namely, the camphor and oxalic acid cases, the referee had considered the *de facto* method of production. In the camphor case each step was examined categorically to see whether it was in fact a synthetic step, and the conclusion come to was that, because there was a leap in the dark at one portion, there was no *de facto* synthesis. In the oxalic acid case, although he (Mr. Swan) had pressed the view that there was a leap in the dark there also, the referee had not accepted it, and had held that there was a *de facto* synthesis. He submitted that the referee could not come to any other conclusion than that formaldehyde made from methyl alcohol was not synthetic, unless Dr. Ormandy's view, that the oxidation process was a synthetic step, *per se,* were adopted. If Dr. Ormandy were right, then he (Mr. Swan) failed absolutely; but he submitted, with great confidence, that the referee must come to the conclusion that he was wrong.

The Referee, referring to his decision in the camphor case as to the meaning of "synthesis," said that one got into a great deal of difficulty in these cases. There was a restricted view and also a wider view. He would not be obstinate and adhere to a view in one case which had been accepted in another if he thought it should be reconsidered; he could only decide these things on the evidence.

Finally, Mr. Swan said that where they had a breaking down referred to in Richter as a synthesis, they would find that it was, in every instance, the last stage of a synthetic operation, and Mr. Parry had admitted that, where they had such breaking down as the last stage, it did not prevent a product being synthetic if there had been an aggregation of synthetic steps.

Should the Referee Concern Himself with Academic or Manufacturing Points?

On the fine chemical point Mr. Swan said he had a very definite submission to make. It was that the Act was intended to put a tax only upon what the trade regarded as fine chemicals, and, in appointing a referee instead of a body of expert chemists to adjudicate on questions in doubt, the Legislature had contemplated that the question involved was not really a chemical question. If there were no trade usage to show how a chemical was regarded, the referee was not asked to go further and classify that chemical, because that involved going into a maze of intricate chemical questions, and no one but a panel of chemists could decide it. Mr. Swan submitted he had established a very strong case that formaldehyde had never been treated by the trade as a fine chemical. The Referee said that the more one knew of the trade the more one saw how little the trade had used this expression "fine."

Mr. Trevor Watson pointed out that the Act did not say whether the referee was to be a barrister, a chemist, or anything else. The Referee said that if the Act had stated that the referee must know nothing about chemistry he would appreciate the point. He also asked what would be the position if he thought it ought to be classified as a fine chemical; and that, had the trade understood all about it, they would have classified it as a fine chemical. Mr. Swan suggested that the referee should never get into that frame of mind, because it was inferential, and was, therefore, irrelevant.

The Referee said he had never been so impressed as he had been in this case with the feeling that the people who decided upon trade usage knew very little about the chemical as to whether it was heavy or fine. They had no

idea how it was made, and yet they were the people who determined the classification. He had never felt so impressed with the feeling that it ought to be regarded as a fine chemical, and those who had said it was not were all wrong. Mr. Swan pointed out that in the tartaric-acid case the importers had got the manufacturers over from abroad in order to show how simple the manufacture was. In this case, however, his clients had not been able to go to that expense, and the referee had had an *ex parte* view as to the method of manufacture. He thought that probably that would account for the state of mind in which the referee found himself when he said he felt it ought to be classified as a fine chemical. If, on trade evidence, it was established that it was not considered a fine chemical, then it should go out of the list. The Referee considered that Mr. Swan's negative proposition was perfectly sound.

Mr. Swan said that there were three publications in which formaldehyde was referred to as definitely heavy; there were others in which it was distinguished from fine chemicals; there were others in which formaldehyde was included under the heading of "general," "technical," or "industrial," where these were distinguished from "pharmaceutical"; and there were still other publications in which formaldehyde was classified with other chemicals wholly or substantially heavy. That was a substantial body of trade evidence. All the direct trade evidence given pointed to formaldehyde not being treated as a fine chemical. On the question of the supervision required, Mr. Swan said that the evidence given on this had all the vice of *ex parte* evidence, because it was taken *in camera*, and was uncriticised by his experts. He contended that the object of the supervision was to get maximum yield, to avoid waste, and to extract every ounce possible from the raw material, in order to make the process as great a commercial success as possible. Dr. Ormandy had spoken of the superiority of the process of the opponents as compared with the German on the question of yield; but, obviously, that gave no indication as to the fineness of the product. The final point was with regard to the use of formaldehyde as an analytical reagent. It was open to the opponents, said Mr. Swan, to call upon the whole of the analytical chemists in London, but they had not called one solitary analytical chemist to say that formaldehyde was an analytical reagent. Mr. Parry, in his vast experience, had never used it, and, therefore, the evidence that it was not an analytical reagent was overwhelming.

Conclusion of the Hearing.

This concluded the hearing, and the referee's decision will be announced in due course.

CHEMISTRY IN THE IRISH FREE STATE.

PROPOSAL TO FORM SEPARATE INSTITUTE.

A SPECIAL general meeting of the Irish Section of the Institute of Chemistry was held at Trinity College, Dublin, on June 1, to discuss the future status of the profession of chemistry in the Irish Free State, Professor W. E. Adeney in the chair.

According to the account of the proceedings in the *Journal* of the Institute, the Hon. Secretary (Dr. A. G. G. Leonard) said it had been suggested to inaugurate a new Institute for Ireland, controlled by a chemical council. Regulations for admission to membership of the new institute had been drafted. President Cosgrave had received a deputation, which had presented a scheme for the organisation, control, and registration of professional chemists in Ireland, suggesting that responsible chemists in the public service and all chemists who desired to give evidence in Courts of Law should be registered by the proposed Irish Chemical Council. The President had received the deputation sympathetically, requesting them to meet him again at a later date, when other members of the Cabinet could be present.

The chief advantages of the new Institute would be—The inclusion of all Irish chemists; the exclusion—with Government authority—of unqualified persons from public appointments; ease of access to the Government, which was sympathetic towards the formation of the organisation; and the provision of an advisory body in connection with Government scientific services.

The following resolution, proposed by Mr. Fagan, and seconded by Prof. Caldwell, was carried unanimously:—

The British Institute to Continue to Function.

"This meeting of the Local Section of the Institute of Chemistry of Great Britain and Ireland approves of the formation of an Irish Institute of Chemistry on the plan put forward in the circular issued by the Committee of Irish Chemists, and it also considers that the Local Section of the Institute of Chemistry of Great Britain and Ireland should continue to function."

Mr. Marlow, the Assistant Secretary of the Institute, said the regulations which had been drawn up seemed, on paper, to be very comparable with those of the Institute of Chemistry of Great Britain and Ireland. In some respects they appeared to be more exacting: he had noted the proposed compulsorily registration of students, and thought that this course was desirable in order that they might build up, during student days, a proper professional *esprit de corps*. In only one respect were the proposed regulations definitely of a lower standard than those of the Institute, and that was in the qualifications proposed for public analysts. It would be possible for an Irish chemist to get the necessary qualification one year after becoming a member of the Irish Institute. The only reference to the Institute in the documents relating to the proposed Irish Institute was the proposal that one representative of the Irish Free State Section should serve on the Chemical Council. He felt that this was an unduly small representation of a body which contained the great majority of qualified chemists in Ireland. He feared that they had been forced to attempt to set up national frontiers in chemistry. He noticed, however, that in their regulations they were including Queen's University, Belfast, and he presumed, therefore, that they had some hope that the present situation between the two parts of Ireland would not affect the practice of chemistry. He trusted, therefore, that they would maintain their standard of qualifications at the high level at which it stood on paper, so that when the present political difficulties had been overcome, and when, as he hoped, Ireland and the other constituent States of the British Empire were completely in amity, it would be possible to say that the Irish Institute was merely a temporary expedient to overcome those difficulties, and that by reason of the maintenance of their standards of qualifications, the two bodies might be fused again into one whole.

THE MONTH IN ENGINEERING.

(Specially Contributed.)

Steam Generation at 3,000lb. Pressure.—The news published this last week or so in the American and British engineering press that a tube boiler is now being constructed at Rugby (Great Britain) to work at over 3,000lb. pressure, is of great interest to chemical engineers, if only because it represents the first attempt actually to work at the critical point of steam and water. As is well known, the latent heat of steam diminishes as the pressure rises. Thus at ordinary atmospheric pressure (14.7lb.) the latent heat of 1lb. of water is 970 B.Th.U., at 50lb. 938.6, at 100lb. 886.7, at 150lb. 869.9, and at 200lb. 848.7. When, however, we begin to approach very high pressures the latent heat falls rapidly, being, for example, 644 B.Th.U. at 1,058lb., and 470 at 2,015lb. If now we continue to heat the water, irrespective of the pressure necessary to prevent it being converted into steam, when the temperature of the water reaches 706° F. and the volume is about three times that at 60° F. (the corresponding pressure necessary being 3,200lb.), the whole mass of the water is suddenly converted into steam at the same volume. That is to say, 706° F. and 3,200lb. pressure is the critical point of steam and water. The exact figures are not yet known, but the above are approximately correct. At this critical point, of course, the latent heat as a factor in the conversion of water to steam will entirely disappear. It must be confessed that the usual explanations of the liquid and the gaseous states are not very lucid, and this question of working at 3,200lb. pressure would seem to be rather a knotty one from the theoretical point of view. The general idea is that a liquid such as water consists of molecules sufficiently close together to exert an influence one upon another great enough to retain the liquid condition, whereas if the molecules are pushed sufficiently far apart they lose this cohesive action and form a huge volume of gas, that is steam.

This extraordinarily fascinating work is being undertaken by Messrs. The Benson Engineering Company, of London, at the Rugby Works of Messrs. The English Electric Company Limited, Messrs. Benson being responsible for the boiler, and Messrs. The English Electric Company for the turbine, which is to work at 1,500lb. steam pressure and 25,000revs. per minute, the combined installation being 1,000kw. The boiler consists essentially of a series of steel tubes, into which the water is forced by hydraulic pumps, and which is heated by means of an oil blast, using superheated air for the combustion. In this way, judging from the laboratory experiments, when the water has traversed approximately 90 per cent. of the length of the coils, it will have been converted at the critical point, and without any absorption of latent heat, into steam. It will then be reduced to 1,500lb. pressure and passed through a second series of coils which act as a superheater and raise the temperature of the steam to about 780° F. It will then be passed into the turbine at this pressure and exhausted again from the turbine at 200lb. pressure before finally passing into the ordinary condensing turbine. It is, of course, only possible to work at pressures like 1,500lb. and over with a boiler in the form of a tube, and the advantage of the Benson method of working at the critical point, and then reducing the pressure, is that the whole of the water can be converted into steam without difficulty, whereas in the ordinary way the formation of steam is violent and spasmodic in the tube, so that such heavy priming results that the method is ordinarily impossible from the practical point of view.

Another Lead-bath Low-temperature-carbonisation Process.—A short time ago there was given in the columns of this paper a description of a lead-bath process for the low-temperature carbonisation of coal, the invention of Mr. J. S. Morgan. Particulars have now just been published of another process in the United States, also using a lead-bath, which has been devised by Messrs. V. Z. Caracristi and Emil Piron. The object of using a lead-bath is to improve the conduction of the heat from the heating medium to the coal, which itself is an extremely bad conductor. In connection with the Caracristi process we understand that a plant has been constructed at Huntingdon, W. Va., U.S.A., which is really a large-scale experimental unit, having a daily capacity of 25 tons, the research work on this plant and in the laboratory extending over the past two years. The firm of Messrs. Henry Ford are strongly interested in the process, and they intend eventually to build a very large low-temperature-carbonisation plant at their River Rouge establishment, Detroit, which will carbonise 4,000 tons of raw coal per day. The intention is to burn the residual low-temperature fuel in the pulverised condition under huge water-tube boilers, which are at present being worked with pulverised raw coal, in conjunction with blast-furnace gas.

The Caracristi process for large-scale working consists essentially of horizontally firebrick retorts, 44ft.—52ft. long, having two horizontal arch chambers 14ft. wide and 6ft 5in. in height, provided with curtain walls at each side to separate the heating and exhaust chambers from the carbonising space. These heating and exhaust chambers are connected by cast-iron **U**-shaped flues in twin form, the lower section of the flues being provided with a bath of molten lead, and having combustion chambers for gaseous firing under the lead-baths, so as to keep the metal in a molten condition. Each of these chambers has a conveyor system made up of three strands of cast-iron plates 3ft. wide and 18in. pitch, held together by steel hinge-pins, being 1in. thick, with flanged ends, with the hinge joints overlapping, so that no cracks can be forced, these flat conveyors riding on the surface of the molten lead. The raw coal is roughly pulverised, and travels through the heating chamber as a thin layer ½in. thick on the lower plates, the actual temperature of carbonisation being just over 1,000° F., the lead being 1,200° F., whilst an elaborate installation of by-product recovery plant and regenerators will also be included.

It is stated that this carbonisation temperature of 1,000—1,200° F. is the most suitable for the plant from the point of view of efficient heat transfer. The remarkable claim is made that carbonisation can actually be completed in five minutes only, so that the plant is of very high productive capacity, the failure in regard to which hitherto has been one of the chief drawbacks of any process of low-temperature carbonisation. The fact that the firm of Henry Ford is associated with the enterprise is sufficient guarantee of its possibilities, although one would think that to keep very large baths or troughs of lead in a molten condition at 1,200° F., presumably for weeks on end, would give much trouble with molten slag on the surface of the lead due to oxidation, and perhaps, also, to organic lead compounds.

The Deterioration of Blast-furnace Linings.—A very important paper has just been read before the American Iron and Steel Institute by Messrs. C. E. Nesbitt and M. L. Bell on "The Disintegration of Firebrick Linings in Iron Blast Furnaces," giving the results of a detailed investigation that the authors have made on this baffling problem. In general the authors are of the opinion that whilst there can be stated to be no very definite position in the blast furnace where deterioration is the greatest, it would appear to be, perhaps, the most marked about 40ft. or 50ft. from the top of the furnace, whilst they also consider that the deterioration of firebrick linings to-day is more severe than it was 15 to 20 years ago. The opinion is expressed that the chief factor in the disintegration of firebricks is the deposition of free carbon within the material of the bricks, and this would seem to be due to the fact that when the bricks contain free or loosely-combined ferric oxides, comparatively large quantities of carbon are deposited, when carbon monoxide is passed over them at a certain range of temperature. The finely-divided carbon deposited in this way exerts a powerful disruptive action and fractures the material readily. The authors have proved experimentally that if carbon monoxide is passed over ferric oxide heated in a glass test tube, free carbon is deposited commencing at a temperature of about 570° F. (300° C.), and the rate increases up to 930° F. (500° C.), when it diminishes, and the action seems to cease at about 975° F. (525° C.). It is possible in the course of 10 hours to have deposited on the top of the ferric oxide no less than 70 times its volume of free carbon, and in this remarkable reaction the ferric oxide appears to be reduced either to a lower oxide or a spongy metallic iron. One or other of these reduced compounds acts as a catalytic agent, breaking up the carbon monoxide bodily into carbon dioxide and carbon, so that the carbon monoxide does not appear to act chemically in the ordinary way.

This would seem to foreshadow some important alterations in the manufacture of firebricks for special purposes, such as the lining of furnaces. The authors recommend that the bricks must be entirely free from uncombined iron oxide, and such bricks can only be manufactured from clay which is similarly free, a condition which can only be realised by weathering the clay in comparatively thin layers of not more than 2ft. thick for several months, so that the iron compounds in the clay will be completely oxidised and give a brown or yellow colour. The portions of the clay which are not coloured must then be converted into bricks.

The Trade Position.—The general position during the month has become decidedly worse, mainly owing to buyers now definitely holding off as far as they possibly can with the object of bringing down the price of both iron and steel. As a result, there has been a very slight drop in prices, but this is regarded by the buyers as nothing like sufficient. The position is becoming decidedly serious. The coke position is somewhat easier, but it is stated that any further substantial reduction in price is impossible with existing working expenses, and there is even talk of shutting down a number of blast furnaces, as stocks are beginning to increase. In almost every engineering centre the same story of a gradual slackening up and disinclination to book orders for the future is told, whilst even the shipments of textile machinery to India and the Far East have diminished. Shipbuilding is particularly badly placed. The sections of engineering dealing with locomotives and colliery material are quite busy, whilst the electrical industries are also fairly good. The colliery industry, also, is beginning to share the general depression. At present the position is quite satisfactory in that the output of the mines is being sold, and congestion at the docks is being relieved by the method of working in three shifts. The position as regards future orders, however, is not quite so cheerful, and there is a tendency in France, Italy, Holland, and Scandinavia to avoid buying as much as possible, in the hope of reducing prices. In May the export figure reached 7,684,405 tons, which is a record for Great Britain, but it seems to be the general opinion that the boom due to the Ruhr difficulties is definitely coming to an end.

NOTES ON THE ITALIAN CHEMICAL INDUSTRY.

(From Our Own Correspondent.)

National Congress of Chemistry.—The first national congress of pure and applied chemistry was held in Rome from June 3 to June 7. Amongst the subjects discussed were the questioins of the national fuel, the necessity of rendering compulsory the debenzolisation of coal gas, the bituminous schists of Ragusa, a new method for the valuation of fertiliser materials, phosphoro-manganese as a fertiliser, and the production of potash from leucite.

Italian Asphaltic Minerals.—Considerable attention is now being paid to the question of the utilisation of the asphaltic rocks of Italy. These rocks, which contain large amounts of bitumen, occur in the province of Syracuse, where workable deposits estimated at 320,000,000 tons exist. Plant now working and in course of erection will ensure an annual production of 50,000 tons of crude oil from the distillation of 1,000,000 tons of shale. The oil, which is obtained by a simple method of distillation, is used directly as a fuel for Diesel engines and as an illuminant for flare lamps.

Revision of the Customs Tariff.—There is every probability that considerable alterations will be made in the Italian import tariff in the near future. A commission representing Italian industrial and agricultural interests has been negotiating at length with a Governmental Sub-Committee, and agreement has been reached on most of the points in dispute. About 600 clauses will be deleted from the import tariff, although the objection has been raised that this would diminish the value of Italo-French and Italo-Swiss commercial treaties, and also the "most favoured nation" clauses. So far as chemicals are concerned the import duty on copper and copper compounds will probably be abolished entirely. It is proposed to reduce the import duty coefficients of crude glycerine from 8 to 5, and on refined glycerine from 10 to 8. The co-efficient on nitrobenzol, aniline, crude toluidine, aniline hydrochloride, and other aniline salts is to be increased from 0.5 to 1.0. The Italian Government will reserve to itself wide discretionary powers in modifying the tariff from time to time, but the general effect will be to ease matters decidedly for importers into Italy.

Company News.—At a recent meeting of the Società Italiana della Celluloide, of Castiglione Olona, the increase of the capital from five to ten million lire was discussed. The Società Italiana del Fosforo, of Milan, is to increase its capital from 300,000 to 1,800,000 lire. The Società Anonima Chimica Lombarda A. E. Bianchi e C., of Rio, near Milan, is considering the reduction of its capital from 12,000,000 to 9,600,000 lire. At Lodi the firm of Anonima Lavorazione Catrame e Sottoprodotti e Prodotti Chimici was founded with a capital of 350,000 lire. The Società Anonima Italiana Silicati was formed at Naples with a capital of 60,000 lire, for the manufacture of the silicates of soda and potash from the siliceous sands in possession of this firm, by means of a patented process of Dr. Reggianini. At a meeting of the mercury firm "Monte Amiata" Società Anonima Mineraria, that has its headquarters in Abbadia S. Salvatore, it was announced that during the past financial year a net profit of 1,531,510 lire was made, and a dividend of 5 lire per share of 50 lire will be paid. At Taranto the Società Tarantina Ossigeno Ing. Graramo e C., with a capital of 440,000 lire, was formed for the production, application, and utilisation of oxygen. The Società Anonima Consorzio Romagnolo per l'Industria Tartarica, of Ravenna, closed its balance at the end of 1922 with a loss of 394,650 lire. The year's working of the Società Italiana del Radium, of Rome, in 1922, showed a net profit of 35,974 lire on a capital of 600,000 lire, enabling a dividend of 5 per cent. to be paid. With a capital of 500,000 lire there was established at Milan the firm of Fabbrica Prodotti Chimici Dott. Oscar Tobler, for producing special chemicals. At Milan the firm Società per l'Esercizio Impianti Chimici, with a capital of 300,000 lire, was founded for the manufacture of chemical plants. At Milan the Società Italiana Commercio Internazionale Solfati, with a capital of 4,000,000 lire, has been formed for trade in chemicals and non-ferrous minerals.

Italian Overseas Chemical Trade.—During the first quarter of this year Italy imported inorganic chemicals to the value of 25,813,362 lire, fertilisers valued at 36,887,066 lire, organic chemicals at 8,974,703 lire, and mineral oils, resins and gums at 156,409,669 lire; exporting inorganic chemicals to the value of 12,473,914 lire, fertilisers valued at 723,268 lire, organic chemicals at 26,873,577 lire, and mineral oils, resins and gums at 1,428,572 lire. During 1922 Italy imported 555,536 tons of mineral phosphates, against 567,543 tons in 1921; 56,371 kilos of essential oils and essences, against 83,489 kilos in 1921; 5,814 tons of acids, against 9,160 tons in 1921; 3,750 tons of oxides, against 1,906 tons in 1921; 106,067 tons of fertilisers, against 68,025 tons in 1921; and 27,999 tons of fats, against 16,422 tons in 1921. Other imports during 1922 were as follows: Ammonia 1,703 tons, caustic potash 683 tons, nitric acid 1,458 tons, bicarbonate of soda 2,074 tons, chloride of ammonia 609 tons, bleaching powder 846 tons, calcium chloride 955 tons, nitrate of potash 1,369 tons, aluminium sulphate 1,796 tons, sulphate of barium 946 tons, sulphate of copper 3,949 tons, sulphate of soda 12,328 tons, sulphate of soda and potassium 2,218 tons, silicate of soda 5,017 tons, refined glycerine 248 tons, and pyrolignite of lime 2,018 tons.

General Notes.—Professor Fachini has presented to the Oils and Fats Bureau, at Milan, a valuable memorandum on the present state of the soap and glycerine industries. Included in this report is a new method for the analysis of glycerine, which is claimed to be both rapid and accurate. The professor has continued his work on the elaboration of methods for the differentiation between glycerine of animal and vegetable origin, a point shown to be of distinct importance during the war as affecting the stability of nitro-glycerine explosives.

The Italian Ministry for War has established a chemical military service to investigate experimentally and practically the physiological effects of the various chemical warfare materials. So far as known at present, no centralised body has been formed, but the decree authorising the formation of the branch has been submitted to all the chemical manufacturing firms in Italy.

The Fauser process for the synthesis of ammonia as worked at the Società Elettrochimica Novarese at Novara (see *Chemical Trade Journal and Chemical Engineer*, May 25, page 631) is proving very successful, and negotiations are being carried on with a view to exploiting the process at other plants. The Società Italiana Prodotti Azotati has already sold this year 289,598 quintals of nitrogenous fertilisers. In 1922 Italy consumed 334,220 quintals of cyanide, as against 160,000 quintals in 1921. The maximum pre-war annual consumption was only 280,000 quintals. Sales of sulphur during June were the largest this year, important contracts having been signed at Paris by the representatives of the Consorzio Zolfifero and important English firms.

INDIAN OILSEEDS CROP.

INCREASED YIELDS ANTICIPATED.

According to the forecast issued by the Department of Commercial Intelligence in India, the estimated figures are based upon reports received from provinces which contain 98.7 per cent. of the total area under rape and mustard, and 99.2 per cent. of the total linseed area in British India. Of the Indian States, estimates are furnished by Hyderabad, Baroda, the States in the Bombay Presidency, six Feudatory States in the Central Provinces, and the States of Alwar and Kotah in Rajputana. The condition of the crops is reported to be generally good, except in Bengal, where the plants were adversely affected through continued absence of rain.

The total area under rape and mustard amounts to 6,213,000 acres, which is 2 per cent. below the finally revised area of last year. The total estimated yield is 1,213,000 tons, as against 1,167,000 tons, the revised final figure of last year, or an increase of 4 per cent. In addition to the areas for which particulars are given above, rape and mustard are grown in certain other tracts in British India, and the average area so grown for the last five years has been some 79,000 acres, with an estimated yield of 15,000 tons.

The total area under linseed is returned at 3,358,000 acres, which is 11 per cent. above the area of last year. The total estimated yield is 532,000 tons, as against 436,000 tons last year, or an increase of 22 per cent. In addition to the areas for which particulars are given above, linseed is grown in certain other tracts in British India, and the average area so grown for the last five years amounts to about 24,000 acres, with an estimated yield of 4,000 tons.

BRUNNER, MOND & COMPANY.

JUBILEE CELEBRATION DINNER.

MR. ROSCOE BRUNNER presided at a dinner at the King Edward VII. rooms, Hotel Victoria, London, on Friday last, attended by over 200 guests, and given by the chairman and directors of Brunner, Mond and Co., Ltd., to celebrate the fiftieth anniversary of the founding of the Winnington Works.

Brigadier-General Sir William Alexander, proposing the toast of "Brunner, Mond and Co., Limited," said that looking back on the history of fifty years, whose culmination they were celebrating, they recognised a great record of splendid achievement and worldwide usefulness. They were celebrating the jubilee of the most successful industry of its kind. What were the landmarks in that pilgrimage of success? The success of Brunner Mond's had been the result of the marriage of brains with hard work. It was in 1873 that Ludwig Mond and John Brunner built the first plant at Winnington, faced considerable difficulties at first with courage, and finally solved them. The most eloquent tribute was the existence of the most important ammonia soda works in the world. The founders had had worthy successors. Mr. Roscoe Brunner, the bearer of a famous name, was a live wire, and was upholding the traditions of courage and service. Was it any wonder that the output of the works in 1881 was multiplied by twenty-eight times in 1922?

Mr. Roscoe Brunner, in reply, said that regrets at inability to attend had been received from the President of the Board of Trade, the Minister of Labour, and Mr. J. M. Beck (the United States Solictor-General). They were proud of their founders and their success, but prouder of the founders' principles and prouder still, perhaps, of this—there have never been Brunner men and Mond men. All who have worked for the firm have been Brunner-Mond men, and continued to be so. Nearly 20 per cent. of their present workers had been with them for over twenty-five years. He claimed that as an illustration of their team work.

Brunner-Mond's had always been a great family, and that was one of the key reasons of its success. That spirit had been maintained, and all who had been engaged in industry know how difficult it had become to maintain that relationship compared with the days when most of the men were known by their Christian names. They had endeavoured by the works council to keep in touch and harmony with those who represented the men. They were not resting on their oars. Looking back to the past only stimulated them to greater endeavours.

The Endowment of Science and Research.

Sir John Brunner, who proposed "Science," recalled hearing his father say, "I owe everything to the application of science to industry." He thought the chemical industry should try to repay the debt it owed to science. It ought to foster research. The Government did very little, and for the time they had lost the help of the German scientific men. It was hard enough for them to live in Germany now without publishing their results. His company hoped to endow and foster research in this country.

Sir J. J. Thomson, whose name was coupled with the toast, replied. The toast of "The Guests" was submitted by Mr. G. W. Balfour, and responded to by Mr. Walter Leaf and the Vice-Chancellor of the University of Cambridge. "The Chairman" was proposed by Sir Max Muspratt.

THE POSITION OF THE PUBLIC ANALYST.

REMUNERATION AND STATUS UNSATISFACTORY.

THE Council of the Institute of Chemistry and the Council of the Society of Public Analysts view with grave concern the attitude of the authorities towards the remuneration, conditions of service, and fixity of tenure of public analysts and official agricultural analysts. The Public Appointments Committee of the Institute have therefore prepared a statement on the conditions of appointment of public analysts, which is being printed and circulated among the public authorities concerned with the administration of the Sale of Food and Drugs Act. This statement, which is also reprinted in the June issue of the *Journal and Proceedings of the Institute*, is rather lengthy, but the whole position as stated by the Institute is summarised as follows:—

The duties of the public analyst are daily increasing in complexity and in difficulty. Higher qualifications than formerly are required of him, not only owing to the general advance in science as applied to the analysis of food and drugs, but also by the exacting character of the numerous regulations of the Government Departments concerned. In 1919, following upon insistent representations to public authorities administering the Acts, the remuneration of public analysts, which had hitherto been totally inadequate, was, in the majority of cases, improved. Unfortunately, however, even this improved remuneration was insufficient having regard to the greatly increased working costs.

The position is becoming still more unsatisfactory owing to a tendency on the part of local authorities, especially in the cases of new appointments, to revert to the pre-war scale of remuneration. Further, the tenure of office of public analysts is insecure; the relative official position of the public analyst to other officers is sometimes not clearly defined or understood by local authorities, and, except in isolated cases, no provision is made for the inclusion of public analysts in any superannuation scheme. The Council of the Institute of Chemistry and the Council of the Society of Public Analysts are of opinion that, unless the conditions attached to the appointments of public analysts are improved, they will cease to attract professional chemists of the proper type.

Scale of Remuneration Recommended.

They recommended that, in the case of public analysts other than those whose laboratories and staffs are provided by the authorities, whatever be the exact method of payment—by fee per sample or by a combination of salary and fee—the remuneration should be at the rate of not less than £1 1s. per sample for the first 100 examined, and not less than 15s. for each sample beyond that number.

BRITISH CHEMICAL AND DYESTUFFS TRADERS' ASSOCIATION.

IN the bulletin dated June 30 it is stated that at the last meeting of the Executive Committee a further seven firms were elected members.

Reparations Dyestuffs.

In the past all reparation dyestuffs, upon importation, have been reserved for consumers for 14 days. This will be shortly modified, and the period allowed consumers will be reduced to 7 days from the time of arrival of each consignment. The discounts to purchasers of large quantities will continue as hitherto. The importation of dyestuffs from Germany as reparation will cease in December, 1924. America has ceased to take delivery of colours from Germany as reparation, and the quantity allowed this country has consequently increased.

The Safeguarding of Industries Act.

Several members of the B.C.D.T.A. complained recently that Customs have detained and sampled imports of chemicals that are in no way connected with the Safeguarding of Industries Act, and have held them pending result of analysis. This has often meant five or six days delay. In many of these instances the goods have been in barges and importers have thus suffered financially through Customs action. This question is being taken up with the authorities. In almost every case the B.C.D.T.A. can secure the immediate release of the goods, and thus save members from incurring charges in respect of demurrage on barges, etc.

Trade with Occupied Germany.

Some few weeks ago notices were issued advising British importers they could obtain delivery of all goods from the Occupied Territories ordered before February 20 last. The German exporter had to get a licence from, and pay a duty to, *his* Government, and the British importer had to get a licence from, and pay a tax to, the Franco-Belgian authorities. When these regulations were complied with, it was understood that there would be no difficulty in getting such goods through. Unfortunately, in the numerous instances in which members have applied for Franco-Belgian licences and signified their willingness to pay tax, it has been found that in practice the facilities mentioned above were not worth the paper they were printed on. Some firms have gone to the length of sending representatives over to endeavour to obtain release of their goods, but after some weeks, they have met with very little success. They express the opinion that until a settlement of the reparations question is made there is little or no hope of carrying on business, either export or import, with Germany (Occupied Territories).

LEGAL INTELLIGENCE.

MANUFACTURING CHEMISTS' FAILURE.

Preston, Hull and Co., Ltd.

Under a winding-up order dated January 16 last, the statutory meetings of the creditors and of the shareholders were held on June 29. The Official Receiver, who presided, said the company was registered on January 14, 1920, with a nominal capital of £12,500., and was promoted by Colvin Percy Preston to acquire as a going concern the business of manufacturing druggists and chemists which he and his wife had carried on at 112, High Holborn. Mr. Preston was appointed managing director at a remuneration of £350. per annum, in addition to which he received an allowance in respect of expenses and 7½ per cent. of the net profits of the company. Towards the end of the year the company opened branches in Manchester, Newcastle, and Birmingham, but these did not appear to have been a success and about the middle of 1922 they were closed. The trading account for the year ending December 31, 1920, disclosed a gross profit of £7,753., but a net loss of £764., the sales for the year amounting to £11,768. The profit and loss account included £1,978. for advertising. During the ensuing twelve months the gross profits fell to £3,897., while there was net loss on the trading of £7,795., the profit and loss account including salaries, £4,460. No further accounts were prepared. The statement of the company's affairs filed in the liquidation disclosed £7,444. due to 64 unsecured creditors, as against which the assets were valued at £378., which mostly consisted of book debts.

As a result of the meetings the liquidation remained in the hands of the Official Receiver.

FAILURE THROUGH LABOUR TROUBLES.

Insulators, Ltd.

On Wednesday, July 4, the statutory meetings of creditors and contributories were held in the liquidation *re* Insulators, Ltd., Bidder Street, Canning Town. Mr. E. T. A. Phillips, Official Receiver, presided. The statement of affairs showed unsecured liabilities £21,523. and assets £877., and the total deficiency as regards contributories amounted to £102,186. The Chairman said the company was promoted in September, 1919, with a nominal capital of £75,000., subsequently increased to £150,000., to carry on business as manufacturers of and dealers in insulating materials for cold storage, and to deal in and instal apparatus for cold storage premises and chambers. The promoter, in the course of his research work discovered a new chemical composition which he named "Insulite" and which he claimed to be wear, fire, water, and vermin proof, and to be suitable for use as a covering for the decks of ships, and as a floor covering where protection from heavy traffic was required. The company acquired the secret process, the freehold factory at Canning Town, stock, plant, and trade named for £53,500., which was paid as to £15,000. in cash and the balance in shares. Owing to labour troubles and depression in shipbuilding, the trading was carried on at a loss. The liquidation remains in the hands of the Official Receiver.

BREACH OF A SOAP CONTRACT.

J. Strother and Co. *v.* H. T. Manning and Co.

In the Mayor's and City of London Court, on Friday, June 29, before Judge Shewell Cooper, Mr. Joseph Strother, trading as J. Strother and Co., Peninsular House, claimed £29. 6s. 10d. against Messrs. H. T. Manning and Co., import and export merchants, 133, Fenchurch Street, E.C., damages for breach of contract to deliver 100 gross of small toilet soap at 5s. per gross as sample. Plaintiff said the soap was wet and dirty, very old and of poor quality and not properly packed, and in many instances crumbled and commercially valueless. Defendants took up the view that they could not accept any responsibility for the soap after it left the warehouse, and that the damage must have been done in transit. The transit was only to Woking, and being summer weather in May it could not have got damaged in four days between the despatch and the complaint.

The defendant, Mr. Manning, said he purchased a thousand gross of the soap in question in November last, and it came from the Continent, he believed, where it was manufactured. He bought it from a London merchant. The soap was not in the condition presented by the samples now shown to the Court, when it was sent out from his warehouse. It was then approximately clean, and in about the same condition as the sample boxes which were shown to the plaintiff at the time of the sale. Apparently the soap had received some extraordinary treatment after it had left his warehouse.

Judgment was given for the plaintiff for the amount claimed with costs.

ACTION AGAINST A CHEMICAL COMPANY.

Turner Drug and Galenical Co., Ltd.

In the Chancery Division on Tuesday, Mr. Justice Russell was asked to make a declaration for judgment in default of defence in the debenture holders action of Fogden v. Turner Drug and Galenical Co., Ltd., of Ilford. Plaintiffs claimed to be entitled to a charge on the company's property, and asked for an account of what was due under debentures.

Counsel for plaintiff said the company was incorporated in 1920 with the object of carrying on business as manufacturing and analytical chemists. Plaintiffs were not only debenture holders, but also mortgagees of the freehold. The company had ceased to carry on business, and payment of the debentures therefore became due.

The company was not represented, and his Lordship made the declaration asked for.

THE STANDARDISATION OF DISINFECTANTS.

PROPOSALS OF THE PHARMACEUTICAL SOCIETY.

An important matter to all users of disinfectants in large quantities was raised at a Council Meeting of the Pharmaceutical Society of Great Britain on Wednesday, July 4. Mr. E. T. Neathercoat (president) was in the chair.

Sir William S. Glyn-Jones, secretary and registrar of the society, reported that a sub-committee had considered at considerable length the subject of the fixation of standards of strength for lysol and chlorodyne. At present there was no standard whatever, and users were much troubled by the considerable variation of strength existent in the various fluids on the market. The Law Committee of the Society had also reported on the matter and agreed with the previous committee that the Ministry of Health should be approached as to the desirability of fixing standards of strength in regard to both lysol and chlorodyne.

Mr. Melhuish pointed out that there were two kinds of lysol on the market, and both differed very considerably in cresol content, and some law was very necessary on the subject. Mr. White took the view that lysol had many characteristics different from all other disinfectants, and that accordingly it would probably be more in their interest to press the Ministry of Health to create standards in this matter.

The President said the points raised had been very valuable ones, but in the meantime he proposed that the original recommendations of the two committees should be adhered to, and that action in regard to disinfectants in general should be deferred for the time being. This course was agreed to.

OUR BOOKSHELF.

Alcoholic Fermentation. Arthur Harden, Ph.D., D.Sc., F.R.S. London: Longmans, Green and Co.; 6s. 6d. net.

Considerable re-arrangement of subject matter and extension of bibliography is noticeable in the 3rd edition. The function of phosphates in fermentation—chemical changes in fermentation—inhibiting and accelerating agents—by-products, etc., form chapters of scientific and practical interest, the importance of which needs no emphasising.

Practical Bacteriology for Chemical Students. David Ellis. London: Longmans, Green and Co.; 4s. 6d. net.

There are many chemists in industry whose training has not called for or included bacteriological study, but who nevertheless would like to obtain a grasp of its general principles. It is a branch of science the application of which will continue to crop up more and more in all sorts of unlikely quarters, and we can do no better service to industrial chemists generally than to call their attention to a very practical little volume at a moderate price.

ITEMS OF INTEREST.

British Coal Output.—The output of coal for the week ended June 23 was 5,588,200 tons, compared with 5,651,100 tons in the preceding week, and 4,353,900 tons a year ago.

Smuggled Saccharine.—At Hull, Mirosslar Skrivanik, a Czech, was fined £1,609, being the single value and duty on 218lb. of saccharine which he was charged with concealing.

Institution of Gas Engineers.—The Institution of Gas Engineers, recently holding its annual conference at Belfast, announces the following elections to office for the ensuing year:—President, Mr. Samuel Tagg; vice-president, Mr. J. Ferguson-Bell; hon. secretary, Mr. W. E. Price.

Barrow Furnace Damped Down.—Owing to the falling-off in the demand for iron the Barrow Steel Company have put out of blast a furnace on the ironworks side of the establishment, leaving only two blowing. The output has been decreased at other works, and there is also less activity in the iron mines. Barrow steel mills remain employed.

Institute of Chemistry.—The Council propose to hold conferences from time to time in centres where sections of the Institute have been formed. The first conference will be held at Liverpool in October. The proceedings will occupy at least two days, and will include an open debate upon the affairs of the profession and of the Institute generally.

British Association.—Arrangements have been made to broadcast the presidential address of Sir Ernest Rutherford to the British Association in Liverpool on September 12. In addition to the sectional meetings, it is proposed to hold a series of citizens' lectures in Liverpool, Birkenhead, Warrington, Wigan, and Southport. It is anticipated that 3,000 to 5,000 people will visit Liverpool for the meeting.

Business Notices.—We understand that Dr. G. N. White has joined Messrs. Oscar Guttmann and Sons, consulting engineers and chemical advisors, of 7 and 8, Idol Lane, Eastcheap, London, E.C.—We are informed by Messrs. Thomas Broadbent and Sons, Ltd., of Central Ironworks, Huddersfield, that their works will be closed from 5 p.m., July 20, to 9 a.m., July 30, on account of the annual holidays.

Fire.—A serious fire occurred on Thursday of last week in the premises of Messrs. Pinkerton, Gibson and Co., wholesale druggists and manufacturing chemists, North East Thistle Street Lane, Edinburgh. After three hours' work the firemen got the outbreak under control. Considerable quantities of stores were destroyed, and much damage done to the floors and joisting, and also to the roof. The outer walls of the building, however, remain intact.

Institution of the Rubber Industry.—An appeal for funds is being made by the Institution of the Rubber Industry, with the object of placing the Institute upon a firm and permanent foundation. This, it is hoped, may be accomplished by attracting more members, and partly with this object in view, and also because the Executive believes in the desirability of fresh activities, it is proposed to extend the lectures, etc., arranged by the Institute and to found a technical entrance examination.

Home Grown Sugar.—Sir Ernest Jardine, Bart., presiding last week at the third annual meeting of Home-Grown Sugar, Ltd., expressed the hope of the board that the results of the coming season would enable the company to pay a dividend on the reduced capital next year for the first time without calling upon the guarantee of the Government. The directors' report and accounts were adopted, and the guaranteed dividend of 5 per cent. provided by the Government for the past year was declared.

The Separation of Isotopes.—Dr. F. W. Aston, who delivered a lecture on this subject before the annual meeting of the Society of Chemical Industry at Cambridge, said he could assure chemists that any separation of isotopes that could be done in the laboratory by any artificial means was so small that it need not change the chemical constants or equations of chemistry for many years to come. Also, there was no process in nature, apparently, which would separate isotopes, and though an enormous amount of labour had been spent on determining various elements from different sources, no change from the correct chemical atomic weight had been achieved. The only exception was lead, but in that case the lead was made by a radio-active process, and it was not in the same category as the other elements.

German Manufacturers in U.S.—It is reported that three German bankers have arrived in America, intending to manufacture soap and chemical products, using German chemists and processes.

Change of Address.—The Magnesium Co., Ltd., announce that as from June 30 the company's address will be 78, Hatton Garden, London, E.C. 1. Telephone No., Holborn 6830/8, and telegraphic address, "Ognesiuma, Smith, London."

Chilean Iodine Combine.—The Chilean Iodine Combine, which under its former organisation was to have terminated on March 31 last, has extended its time of existence as such to June 30. The proposed reforms in the statutes have now been drawn up and will be submitted to those interested in the industry. Under these new regulations, the old Iodine Combine will become the Association of Iodine Producers of Chile.

Mining Subsidence.—The Royal Commission on Mining Subsidence has decided to take evidence in public. Evidence will be invited, in the first place, from the Government Departments concerned as to the existing law and conditions with regard to matters covered by the inquiry. This evidence will be opened on October 16, and a further announcement regarding that meeting will be made in due course.

Tariff Notes.—As from June 4 last, sulphate of copper imported into Roumania is to be exempt from import commission tax.—The duty on tar imported into San Salvador has been reduced to 3 centavos (gold) per kilog. As from August 7, a duty of 5 per cent. is imposed on exported sugar when the declared value is 4 dollars and more per quintal of ·46kilogs.—The Swedish sugar import monopoly has been withdrawn from June 1. Sugar may now be imported without restriction.

Distinguishing Caffeine from Theobromine.—Caffeine may easily be distinguished from theobromine by means of the Nessler's reagent, states O. Frey (*Pharm. Monatshefte*, 1922, No. 6). The former gives a red colouration after about a minute. If the mixture be left to stand for an hour or so and then boiled for three minutes, a dull-red precipitate is obtained. Under similar treatment theobromine gives a pale-brown colouration. The presence of antipyrine vitiates the reaction.

Cape Explosives Debentures.—The Cape Explosives Works, Limited, 7½ per cent. debenture stock will be redeemed on January 1, 1924. The amount outstanding is about £1,000,00. sterling. The stock, offered at 93, is now quoted at 103, the redemption price fixed by the prospectus. The stock is not due for repayment till January, 1944, but the company is exercising its powers to redeem it on six months' notice. The existing security will be exchanged for new debenture stock, which will undoubtedly carry a lower rate of interest.

The Institute of Metals.—The annual autumn meeting will be held this year in Manchester on September 10—13. The meeting will open with the second annual autumn lecture, to be delivered by Lieut.-Col. Sir Henry Fowler, K.B.E., on "The Use of Non-Ferrous Metals in Engineering." The lecture will be a popular one, and is open to the public, tickets being obtainable from Mr. G. Shaw Scott, M.Sc., 36, Victoria Street, London, S.W. 1. The mornings of September 11 and 12 will be devoted to the reading and discussion of papers. Visits will be paid to several large works in the vicinity of Manchester. With the exception of the autumn lecture, the meetings are open only to members and students of the Institute.

British Laboratory Equipment.—The Council of the Institute of Chemistry have received from the Department of Scientific and Industrial Research a request to nominate three or four members to furnish information with regard to the quality and technical range of British production of optical glass and instruments, laboratory glass and porcelain, synthetic organic chemicals, analytical reagents, and other fine chemicals. The Department had already sought the opinions of a large number of professors of chemistry, physicists, and others, but, comments the *Journal* of the Institute, appeared to have addressed inquiries to very few practitioners in chemistry. The Council have forwarded the names of Mr. W. T. Burgess, Dr. J. T. Dunn, Dr. Bernard Dyer, Mr. E. W. Voelcker (hon. treasurer), together with that of Mr. H. W. Cremer, who is responsible for supplies in the chemical department of King's College, London.

PARLIAMENTARY NEWS.

Fertilisers and Feeding Stuffs Act.

In the House of Commons on Thursday, June 28, Mr. Turton asked the Minister of Agriculture: whether he is aware that county councils are prohibited from instituting proceedings against offenders under the Fertilisers and Feeding Stuffs Act, 1906, unless and until the Ministry has given its consent; and, if so, whether he is prepared to bring in a Bill to remove this restriction?

The Minister of Agriculture (Sir Robert Sanders): The answer to the first part of the question is in the affirmative. I am taking steps to appoint a Departmental Committee to inquire into the working of the Act referred to, and to report as to what Amendments, if any, are desirable.

Pitch Cancer.

Mr. D. Williams asked the President of the Board of Trade the number of men certified as suffering from pitch cancer by those engaged in the manufacture of pitch and patent fuel during the past five years; how many have died of this disease during the same period; and how many employed in those industries have died in the same period from other forms of cancer; and whether, in view of the growth of this disease, he will make it obligatory on the manufacturers of these commodities to use mechanical appliances in the handling of pitch wherever possible?

Mr. Bridgeman: The numbers of men reported to the Factory Department as suffering from this disease during the five years 1918 to 1922 were as follow: In 1918, 23; in 1919, 10; in 1920, 25; in 1921, 18; and in 1922, 15. No fatal cases were reported in 1918 to 1920; two were reported in 1921, and one in 1922. Before 1920 the disease was not compulsorily notifiable under the Factory Act, but cases were notified under a voluntary arrangement. The figures do not indicate any growth in the incidence of this disease. I regret that no information is available to show the number of deaths in these industries during the period in question from other forms of cancer. As regards mechanical appliances, I understand that these are generally used where practicable, but that they can only be used in a few operations. I am advised that the most effective precautions against this disease are great attention to personal cleanliness and periodic medical examination, and that facilities to enable the worker to take these precautions have been arranged for at the instance of the Factory Department at all the works concerned.

German Reparation Duty.

Sir W. Joynson-Hicks, replying to Mr. W. A. Jenkins, said: The amounts collected by the Commissioners of Customs and Excise under the provisions of the German Reparation (Recovery) Act are as follows:

Year ended March 31, 1922	£3,709,000
Year ended, March 31, 1923	£7,474,000
Two months ended May 31, 1923	£1,397,000
Total	£12,580,000

The percentage rate of the levy was reduced from 50 to 26 as from May 13, 1921.

Exports of Coke.

The Secretary for Mines (Lt.-Col. Lane-Fox), replying to Mr. Smedley Crooke, on July 2, said: The following statement gives the average price f.o.b. of export coke and the total amount of coke exported during the first quarters of 1922 and 1923 respectively.

—	Total Amount of Coke Exported.	Total Value.	Average Value Per Ton (f.o.b.).
1st Quarter, 1922.	Tons.	£	s. d.
Gas coke	226,068	345,046	30 6
Other sorts	296,289	451,088	30 5
Total coke	522,357	796,134	30 6
1st Quarter, 1923.			
Gas coke	294,553	428,941	29 2
Other sorts	489,237	863,654	35 4
Total coke	783,790	1,292,595	33 0

SOUTH WALES NOTES.

[Specially Contributed.]

There is not much new business being booked for tinplates. The bulk of trade in this industry is controlled by merchants, and the latter seem to be waiting for a fall in quotations. There is every sign that prices will be easier, inasmuch as the steel makers are now experiencing a dull time and have to stock in order to keep their mills going, while the prices of raw materials used in the make of tinplates are cheapening. On the whole the returns show that the volume of trade is steadily expanding. Patent fuel manufacturers, owing to more abundant suplies of small coal and easier conditions in supplies of "binding" materials, are offering better terms for briquettes and some of the best brands can now be purchased at £1. 17s. 6d. per ton f.o.b. Algeria, France, and Italy are at present the most important buyers, but other countries are sending better inquiries, and home demands are on the increase. In the iron and steel industries considerable anxiety prevails and bookings do not look very good at the moment, many works having only some two or three weeks' orders in hand. Galvanised sheet makers have slightly lowered their prices. The non-ferrous metals trade is somewhat dull, with little prospect of improvement in the copper trade. Cokes are getting plentiful and the furnace qualities show a tendency to ease in price. Foundry cokes are in strong demand. The ovens are working well, by-products being in good call, with the exception of sulphate of ammonia, which is somewhat neglected.

The imports to Swansea for the week were 11 tons copper ore from Lisbon, 3,266 zinc concentrates from Port Pirie, 10 tons ferro phosporus, and 15 tons spelter from Hamburg, 495 tons phosphate of lime from Antwerp, 1,462cwt. nickel oxide from Montreal, 1,315 tons pyrites from Wyborg, 5,040 tons pitch from Pensacola, and 200 tons iron pyrites from Pomaron; imports to Port Talbot, 2,829 tons precipitate of copper from Huelva; to Llanelly 238 tons basic slag from Ghent; to Cardiff 100cwt. nickel from Antwerp, 2cwt. olive oil from Bilbao, 32 tons phosphorus from Montreal, and 40 gallons acetic acid from Rotterdam. The exports from Newport included 4 tons salammoniac and 11 tons zinc chloride to Bombay.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained.

Belgium.

A Belgian firm at Antwerp desire to secure the agency of British firms manufacturing perfumery, druggists' sundries, etc. (Ref. No. 814.)

Italy.

An agent in Milan desires to secure the representation for Italy of British exporters of shellac, gum arabic, etc. (Ref. No. 818.)

Poland.

An agent in Warsaw desires to secure the representation of British firms in caustic soda, tallow, and ethereal oils. (Ref. No. 823.)

Spain.

A commission agent in Tortosa is desirous of representing British firms for the sale of chemical products and fertilisers. (Ref. No. 824.)

Spain and Portugal.

The Spanish-speaking principal of a British firm of exporters, who is shortly visiting the chief centres in Spain and Portugal, is prepared to act for British manufacturers of chemicals and other lines, with a view to introducing their products into these countries, the appointment of local agents, etc. Terms: commission on results basis. (Ref. No. 826.)

United States of America.

A firm of importers in San Francisco wishes to communicate with British producers of sulphate of ammonia, superphosphate and other fertilisers, with a view to obtaining agencies for the Pacific Coast of the United States. (Ref. No. 833.)

FERTILISER NEWS.

Nitrate of Soda.—Shipments during the latter half of last month were on a much heavier scale, being almost three times the quantity exported in the first fortnight. Total shipments, therefore, amounted to about 165,000, of which 75,000 tons was due for Europe, 55,000 tons to the United States, and 35,000 tons to Japan and other customers. Production being estimated at about 150,000 tons, coast stocks were accordingly reduced to about 983,000 tons. With the stocks in consuming countries, together with material afloat, reaching the figure of 272,000 tons, the visible supply as at June 30 last, therefore, amounted to 1,255,000 tons, statistically much better than in previous years, and, in fact, below the figure for June 30, 1914, by some 10,000 tons. Sales by the Producers' Association have been well maintained, and so far amount to about 880,000 tons for the coming season. There is reported to be some change in the tendency of the market, however, and the quantity destined for European ports (including Egypt) is larger than the amounts for the United States and other countries combined. The demand from America, in fact, is falling off, although it is early yet to anticipate the further sales. Deliveries from ports in Europe and Egypt at 75,000 tons during June exceeded imports by 37,000 tons, and stocks were correspondingly reduced by that amount. There were, however, reshipments from Antwerp and Holland to various other European and Egyptian ports involving a total of 6,500 tons. The improved weather on the Continent has doubtless been responsible for the increased consumption, though it should be remembered that consumption is by no means synonymous with "port deliveries." Large orders having been booked on the new season's account, reports are already reaching this country from Chile pointing out the difficulties confronting producers, entailing heavier production costs. If the scale of production is to be increased, as is anticipated, the scarcity of labour is likely to prove a serious obstacle. This, of course, may be the peg on which to hang a higher price list, but increasing production of other and cheaper forms of nitrogen may cause the Chilean producers to reflect on the probable result of such a manœuvre.

Sulphate of Ammonia.—The situation in the fertiliser market being very different to that obtaining twelve months ago, it was to be anticipated that the price of sulphate of ammonia would be reduced for the ensuing season. The extent of the reduction, as revealed in the circular just issued by the Federation, is considerable, and should stimulate the consumption of the fertiliser in the United Kingdom. For July and August delivery, sulphate of ammonia is on offer for home agricultural use at £14. 15s. per ton for neutral quality in fine friable condition, free from lumps, having a basis of 25¾ per cent. ammonia. This price is for lots of 4 tons and upwards, delivery to consumer's nearest station or wharf in Great Britain. As has hitherto been the case, a certain amount of ordinary quality sulphate, basis 25¼ per cent. ammonia, is available, deliveries of which may be made at the lower figure of £13. 12s. per ton. The bulk of deliveries, henceforward, however, are expected to be of the better quality, which is a most encouraging fact. The pressure brought to bear, and the practical advantages accruing have resulted in a much larger proportion of the make in the United Kingdom reaching the high standard of excellence desired by the Federation. This policy is undoubtedly increasing the confidence and interest of consumers, both at home and abroad, and is the soundest way of strengthening the market for British material. With the value of sulphate, as sold at the new prices, being about 14s. per unit, and taking into account the higher content of nitrogen, the greatly improved mechanical condition, and so on, the price for this fertiliser is now under pre-war figures. Indeed, it is claimed by the Federation that of all the forms of nitrogen now on the market, British sulphate of ammonia is the cheapest. According to the circular, stress is laid on the fact that the quoted price is for material destined to be used for home agricultural purposes only, and contracts are to contain the following stringent, but very necessary clause: "Buyers undertake that the sulphate of ammonia delivered under this contract shall be used for home agricultural consumption in the United Kingdom, Channel Islands, or Isle of Man, and to request an identical undertaking from any buyers to whom they may offer or sell such sulphate; and it is hereby agreed that in respect of every ton of such sulphate sold for export or exported to territory other than the countries named above, whether such sale or exportation shall have been made by buyers themselves, or by buyers' sub-purchasers, or any other sub-purchasers, buyers shall pay to sellers in addition to the purchase price thereof, £10. as and for liquidated damages." With the exception of two items, the allowances and abatements are on the same scale as that prevailing last season. These exceptions are, in the first place, if buyer elects to take delivery ex works by his own vehicle, when an allowance of 5s. per ton is made, compared with 10s. previously. A reduction has also been made, from 12s. 6d. to 10s. per ton on deliveries to fertiliser manufacturers, agricultural merchants, etc. Prices for September delivery will be announced in due course, when it may be anticipated that the Federation's policy of a slowly rising scale of prices will be adopted.

Superphosphate.—British manufacturers have announced their new scale of prices for July delivery, and until further notice. For superphosphate showing 28 per cent., the quotation stands at £3. 2s. 6d. per ton, net, in bags at Liverpool; for 30 per cent., £3. 5s.; 33 per cent., £3. 9s. 6d.; and for 35 per cent., £3. 12s. 6d. The demand at present is generally very slow, very little business passing in any descriptions, with the possible exception of nitrate of soda. The abundant supplies of phosphate rock from Nauru and Ocean Islands which have been reaching Australia have led to the initiation of a scheme for the manufacture of superphosphate on a large scale in Tasmania. Production is to be undertaken by the Electrolytic Zinc Company of Australasia, and they intend to erect a plant with a 50,000-ton capacity. Sulphur is readily available from the zinc concentrates, which contain between 25 and 35 per cent. of the product, and it is estimated that the supply will eventually reach over 30,000 tons. Formerly, some 40,000 or 50,000 tons of sulphur per annum have had to be imported for the manufacture of acid, but this expense is likely to be considerably curtailed. According to the new scheme, therefore, it is expected that something like 45,000 tons of superphosphate can be produced annually.

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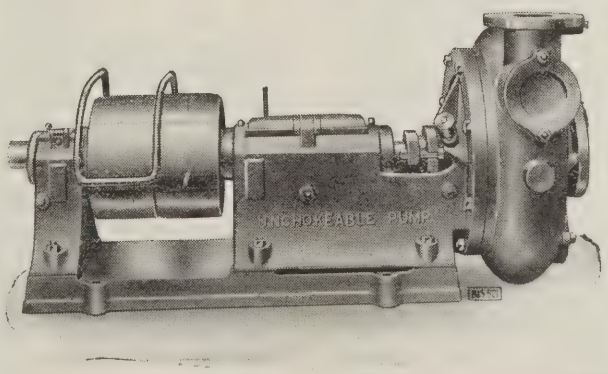

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STAMFORD.

LONDON:
CENTRAL HOUSE, KINGSWAY, W.C.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN MAY.

(Concluded from page 766.)

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of May, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended May 31.			Value. Month ended May 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Gums and Resins:						
Arabic and Tragacanth ..... cwts.	7,250	12,331	12,203	152,324	43,792	55,748
Kauri ..... ,,	7,471	3,465	5,322	34,016	14,161	23,262
Rosin ..... ,,	30,130	122,164	106,631	23,355	85,715	72,168
Shellac, Seedlac, and Sticklac ... ,,	6,098	15,373	9,877	112,326	286,948	111,097
Oils, Fats and Greases:						
Animal (except Marine Animal): Not Refined Tallow:						
From France.... tons	—	—	—	—	—	—
,, China..... ,,	—	—	50	—	—	1,900
,, U.S.A. ... ,,	—	274	—	—	10,082	—
,, Uruguay . ,,	18	590	259	583	23,294	9,320
,, Argentine Republic ,,	312	304	1,338	10,703	11,915	53,729
,, Australia.. ,,	170	1,772	1,392	5,614	64,434	53,472
,, New Zealand ,,	2,778	4,995	3,165	86,190	167,548	118,982
,, Other Countries ,,	—	17	159	—	577	5,772
Total	3,278	7,952	6,363	103,090	277,850	243,175
Fish (and Marine Animal)..... ,,	3,696	7,117	3,001	130,708	237,507	117,146
Mineral, Crude Petroleum..... galls.	9,299,586	32,485,858	10,073,557	167,385	435,748	615,195
Vegetable, other than Essential:						
Castor Oil ..... tons	19	186	372	1,295	8,321	18,590
Coconut Oil, Unrefined ..... ,,	5,206	2,777	1,656	215,926	110,175	73,421
Cotton-seed Oil, Unrefined ..... ,,	—	39	852	—	1,578	34,883
Linseed Oil ..... ,,	2	30	1,140	125	1,172	53,898
Olive Oil, Unrefined ..... ,,	401	307	215	44,771	19,697	13,647
Palm Oil, Unrefined ..... ,,	2,483	9,616	4,912	86,228	313,985	175,095
Palm Kernel Oil, Unrefined..... ,,	1,025	—	—	46,520	—	—
Rape-seed Oil ... ,,	—	81	20	—	3,418	771
Soya Bean Oil ... ,,	318	1,208	2,668	21,470	45,974	94,894
All other Sorts .. ,,	59	1,084	973	3,772	50,654	49,167
Soap Stock ..... ,,	40	62	48	982	1,771	824
Stearine:						
From Belgium .. ,,	45	31	38	2,538	1,793	1,937
,, Other Countries ,,	144	330	196	7,422	17,307	10,217
Total ..... ,,	189	364	234	9,960	19,100	12,154
Tanning Substances, not elsewhere specified:						
Barks for Tanning cwts.	17,381	51,284	46,076	9,189	25,580	18,477
Sumach ..... ,,	2,476	10,274	10,317	1,784	6,848	8,256
Gambier ..... ,,	6,189	5,456	8,915	11,654	8,538	18,204
Myrobalans ..... ,,	37,598	44,015	55,586	13,115	16,043	20,301
Valonia ..... ,,	1,561	4,815	2,092	756	2,542	1,303
Other Sorts ..... ,,	127	5,735	3,743	95	3,989	3,042
Boron Minerals (including Borate of Lime, Borate of Magnesium, and Boracite) ... tons	487	2,660	615	10,327	52,284	9,981
Fertilisers:						
Guano, Raw .... ,,	—	—	—	—	—	—
Phosphate of Lime and Rock Phosphate ..... ,,	14,704	45,473	14,868	48,153	117,542	26,483
Sulphur, Crude.. ,,	—	5,628	7,503	—	27,133	29,814
Fertilisers, not elsewhere specified:						
Basic Slag ..... tons	728	3,203	4,347	4,120	11,468	12,348
Gelatine, Glue, and Size ..... cwts.	7,052	10,424	14,207	43,699	46,085	61,000
Bones for Manure tons	2,124	246	1,268	71,243	1,361	9,415

Articles.	Quantities. Month ended May 31.			Value. Month ended May 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Starch, Dextrine, Farina, and Potato Flour:						
Rice Starch ..... cwts.	3,340	7,505	8,190	6,263	11,677	11,709
Other kinds of Starch ..... ,,	57,458	129,531	101,188	44,417	79,935	78,759
Dextrine, and Farina or Potato Flour cwts.	28,682	62,017	69,789	34,501	76,298	52,828
Total ..... ,,	89,480	199,053	179,467	85,181	167,910	143,296
Copper Ore (including Regulus, Matte, Precipitate, Cement, Copper, and Scale):						
From Portugal .. tons	—	—	—	—	—	—
,, Spain .... ,,	—	327	2,215	—	11,180	139,017
,, Mexico ... ,,	—	—	—	—	—	—
,, Peru ..... ,,	27	—	10	1,890	—	159
,, Chile ..... ,,	46	10	—	8,227	259	—
,, Cape of Good Hope ... ,,	58	—	—	1,033	—	—
,, Australia.. ,,	—	—	—	—	—	—
,, Other Countries ,,	60	119	806	1,880	3,706	32,780
Total ..... ,,	291	456	3,031	13,030	15,145	171,956
Iron Pyrites (including Cupreous Pyrites) tons	5,170	64,806	35,114	22,679	137,140	67,742
Manganese Ore.. ,,	21,518	31,518	57,227	106,921	126,885	188,941
Silver Ore, including the value of the Silver contained in Argentiferous Ores and Metals .....val. £	—	—	—	38,346	50,156	51,727
Tin Ore and Concentrates:						
From S. America tons	442	2,390	3,209	40,390	179,321	336,150
,, British South Africa ... ,,	42	—	—	5,250	—	—
,, Other Countries ,,	567	430	995	54,919	38,691	108,977
Total ..... ,,	1,051	2,820	4,204	100,559	218,012	445,127
Lead, Pig and Sheet:						
From Spain .... tons	7,004	2,243	5,564	159,121	50,068	150,590
,, U.S.A. ... ,,	—	1,031	2,751	—	22,917	68,097
,, Mexico ... ,,	—	2,345	—	—	54,934	—
,, Australia.. ,,	50	6,085	4,020	1,200	145,718	101,951
,, Other Countries ,,	3,655	4,156	4,897	82,508	95,479	127,785
Total ..... ,,	10,709	15,860	17,232	242,829	369,116	448,423
Mercury ..... lbs.	7,865	—	561,067	1,138	—	73,163
Tin: Blocks, Ingots, Bars and Slabs:						
From Straits Settlements and Federated Malay States ... tons	770	1,038	990	137,445	150,725	205,235
,, Australia.. ,,	20	15	35	3,560	2,265	7,425
,, Other Countries ,,	415	1,169	141	74,015	171,225	29,173
Total ..... ,,	1,205	2,222	1,166	215,020	324,215	241,833
Zinc, Crude (*i.e.*, Cakes, Slabs, Blocks, etc.) tons	2,206	7,698	8,588	55,946	190,281	292,081
Manufactures, not elsewhere specified (including Rolled Sheets, Plates, and Discs) tons	710	777	1,039	24,721	30,261	44,286

Italian Regulations for Colouring Materials.—An Italian Royal Decree recently issued specifies the colouring materials which may or may not be used in the preparation of foodstuffs, toys, soaps, shaving soaps, dentifrices, and cosmetics. A copy and translation of the Decree may be seen by persons interested on application to the Department of Overseas Trade (Tariff Section), 35, Old Queen Street, London, S.W. 1.

REPORTS OF COMPANIES.

Zinc Corporation, Ltd.

At the annual general meeting held in London on Wednesday (June 27), Mr. F. A. Govett, presiding, said: As regards the price of lead, I said last year there was some reason to think that consumption was enlarging, and that therefore the outlook was reasonably good. This has been fairly verified, and I think I may say again to-day that the price is likely to be maintained, with restricted production, considerable American consumption, and a great deal of rebuilding in Europe, which will no doubt continue, so that the outlook for demand seems fairly good. There has been no reduction generally in production costs—in fact, with dearer coal, it has been rather the other way. America has been producing all she can in virtue of the demand for the by-product silver on Government purchases, under the Pittman Act, constituting a sort of bonus with silver at a dollar, contrasted with our market prices. As the purchases under the Act have now ceased, this stimulus on production will disappear, and American lead will again have to compete on even terms. However, altogether I should look for a continued high price. As regards our subsidiary companies, I have not much to say but what is good. The Associated Smelters is as well managed and just as successful as before. The Zinc Producers efficiently handle the business of the zinc, while the Electrolytic Zinc is now producing over 40,000 tons of refined zinc, which will be further increased, and, lastly, the Lead Manufacturers are making satisfactory profits.

British Dyestuffs Corporation, Ltd.

The report for the year ended October 31 last states that the result of the year's transactions, after providing £411,382 for depreciation, and crediting the estimated amount in respect of recovery of excess profits duty, is a profit of £102,656. The balance of loss carried forward from the previous period amounts to £803,355, leaving to be carried forward to the next period a deficit of £700,698. In spite of severe restriction in the manufacture of dyestuffs due to the serious depression in the dye-using industries, and of substantial reductions in selling prices, the trading results of the year showed a marked improvement over those for the previous year. The directors express the opinion that it would be advantageous for administrative purposes to liquidate the associated companies—namely, British Dyestuffs Corporation (Huddersfield), Limited, British Dyestuffs Corporation (Blackley), Limited, and Claus and Co., Limited, and to transfer their undertakings to British Dyestuffs Corporation, Limited, which would then become the sole owning and operating company.

British Oxygen Co., Ltd.

Report for the year ended March 31, 1923, states that after providing for debenture interest and redemption, depreciation and usual standing charges, profit amounted to £131,800. Directors propose to place £25,378. to general reserve, bringing total to £150,000. Remaining balance is £106,422. Final dividend, free of tax, at the rate of 1s. 9d. per share (absorbing £40,312.), making, with the interim dividend of 9d. per share, free of tax, paid in December last, for the year 2s. 6d. per share, equivalent to 12½ per cent., free of tax, upon whole issued capital.

W. J. Bush and Co., Ltd.

Accounts for 1922 show a gross profit of £245,940., and a net profit of £41,788. Adding £2,658. brought in, after adjustment of E.P.D., corporation profits tax, and income tax, there is a balance of £44,446. Directors recommend final dividend of 5 per cent. on ordinary shares, making 8 per cent. for year. Forward, £18,197.

New Transvaal Chemical Co., Ltd.

Report for year to June 30, 1922. shows that the balance standing to credit of profit and loss, including £6,254. brought forward, is £83,290. Directors have transferred to depreciation account, £10,570., leaving £72,720., out of which dividends on preference shares absorbed £24,000. Directors recommend payment of the remuneration of the London board, £630., dividend of 15 per cent. on ordinary shares, £37,500; forward, £10,590.

DIVIDENDS.

Dominion Tar and Chemical Co., Ltd.—Interim dividend of 2½ per cent., free of tax.

Mond Nickel Co., Ltd.—Final dividend of 7½ per cent., free of tax, on the ordinary shares, making 10 per cent. for the year ended April 30. The dividend a year ago was 5 per cent., making 7½ per cent. for the year, free of tax.

Briton Ferry Chemical and Manure Co., Ltd.—Dividend announced on 7 per cent. cumulative preference shares for the completion of the payment of arrears of dividend to December 31 last and six months' interim dividend to June 30.

Welsbach Light Co., Ltd.—Dividend of 5 per cent. actual (1s. per share) and a bonus of 2½ per cent. actual (6d. per share), both less income tax.

Broken Hill South Mining Company, Ltd.—Dividend of 1s. 6d. per share.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Booshu Manufacturing Co., Ltd., London, E.C., polish manufacturers.—Reg. June 5, £1,250. deb., to E. V. F. R. Dugmore, 11, St. Marks-rd., Alverstoke.

BANKRUPTCY INFORMATION.

Fishwick, Albt. Baden-Powell, 4, North-rd., Longsight, Manchester, trading as Brown and Co. soap manufacturers. 1st and final, 1/4, at O.R.'s, Manchester, July 2.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Teague, Wm., 46, Olive-la., Darwen; paint manufacturer; £23. 13s. 4d. May 11.

Ajax Manufacturing Co., Ltd., 62a, Loughborough-rd., Brixton; paint manufacturers; £13. 13s. 10d. April 19.

South Wales Colliery and Shipping Supply Co., oil and grease manufacturers; £10. 4s. 11d. April 27.

NEW COMPANIES.

Burbanks (Pilbarra) Copper Mines, Ltd. Capital £150,000., 5s. shares. Agreement with Burbanks Birthday Gold Mines, Ltd., and E. C. C. Smith, the lidr. thereof. Secretary: E. C. C. Smith, 20, Bucklersbury, E.C.

Cement Supply Co., Ltd.—Private company. Capital £2,000. £1. shares (1,950 A. and 50 B. Manufacturers of and dealers in cement, etc. Office: Westminster Chambers, 3, Victoria Street, S.W. 1.

Crampshaw, Ltd.—Private company. Capital £500. Manufacturers of and dealers in all kinds of carbolic, creosotic and other disinfecting fluids and powders, etc. Secretary: E. Cadogan, Imperial Buildings, Mount Stuart Square, Cardiff.

Industrial Residues, Ltd.—Private company. Capital £100. Dealers in residual products, etc. Secretary: A. Clayfield, 10, Upper Priory, Birmingham.

Pike, Laggett and Cash, Ltd.—Private company. Capital £5,000. Glass manufacturers and merchants, etc. Office: Chatham Place Glass Works, Hackney, E. 9.

Treamble Minerals, Ltd.—Private company. Capital £20,000. Office: Exchange Buildings, Station Road, Port Talbot.

Waterhouse and Gray, Ltd.—Private company. Capital £1,000. Manufacturing chemists and wholesale druggists, etc. Office, 52, Stanley Street, Sheffield.

Windsor Richards Protective Paint Co., Ltd.—Private company. Capital £1,000. Office: 104, High Holborn, W.C.

George O'Malley, Ltd.—Private company. Capital £1,000. Wholesale and retail dispensing chemists. Office: Main Street, Mohill, Co. Leitrim.

Klenso, Ltd.—Private company. Capital £5,000. Manufacturers of soaps, soap powders, etc. Solicitor: C. J. Murray, 30, Parliament Street, Dublin.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

June 18 to 23 (inclusive).

Treating Tar for Roadmaking. Aeberli, H. 16,376.
Centrifugal Separators. Aktiebolaget Separator. 16,010 and 16,026.
Diastases and Toxines. Boidin, A.; and Effront, J. 15,797.
Substances Containing a Methyl Radicle. Calvert, G. 15,932.
Adhesives. Coffey, A. J. 16,111.
Viscose Silk. Dreaper, W. P. 16,196.
Aliphatic Derivatives. Dreyfus, H. 16,263.
Polymerisation Products of Acetylene. Elektrizitätswerk Lonza. 16,283.
Colouring Fibrous Materials. Gentner, C. 16,134.
Adhesive for Rubber, Leather, etc. Hallett, G. 15,768.
Insecticides. Howles, F.; and McDougall, I. 16,371.
Heating Coal. Ilingworth Carbonisation Co., Ltd.; and Illingworth, S. R. 16,272.
Calorimeters. McAlpine, G. L. 15,948.
Vulcanising Oils or Fats. Meulen, J. H. van der. 16,164.
Autoclaves. Mycock, W. 16,214.
Scrubbing and Washing Gases. Nielsen, H. 16,167.
Aluminium Paint. Ormiston, C. P. 16,287.
Separating Materials of different specific gravity. Peale, R. 16,155, 16,156, 16,157, and 16,158.
Detonating Explosives. Staudinger, H. 16,165.
Solutions of Metal-iodide-alkali-iodide Compounds. Truttwin, H. 15,876.
Cellulose Acetates. Zdanowich, J. O. 15,781.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1921.

Concentration of Ores and Minerals. Marks, E. C. R. (*Eureka Metallurgical Co.*). 33,254. **199,051**
Apparatus for Chlorine Control. Meter, J. W. van. 33,359. **199,052**
Extraction of Oils from Fish. Mitsui, K.; and Takahashi, C. 33,425. **199,054**
Cement. Rigby, T. 34,126. **199,056**

1922.

Vulcanising Rubber. Naugatuck Chemical Co. 931. **174,915**
Chlorination of Montan Wax. Jennings, H. W. K. (*Stinnes, H., firm of*). 4,581. **199,073**
New Aromatic Carbonyl Compounds Containing Trivalent Arsenic. Margulies, Dr. O. 7,119. **199,091**
New Derivatives of Organic Arsenic Compounds. Margulies, Dr. O. 7,120. **199,092**
New Arsenoxides and Arsenobenzols. Margulies, Dr. O. 7,144. **199,093**
Sulphurous Acid Compounds of Isatinanilide or Arylides. Stephan, Dr. C. 8,059. **199,154**
Chlorination of Cellulose Lyes. Schmidt, Dr. A. 9,323. **178,104**
Lubricating Oils. Eichwald, E.; Vogel, H.; and Hardt, P. 9,697. **178,113**
Evaporating, Distilling, Heating, or Cooling Fluids. Blair Campbell and McLean, Ltd.; and Blair, A. 12,592. **199,210**
Esters and Ethers of Ethylidene-glycol and Vinyl Alcohol. Consortium für Elektrochemische Industrie Ges. 16,898. **182,112**
Methane. Farbwerke vorm. Meister, Lucius, and Brüning. 23,561. **186,899**
Magnesium Carbonate from Magnesium Carbonates and Magnesium Silicates Containing Calcium. Hambloch, Dr. A. 33,798. **194,663**
Hydroxylated Aliphatic Arsinic Acids. Etablissements Poulenc Frères; and Oechslin, C. 34,890. **191,028**
Acetone from Acetylene. Elektrizitätswerk Lonza. 2,200 **192,392**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Asbesto-cement Compositions. Lanhoffer, I. E.; and Lanhoffer, O. E. 139. **199,350**
Diphenylguanidine. Naugatuck Chemical Co. 9,369. **199,354**
New Dyestuffs of Indigo Tint. Society of Chemical Industry in Basle. 11,431. **199,360**
Hydrogen. L'Oxhydrique Française. 11,651. **199,364**
Dioxyperylene. Pereira, H. 15,642. **199,401**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Fumigants. J. E. Evans-Jackson, London. (Deutsche Gesellschaft für Schädlingsbekämpfung, Frankfort-on-Maine, Germany.) British Patent, **196,524**, of 1922.

In fumigating for the destruction of insects the gaseous or volatile poisonous substance employed is hydrocyanic acid or a cyano-carbonic ester such as the ethyl or methyl esters, and to this is added a halogen acid ester, such as methyl chloro-carbonic acid ester or a bromo-acetic acid ester, a haloketone, or a halogen xylol, any of which are strongly irritating to the respiratory organs, so that escape of the vapours may be readily detected.

Filter-presses. S. R. Jackson, Hanley; A. E. Jackson, Baddeley Green; and T. D. Jackson, Birches Head; all in Stoke-on-Trent. British Patent, **193,654**, of 1922.

Metal plates for filter-presses are formed with a surround having pockets or cavities, the walls of which are equal in thickness to the other parts of the plate, so that contraction due to cooling is uniform throughout.

Colloidal Antimony Sulphides. M. E. Wolvekamp, Oakland, California, U.S.A. British Patent, **197,061**, of 1922.

Stable, colloidal antimony tri and penta sulphides associated with a salt of a protein are prepared by redissolving in alkali the product obtained by precipitating an alkaline solution of a sulphantimonite or of a sulphantimonate with excess acid. In examples colloidal antimony trisulphide is obtained from a solution containing tartar emetic, sodium sulphide, and sodium protalbinate, and colloidal antimony penta sulphide is obtained from a solution containing Schlippe's salt and sodium protalbinate. The solution of the precipitate obtained by adding sulphuric acid is redissolved in caustic soda and evaporated at 100° C. to dryness. Alternatively the solid product may be obtained by adding hydrochloric acid and alcohol to the alkaline solution of the sulphantimonite or sulphantimonate.

Sodium Chromate. E. Baumgartner, Roskilde, Denmark. British Patent, **197,223**, of 1922.

Sodium chromate is obtained by heating in a current of hot air in a muffle, a mixture of chromium ore with sodium carbonate with or without lime or calcium carbonate. The materials are formed into briquettes and are arranged in the muffle, for instance in rows with spaces between so as to allow contact with the current of air. Stirring or turning of the charge is unnecessary and undesirable and the operation is complete in one burning.

Sodium Hydroxide. Courtaulds, Ltd., and R. O. Jones, both in London. British Patent, **197,198**, of 1922.

Solutions of sodium hydroxide obtained by causticising strong solutions of sodium carbonate with lime and filtering are concentrated by cooling to between 0° and minus 15° C. to remove the sodium carbonate as decahydrate. In this way solutions containing 15 to 25 per cent. sodium hydroxide and not more than 1 per cent. sodium carbonate may be obtained. Instead of causticising in the usual manner the process described in Specification 182,661 may be used.

Sulphurised Dyestuffs. F. W. Atack, Manchester. British Patent, **196,993**, of 1922.

Indophenolic bodies are sulphurised by treatment with a polysulphide in presence of normal butyl alcohol as solvent. The indophenol may be used dry or in the form of a wet paste. In an example the indophenol from carbazol and *p*-nitroso-phenol is treated with sodium sulphide and sulphur in presence of butyl alcohol at 100° C. and under a reflux for 50 hours. The resulting mixture is diluted with water and the dyestuff separated in the usual manner. It is stated that pyridine may be used in admixture with the normal butyl alcohol. According to the Provisional Specification organic compounds in general may be sulphurised as described above and pyridine alone or other inert liquid of similar boiling-point may be employed as a solvent.

Powdered Lead. G. Shimadzu, Kyoto, Japan. British Patent, **197,031**, of 1922.

A chemically-reactive fine lead or other metal powder is produced by rotating a vessel charged with lead balls or pieces of metal so as to cause abrasion of the balls or pieces between each other and the inner surface of the vessel. Hard metal balls may be introduced into the vessel with the pieces of lead. A hollow cylindrical iron vessel with feed and discharge openings at its ends may be used. An air blast from a blower within the vessel blows the fine

powder out of the discharge opening into a collecting-chamber; or the vessel may be pierced all over with small holes through which the fine powder is blown out. Instead of air, dry carbonic-acid gas, nitrogen, etc., may be used to discharge the metal powder from the hollow cylinder, and the velocity of the air or other gas may be regulated to determine the fineness of the powder removed from the cylinder.

Catalytic Materials. L. Casale, Rome. British Patent, **197,199**, of 1922.

A catalytic material is prepared by injecting oxygen under pressure into heated iron or an alloy of iron with manganese, chromium, molybdenum, tungsten, carbon and the like, until the mass is brought into a state of violent ebullition and part of the oxidation product is vapourised away. Any impurities present in the starting material which are detrimental to catalysis are thereby eliminated. The cooled product may be reduced to the metallic state with hydrogen or nitrogen-hydrogen mixture. The catalysts are for use more particularly in the synthesis of ammonia, but may be employed for other catalytic operations such as the oxidation of ammonia to nitric acid or of carbon monoxide to carbon dioxide, or for the production of hydrogen from water and carbon monoxide. The proces may also be applied to the regeneration of iron or iron alloys whose catalytic efficiency has become impaired. According to the example, oxygen is forced through a hole in the bottom of a magnesia crucible containing turnings of impure iron or molybendum steel together with lime, the turnings being heated to a temperature below that of fusion; the reaction proceeds with almost explosive violence and is stopped when 5 to 15 per cent. of the oxidation product has been eliminated by the excess of oxygen; on cooling, the resulting iron oxide is crushed and either used as such or reduced to the metal.

Dyeing Cellulose Ethers. H. Dreyfus, London. British Patents, **196,952, 196,953, 196,954,** and **197,281,** of 1921.

Insoluble cellulose ethers in thread, film, fabric, or other form, or mixed goods containing them, are dyed or printed with acid dyes or direct cotton dyes. The dyes may be dyed on mordants, or be after-chromed or treated with copper salts, etc. In examples, ethyl cellulose silk is dyed with congo red, diazo fast black, nigrosine B, alizarine astrol B. azo yellow 3G, rocelline, and orange 11. Specification 182,830 is referred to. They are also dyed or printed with basic dyes. Mordants may be employed, or the dyeings may be after-treated by known methods. In an example, ethyl cellulose silk is dyed in a bath containing acetic acid with the following dyes:—Magenta, malachite green, rhoduline red B, methyl violet O, auramine O, saffranine T, thioflavine T, or methylene blue B. They are also dyed by forming azo dyes on the material or by forming thereon aniline blacks, paramine browns, and the like by oxidation of aromatic bases. In examples, Paranitraniline red and aniline black are formed on ethyl cellulose silk. They may also be dyed with vat dyes. In an example, ethyl cellulose silk is dyed with indigo in a hydrosulphite vat; anthraquinone vat dyes are also specified as suitable.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Halogen - Substituted Hydrocarbons. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. British Patent, **196,272.** Convention date, April 15, 1922.

Halogen-substituted hydrocarbons or mixtures thereof are converted with elimination of hydrochloric acid into hydrocarbons or other halogen-substituted hydrocarbons containing a higher number of carbon atoms by conducting them, in admixture with water, over certain catalysts at a raised temperature not exceeding 400° C. The catalysts comprise metals, certain non-metals, and metallic compounds, such as ThO_2, $ZrCl_4$, Bi_2O_3, $SnCl_4$ and $ZnCl_2$, and are mounted on porous materials, particularly highly-active charcoal. Pressures higher than atmospheric may be employed. According to an example, methyl chloride and traces of water are passed through a tube containing finely-divided platinum mounted on a carrier and maintained at a temperature of 275° C.; the product, comprising ethyl chloride, unchanged methyl chloride and hydrochloric acid, is washed to remove the acid and the gaseous chlorides are separated either by the use of an absorbent, such as highly-active charcoal, or by liquefaction and fractional distillation of the mixture.

Refining Tin. T. Goldschmidt Akt.-Ges., L. Schertel, and W. Lüty, Essen, Germany. British Patent, **196,938.** Convention date, April 29, 1922.

Tin is refined by removing impurities, such as arsenic, antimony, and copper, in a scum produced by adding to a bath of molten tin an element, such as sodium, calcium, zinc, or aluminium, and then bringing the bath into contact with an oxygen-containing substance, such as air or water. The elements may be added in instalments, and the scum removed after each addition, and the elements may be added separately or together such as in the form of an alloy. The scum obtained in one refining operation may be used for the treatment of further quantities of tin, and when the absorptive capacity of the scum is sufficiently reduced, any tin present may be separated by a liquidation process, and the elements recovered in any known way.

Synthetic Resins. Holzverkohlungs-Industrie Akt.-Ges., Konstanz, Baden, Germany. British Patent, **196,265.** Convention date, April 11, 1922.

Resins are obtained by the interaction of aromatic hydroxy compounds, such as phenols and naphthols, with methylene chloride in the presence of ammonia or of substances which produce ammonia. Usually two or more molecules of ammonia are employed for each molecule of methylene chloride. Other bases, such as sodium hydroxide, may be added to facilitate the reaction. According to an example, phenol is heated for some hours with methylene chloride and aqueous ammonia at a temperature of 150° C., a yellow resinous product being obtained.

Coating Aluminium. Aluminium Company of America, Pittsburg, U.S.A. (Assignees of A. Pacz, East Cleveland, Ohio, U.S.A.) British Patent, **195,625.** Convention date, April 3, 1922.

Aluminium is alloyed with at least 4 per cent. of silicon, and the alloy is treated so as to form on its surface a layer of silicon which resists corrosion, forms a basis for paint, electro-plating depositions, etc., and also serves as a self-lubricating bearing material. In the treating process, which is termed "silurising," the alloy is pickled in either acid or alkali solutions, or both, and then subjected to the action of aqua ammonia at about 50-80° C. If the article is free from grease the pickling may be omitted. Articles to be electro-plated need not be treated with ammonia.

Alkali and Alumina from Leucite. F. Jourdan, Rome. British Patent, **195,084.** Convention date, March 16, 1922.

Leucite or other rock containing alkali and aluminium silicate is fused with lime or calcium carbonate and the product is pulverised and extracted with water, a solution of alkali aluminate being obtained. Carbonic acid, which may be obtained by calcining limestone, is then passed into the solution to obtain alumina and alkali carbonate. The lime and leucite may be mixed in the proportion of 70 to 120 parts of lime to 100 parts of leucite, and the mixture may be made into small briquettes. The heating may be effected in a kiln or rotary furnace, the temperature being 1000-1400° C.

Azo Dyestuffs. Farbwerke vorm. Meister, Lucius and Brüning, Hoechst-on-Main, Germany. British Patent, **193,883.** Convention date, February 24, 1922.

Azo dyes are obtained, either in substance or on the fibre, by coupling diazo compounds with a *p*-toluidide, a *p*-alkyloxyanilide, a *p*-aryloxyanilide, or a *p*-arylkyloxyanilide of 2:3-oxynaphthoic acid, in which the arylido group contains halogen as substituent. The shades obtained on the fibre are fast to kier-boiling, especially those derived from halogenated diazo components. An example is given in which diazotised 6-nitro-2-toluidine is printed on material padded with 2 : 3-oxynaphthoic-chlortoluidide (NH : Cl : CH_3 = 1 : 2 : 4).

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The slump in the hematite pig-iron trade, which has resulted in a marked diminution in production in the Furness district, had not affected West Cumberland in mid-week, and the whole of the production of coke was still going into consumption. It looks as though there also, however, furnaces will have to be damped down and in that case, of course, the coking plants will be unable to work at normal pressure. The bottom seems to have fallen out of the iron trade, and it is significant that Bessemer mixed numbers were stated to be only nominally at last week's quotation of £6. 5s. delivered at Glasgow and Sheffield. Less than this figure is being accepted to obtain any business that is moving, and there was no concealment of the fact that the accumulation of stocks of iron may force makers to curtail their production. The unfavourable developments of the last few weeks are attributed to the unrest on the Continent, and it becomes increasingly certain that there can be little if any improvement in the outlook until the reparations problem is in a fair way to settlement. As yet neither the coal nor coke trade has become seriously involved in the depression in the iron trade. All the coal being raised finds a ready market, though it is not to be forgotten that as the dispute at the Whitehaven collieries still drags on, the production is appreciably lower. There is rather more coal at command for shipment since there has been a seasonal decline in local house needs, and rather less coal is wanted for the iron ore industry, nearly all the privately-owned mines having closed down. Coke production likewise is diminished, but even so makers now are able to supply some Scotch needs which have arisen. Nothing is being done in the Continental market. Local smelters are paying 24s to 30s. per ton for the local coke, according to carbon content. For the first time for many months there have been no imports of East Coast coke into the district, and the supplies to the Furness district this week have fallen from 13,500 tons to 7,500 tons. By-products are a middling market, and road tar is in good demand. Creosote is in fair request, and tar acids are a moderate trade.

PUBLICATIONS RECEIVED.

Department of Overseas Trade Reports.—Obtainable from H.M. Stationery Office. **Denmark** (to March, 1923). By Mr. R. M. Turner, Commercial Secretary to the British Legation, Copenhagen. Price, 1s. 6d. net. **Serb-Croat-Slovene Kingdom** (Jugoslavia), to April 1923. By Captain E. Murray Harvey, O.B.E., M.C., Commercial Secretary to H.M. Legation, Belgrade, 1923.

Review of the Oil and Fat Markets for 1922.—Thornett and Fehr, Baltic House, Leadenhall Street, London, E.C. 3.

Bulletin des Publications Nouvelles, June, 1923.—Gauthier-Villars et Cie., 55, Quai des Grands-Augustins, Paris.

Fume and Dust Collecting.—Booklet containing full illustrated descriptions of plant supplied by the well-known specialist, Albert E. Harris, of London.

Catalysis in Organic Chemistry. By Paul Sabatier. Translated by Professor T. Emmet Reid. London: The Library Press, Ltd., 26, Portugal Street, W.C. 2. Pp. 406. Price, 25s. net.

Research Chemicals (Boots Pure Drug Co., Ltd.).—A very lengthy list of fine chemicals produced at their Nottingham laboratories.

"Converting a Business into a Private Company." Third Edition. 1s. net. London: Jordan and Sons, Ltd.

"Invicta Bituminous Materials."—An attractively illustrated description of the utility and achievements of the road-construction products made by Messrs. Thos. Hill-Jones, Ltd., Bow Common Lane.

New Testing Machine for Refractory Materials.—Technical Pamphlet describing the principles and operation of the Lever Press. Trost Brothers, 26, Little Park Street, Coventry.

Monarch Chemical Sprays.—New catalogue and Price List. Copies may be obtained by readers on application to Mr. H. T. Watson, 46, Fairfield Road, Widnes.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," July 7, 1888.)

Technical Instruction.—If we had to draw the line between chemists and chemists, we would say that the man who was simply kept in the laboratory to test drugs should be placed on the lower side of that line, and it is a question whether a lad from a Board School would not do quite as well as a more highly-trained man. Our own opinion is that wherever the employer or responsible manager is not truly a chemical expert, the deficiency should be supplied by the appointment of a first-rate man as superintendent, who should have a position co-equal with the manager. And in cases also where the employer does not himself personally superintend, but is yet a good chemist, the presence of another good chemist is none the less essential, seeing that the constant supervision of chemical processes is absolutely necessary. We have laid much stress on the desirability of securing the services of a good chemist, a man of originality of thought and of thorough devotion to his work, and may not improbably be asked the question: Supposing a manufacturer be willing to pay a fair salary, what guarantee has he that he is securing the services of the right man? We cannot answer the question. Chemists are not "hall marked"; there is no royal road to any method of differentiation, and we fear there is no other way than to take him at his own estimate until the contrary has been proved.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT.

Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—The poor state of business generally is now very marked. Almost without exception, industrial chemicals seem to be of no interest to the usual buyers at home or to foreign purchasers. What little buying there is about is invariably for the smallest possible quantity, with the price cut to a minimum No one—neither buyer nor seller—shows the slightest confidence. It seems an undeniable fact that the long-drawn-out political unrest in Europe generally, and the Franco-Belgian occupation of Germany, are gradually bringing commerce to a complete standstill. A settlement of the various disputes on almost any basis would seem preferable to the present position. **Acetic Acid** keeps steady at old rates—there is little about on spot; inquiry has been much slower of late; 80% technical, £47.; 80% pure, about £50.; 98% glacial, £60. in casks and £75. in glass demijohns, ex wharf, London. **Acetone,** British Government specification, about £120. per ton; this is the quoted rate, and the market seems quite firm, with supplies very short. **Arsenic,** Cornish, white powdered, about £71. to £72. per ton; these prices are asked for a few small spot parcels on the market; very little demand. **Alum,** lump, in casks, £10. 10s. per ton; dealers continue to quote at this rate, but find very little interest shown. **Anhydrous Ammonia,** 99-95%, 1s. 5d. to 1s. 6d. per lb.; dealers are offering at slightly cheaper rates, with the market dull. **Barium Chloride,** 98-100%, £15. to £15. 10s. per ton; the market has moved in buyers' favour—business has been very poor. **Bleaching Powder,** 35-37%, £10. to £10s. 10s. per ton; dealers are offering at these rates with little doing. **Borax,**

commercial, granulated, £26. 10s.; crystal, £27.; powder, £28.; extra fine, £29.; B.P., crystals, £31.; powder, £32.; extra fine, £33. per ton, for home trade only, in free 2cwt. bags, carriage paid to destination. British makers continue to offer at these rates. Importers are offering under similar conditions commercial granulated at £25. 10s., and powdered £27. per ton. **Borax Glass,** lump, £74.; powdered, £75. per ton, in tin-lined cases; British makers' prices are at these levels. **Boric Acid,** commercial, crystals, £50.; powdered, £52.; B.P., crystals, £56.; powdered, £60.; extra fine, £62.; in bags free, carriage paid to destination; British makers continue to offer at these prices; dealers are quoting at very competitive rates. **Cream of Tartar,** 99-100%, 92s. to 94s. per cwt., less 2½%; this market has shown a little business, and prices as quoted seem steady. **Citric Acid,** B.P., crystals, about 1s. 9d. per lb., less 5%; spot offers for small lots are at about this price, but there has not been much business about. **Epsom Salts,** commercial quality, about £5. per ton, in bags; the demand is still very poor—dealers offering at this price. **Formaldehyde,** 40% volume, about £95. per ton, nominal; there are little, if any, stocks on spot, and buying is not taking place; the market is likely to remain idle until the referee's decision in the appeal case is issued; the hearing has been completed. **Glauber's Salt,** commercial quality, about £3. 15s. to £4. per ton, in bags; this market is particularly quiet—quoted rates unchanged. **Lead Acetate,** brown, about £42.; white crystals, about £43. to £44. per ton; slightly easier rates are quoted this week, with the market dull. **Litharge,** pure flake, British, about £37. per ton; imported is offering by dealers at about £35. to £35. 10s. per ton; not much doing. **Lithopone,** 30% Continental red seal, about £22. 10s. per ton; this market keeps fairly steady, and some limited business continues. **Ammonium Chloride,** grey galvanising, about £30. 10s. per ton; plenty of material available on spot at this rate, but the demand is small. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers quote at these rates. **Oxalic Acid,** about 6d. to 6¼d. per lb., as to quantity; this market remains very dull—prices are unchanged. **Bichromate of Potash,** about 6d. per lb.; this market, so far as dealers are concerned, shows but little life. **Carbonate of Potash,** 90-92%, about £29. per ton; 96-98%, about £32. per ton; the demand remains poor—spot stocks available. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; business has been quiet—quoted rates are easy. **Caustic Potash,** 88—92%, about £33. 10s. per ton; dealers in imported material are quoting at about this figure—there has been little doing. **Permanganate of Potash,** about 10d. per lb.; this market is easier this week and prices are irregular—business has been quiet. **Prussiate of Potash,** yellow, about 1s. 3¼d. to 1s. 3½d. per lb.; dealers are offering at cheaper rates once more this week, but business is still lacking. **Sulphate of Potash,** 90%, £11. 10s. per ton, ex ship; the market shows no change on the week. **Mercury,** about £11. per bottle of 75—76lb. net; prices are about the same, with business rather quiet. **Red Lead,** imported, about £35. 10s. per ton, c.i.f., London; this market remains dull—quoted rates are steady. **Salammoniac,** dog-tooth crystals, £49. to £50.; medium, £43. to £44.; fine white crystals, £27. to £28. per ton; there has been but very little inquiry for the spot supplies on offer—quoted rates from dealers are unchanged. **Saltcake,** ground and unground, home trade, about £5. per ton; export, £5. 5s. to £5. 10s. ton, f.o.b.; some inquiry continues. **Acetate of Soda,** about £25. per ton; dealers are quoting at this level for forward delivery. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid in the United Kingdom; this price is quoted by British makers for home consumers only. **Soda Crystals,** £5. 5s. per ton, in bags, carriage paid to destination; British makers selling at about this figure for home trade only; dealers are offering at competitive rates. **Caustic Soda,** 70—72%, £19. 10s.; 76—77%, £21. 10s. per ton, in drums, ex wharf, shipping port; dealers continue to quote at about these prices, but are finding but little business. British makers' prices for home trade only are unchanged at from £19 to £21. 10s. per ton, in drums, carriage paid. American material is offering c.i.f. Continent at competitive prices. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination; British makers offering for home trade only at this price. **Chlorate of Soda,** crystals and granular, 2⅞d. per lb.; spot business remains quiet—quoted rates are easy. **Cyanide of Soda,** 98—100%, 8½d. to 9d. per lb., for export. Home trade, about 11d. per lb.; British makers' prices are quoted. **Nitrate of Soda,** 96%, £13. 7s. 6d. per ton, f.o.r. Liverpool; quoted prices are level on the week, with the market steady. Nitrite of Soda, 100%, about £27. per ton; the market shows no change on the week. **Prussiate of Soda,** about 7d. per lb.; offers are plentiful, but business remains very slow, and the market is not at all steady. **Hyposulphite of Soda,** pea crystals, about £15. 10s. per ton, in 1cwt. kegs; commercial quality, about £10. 10s. per ton, in casks; dealers have been doing some little business and their prices seem fairly steady. **Sodium Sulphide,** 60—62% solid, £14. to £14. 10s. per ton; broken, £15. to £15. 10s. per ton, in drums; 60—62% concentrated, £15. per ton, in casks; dealers are offering at cheaper rates, but find business still very difficult. **Sulphate of Copper,** about £26. to £26. 10s. per ton; prices are a little cheaper this week—business has been limited. **Tin Crystals,** 1s. 4d. per lb.; the market is unchanged on the week. **White Lead,** imported, about £43. to £44. per ton; dealers are doing some small business in imported material at about these figures. **Zinc Oxide,** B.P., about £52.; white seal, about £44.; 99.5%, about £37. per ton, f.o.r. makers' works; British makers continue to offer at about these levels, with very little doing.

Pharmaceutical Chemicals.—From all quarters reports on the past week's business are very depressing. A state approaching stagnation seems to have been reached in many items. Prices in a large number of products are quoted at cheaper rates this week. **Acetanilid,** crystals and powder, about 1s. 6d. per lb.; this article is now being offered at cheaper rates—market quiet. **Acetyl-Salicylic Acid,** B.P., about 3s. 1d. per lb.; the market has moved in buyers' favour and business has been much slower. **Benzoic Acid,** B.P., about 2s. 6d. per lb.; there has been but little inquiry on the market. **Diethylbarbituric Acid,** B.P. (barbitone), about 21s. per lb.; this unchanged rate is quoted by dealers, but there is little business about. **Salicylic Acid,** B.P., about 2s. 3d. per lb.; this market has been quiet and prices are not any too steady. **Tannic Acid,** leviss, about 3s. 6d. per lb.; this market keeps fairly steady, but business is lacking. **Amidopyrin,** about 14s. per lb.; slightly easier rates are being quoted here, with business dull. **Ammonium Bromide,** about 7¾d. to 8¼d. per lb.; cheaper offers are being made, but the demand is very poor. **Benzonaphthol,** about 5s. per lb.; quoted nominal on an idle market. **Benzaldehyde 03,** about 3s. per lb.; the spot position is unchanged, with little doing. **Beta-naphthol,** resublimed, about 1s. 10d. per lb.; this market seems steady, but remains on the quiet side. **Calcium Lactate,** about 1s. 10d. to 2s. per lb.; some cheaper offers have been on the market, which is still quiet. **Chloral Hydrate,** duty paid, 4s. to 4s. 3d. per lb.; these rates are maintained by spot holders. **Creosote,** B.P., about 2s. 2d. per lb.; there has been no improvement in business. **Creosote Carbonate,** about 8s. 6d. per lb.; this unaltered price is asked by dealers, who find business very quiet. **Guaiacol Carbonate,** about 8s. 3d. per lb.; the market remains neglected. **Hexamine,** about 4s. per lb.; there is a slightly easier tendency in this product, and business has been much quieter. **Hydroquinone,** 3s. 8d. to 3s. 9d. per lb.; there has been some little business about—prices seem steady. **Methyl Salicylate,** about 2s. 6d. per lb.; the tone of the market is not so good this week—business very small. **Methyl Sulphonal,** about 15s. per lb.; there is still no interest shown in this product. **Paraformaldehyde,** about 3s. 9d. per lb.; this price is so far maintained, but the market is dull. **Paraldehyde,** about 1s. 5d. per lb.; easier prices are being quoted this week, but there are few buyers about. **Phenacetin,** about 6s. 6d. per lb.; spot holders continue to quote at about this rate, but find business much quieter. **Phenazone,** about 7s. 6d. per lb.; the quoted rate is maintained, with the market flat. **Phenolpthalein,** about 6s. 3d. per lb.; Continental rates are still firm, and the spot position keeps in line. **Piperazine,** about 3s. 6d. per oz., in kilo. lots; there is still but little inquiry about for the spot supplies available. **Potassium Bromide,** B.P., crystals and granular, 6¾d. to 7d. per lb.; this market, with the other bromides, has moved in buyers' favour and there seems to be little demand for the plentiful offers about. **Potassium Permanganate,** B.P., about 10½d. per lb.; the market has moved to this easier rate, and business is quieter. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; this market remains idle—quoted rates unaltered. **Salol,** about 2s. 9d. per lb.; there is a somewhat easier tone here, and the demand has been much lighter. **Sodium Benzoate,** about 2s. 6d. per lb.; no movement reported—quoted un-

changed. **Sodium Bromide**, crystals and granular, 7½d. to 8d. per lb.; offers for spot supplies and for shipment from the Continent are easier this week; business is very poor. **Sodium Diethylbarbiturate**, about 18s. 6d. per lb.; no business recorded. **Sodium Salicylate**, powder, about 2s. 5d.; crystals, about 2s. 7d. per lb.; prices are a shade cheaper this week, and business has dropped off. **Sulphonal**, about 15s. per lb.; little interest shown in offers at about this rate. **Terpin Hydrate**, about 1s. 9d. per lb.; this market is fairly steady, but quiet. **Thymol**, about 15s. per lb.; offers at this rate, with buyers scarce.

Coal-tar Products, Intermediates, Etc.—Pitch is nominal on spot, but fair business is being done for forward delivery at firmer rates. Carbolic acid crystals are again cheaper. Naphtha is also lower. Other products show no material change. The market generally is extremely quiet. **Aniline Oil**, 9½d. to 10d. per lb., drums free; last week's easier price is still quoted, with business lacking. **Aniline Salt**, 9½d. to 10d. per lb., casks free; there has been no further alteration in the quoted price. **Betanaphthol**, about 1s. 1d. to 1s. 2d. per lb.; business remains very quiet—quoted rates are easy. **Benzol**, 1s. 7d. per gallon, f.o.r. makers' works, in buyers' packages; quoted rates are unchanged—business very poor. **Toluol**, 2s. per gallon, f.o.r. makers' works, in buyers' packages; the demand remains slow—quoted price shows no change. **Xylol**, pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; there has been no improvement in business—prices are unaltered. **Naphtha**, about 1s. 5d. per gallon; a further depreciation is recorded and business is still very unsatisfactory. **Solvent Naphtha**, 90—160, 1s. 5d. per gallon, drums extra; the market has been dull—no change in price. **Heavy Solvent Naphtha**, 90—190, 1s. 4d. per gallon, drums extra; the market has been almost idle—quoted rates unchanged. **Special Oil**, for Diesels and motors, 10d. per gallon, barrels free; this product is seldom called for—quoted as last week. **Burning Oil**, crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; there has been very little demand of late—prices are unaltered. **Creosote Oil**, 10d. per gallon, naked f.o.b.; this market holds steady, but has been quieter during the past week. **Carbolic Acid**, crystals, about 1s. 2d. per lb.; a sharp drop in price has taken place and the market remains very flat. **Naphthalene**, about £20. per ton; market steady, but dull; crude, £7. to £13.; crystals, £21.; powdered, £17. 10s.; balls, £24.; tablets, £28.; candles, £28. per ton, packages free. **Disinfectants**, 3s. 9d. per gallon, barrels free; this old rate continues to be quoted, with the demand small. **Pyridine**, 18s. per gallon; the spot market has practically nothing to offer—prices as quoted are very firm. **Hexamethylene**, 4s. to 4s. 3d. per gallon; this market keeps very steady at these rates. **Pure Methyl Alcohol**, £100. per ton, ex wharf, London; spot stocks are still restricted—quoted prices from dealers are firm. **Pitch**, 132s. 6d. per ton, spot London, nominal; no business reported; 145s. is quoted for forward positions, and a fair volume of business is said to have been done.

ITALIAN CHEMICAL MARKET.

Genoa, June 30.

Notwithstanding the considerable rise in the value of the English pound, the smaller demand for industrial chemicals caused a reduction in prices of most products. The activity in the soap and cotton industries, however, together with the higher lire quotations, increased the price of caustic soda. The sulphur position was much better, the demand being of larger dimensions. It is probable that the reduction of stocks will lead to higher prices in the near future. Quotations during the month were as follows, prices being per 100 kilos. at Milan, unless otherwise stated:—**Caustic Soda**, 70-72%, Italian, 185 lire; American, 76-78%, 210 lire; English, 190 lire; French, 190 lire. **Carbonate of Soda**, 98-100%, Italian, 75 lire; English, 79 lire (Genoa); American, 78 lire (Genoa); demand continues very good. **Soda Crystals**, 50 lire. **Alum**, crystals, 85 lire; demand very fair. **Bicarbonate of Soda**, powder, bags, 159 lire (Genoa). **Bichromate of Soda**, 445 lire (Genoa); **Bichromate of Potash**, crystals, 590 lire. **Borax Crystals**, 99%, in kegs, 425 lire; in fair request. **Carbonate of Ammonia**, lump, 430 lire; powder, 370 lire; in brisk demand. **Carbonate of Magnesia**, pure, 430 lire; demand very fair. **Chlorate of Potash**, crystals, 290 lire; in little request; powder, 310 lire (Genoa). **Acetone**, pure, 98-99%, 1,250 lire; little called for. **Glacial Acetic Acid**, 99%, 1,300 lire. **Boric Acid**, crystals, 800 lire. **Lactic Acid**, 80%, 600 lire. **Bisulphite of Soda**, crystals, 350 lire. **Formaldehyde**, 40%, 860 lire. **Phosphate of Soda**, 160 lire; in better demand. **Hyposulphite of Soda**, crystals, 120 lire. **Metabisulphite of Potash**, 400 lire. **Nitrite of Soda**, 96-98%, dull at 295 lire. **Permanganate of Potash**, crystals, 800 lire; in little call. **Sulphate of Alumina**, crystals, 18%, 100 lire; 14-15%, 75 lire. **Sulphate of Zinc**, 180 lire. **Citric Acid**, crystals, 1,900 lire. **Sulphate of Iron**, 50 lire. **Hydrofluoric Acid**, 50%, 600 lire. **Oxalic Acid**, crystals, 660 lire. **Tartaric Acid**, crystals, 1,350 lire; a little better demand. **Chloride of Ammonia**, lump, 98-100%, 650 lire (Milan); powder, 95-96%, 325 lire (Genoa). **Chloride of Calcium**, 75-80%, 70 lire. **Bleaching Powder**, French, 110-115%, 90 lire; electrolytic, 100 lire. **Cream of Tartar**, 98-99%, powder, 930 lire. **Yellow Prussiate of Potash**, crystals, 2,000 lire. **Yellow Prussiate of Soda**, crystals, 1,400 lire. **Silicate of Soda**, Italian, 38-45%, 65 lire; crystals, 85 lire; English, 140° Tw., 100 lire; usual good demand. **Sulphate of Soda**, crystals, 43 lire; powder, 65 lire. **Sulphate of Magnesia**, crystals, 50 lire. **Chloride of Magnesia**, solid, 80 lire. **Hydrochloric Acid**, 20—21° Bé., 25 lire. **Sulphuric Acid**, 50Bé., 20 lire; 66 Bé., 45 lire. **Nitric Acid**, 36° Bé., 145 lire; 42° Bé., 180 lire. **Benzaldehyde**, 3,500 lire, in quiet demand. **Tannic Acid**, 80%, 2,000 lire; in fair request. **Aluminium Acetate**, 160 lire. **Lead Acetate**, yellow, 560 lire; white, 570 lire; in fair demand. **Beta Naphthol**, 2,800 lire; in fair demand. **Barium Peroxide**, 1,000 lire. **Sodium Peroxide**, 1,800 lire; in fair request. **Red Prussiate of Potash**, in fair inquiry, at 3,150 lire. **Caustic Potash**, 88-92%, 380 lire. **Tartar Emetic**, powder, 1,200 lire. **Mineral Superphosphate**, 28 lire. **Bone Superphosphate**, 52 lire. **Basic Slag**, 16-18%, 37 lire. **Nitrate of Soda**, 15-16%, 142 lire. **Nitrate of Ammonia**, 15—16%, 125 lire. **Nitrite of Lime**, 12—13%, 110 lire; in limited request. **Sulphate of Ammonia**, 20-21%, 170 lire; in good supply. **Sulphate of Copper**, 98-99%, Italian, 225 lire; foreign, 226 lire. **Chloride of Potash**, 72 lire. **Sulphate of Potash**, 90 lire. **Calcium Cyanamide**, 15—16%, 110 lire. **Sulphur**, refined, in blocks, 55 lire (Catania, Sicily); 70 lire (Milan). **Sulphur**, sublimed, 70 lire (Catania, Sicily); 77 lire (Genoa). **Green Olive Oil**, 360 lire; better requested. **Pure Olive Oil**, Riviera, 825 lire; Pari, 650 lire; Molfetta, 625 lire; Bitonto, 650 lire; Calabria, 625 lire; refined, 750 lire. **Crude Tar** fell from 325 to 320 lire.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £64. 15s. to £64. 17s. 6d., cash; £65. 5s. to £65. 7s. 6d., three months; electrolytic, £71. 10s. to £72. **Tin**: Standard, £176. 2s. 6d. to £176. 5s., cash; £177. 5s. to £177. 7s. 6d., three months; Straits, £179.; English, £177. **Lead**, soft foreign, £23. 17s. 6d., prompt; English, £25. 5s.; chemical sheet, 33s. per cwt. for 2-ton lots, delivered. **Spelter**, prompt, £27. 15s.; hard, £25. 5s. **Antimony**, English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium**, 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel**, £130., delivered; £130. to £135. for export, f.o.b. **Mercury**, £10. 10s. **Bismuth**, 10s. **Platinum**, 500s. per oz. **Wolfram**, spot, 13s. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust**, quotations are lower, as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. Wednesday.

There has been rather better inquiry during the last week for heavy chemicals both on home and export account, but values generally continue in buyers' favour. For alkali products the home quotations are maintained at recent rates, though there are cheaper supplies offering from the Continent. **Bleaching Powder** unchanged at £11. 7s. 6d., softwoods, on rails. **Glauber's Salt** easier at £4. per ton, carriage paid, but only in small demand. **Chlorates** are in better request, **Potash** at 2⅞d., and **Soda** 2¾d. per lb. **Bichromates** are unchanged. **Roasted Saltcake** still in active request for export, and price firmer at £4. 15s. to £5. per ton, f.o.b. Liverpool; price for home consumption is unchanged at £4. 10s., carriage paid. Imported American **Sulphur** dearer at £5. 5s., on rails. For **Sulphate of Copper**

there is only small demand, and price nominal at £26. f.o.b. Liverpool. Quotations for **Phosphate** and **Commercial Hyposulphite of Soda** are easy, and business is reported as only small. **Nitrite of Soda** steady at £26. 10s., ex store. Concentrated **Sulphide** at £14. 10s. to £15. per ton, carriage paid. White powdered **Arsenic** is more plentiful, and price lower. Yellow **Prussiate of Potash** easier at 1s. 3d. per lb.; **Soda** unchanged at 7d., carriage paid. **Caustic** and **Carbonate of Potash** are freely offered, and prices have a lower tendency. Grey and brown **Acetate of Lime** continue in short supply, and price is well maintained. **Acetic Acid** firmer at £47. 10s., ex store, for 80%. **Acetate of Soda** in better request, and price firm at £24. 10s., ex store. **Miscible Wood Naphtha,** 6s. 9d. per gallon. **Acetone** quoted at £118. per ton. For **Lead Salts** there is more inquiry, and quotations are steady; white and brown **Acetate** £42., net, per ton, carriage paid. **Barium Chloride** easier at £14. 10s. to £15. per ton. **Green Copperas** is selling freely, but prices show no improvement. **Oxalic Acid** dull at 6d. to 6¼d. per lb., ex store. **Permanganate of Potash** lower at 9¾d. to 10d. per lb.

SWANSEA MARKET REPORT.

WEDNESDAY.

Very little business was transacted in **Tinplates,** the prices being on the basis of £1. 3s 1½d. per standard box, f.o.b. **Galvanised Sheets** met with a weak demand, and easier quotations £18. 7s. 6d. per ton, f.o.b. **Copper** exhibited weakness at £64. 12s. 6d. per ton prompt and £65. 2s. 6d. three months. **Tin** was neglected and easier at £176. 12s. 6d. per ton prompt, and £177. 17s. 6d. three months. **Lead** in small demand at £23. 17s. 6d. per ton for foreign prompt, and £23. 2s. 6d. three months; English, £25. 5s. **Spelter** depressed at £28. 2s. 6d. per ton prompt, and £28. 12s. 6d. forward. **Zinc Sheets,** £36. 7s. 6d. per ton f.o.r. **Sulphate of Ammonia** remains quiet for home wants at lower rates. **Sulphate of Copper** slow at £26. 7s. 6d. per ton, less 5% in casks f.o.b. **Nitrate of Soda** quiet, with prompt at £13. 7s. 6d. per ton, and forward £13. 12s. 6d. **Bone Meal,** little demand, with prompt at £8. 12s. 6d., in bags. **Sulphuric Acid** in steady demand at £3 12s. 6d. to £7. 2s. 6d. per ton on rails at works. **Pitch** firmer at £5. 12s. 6d. per ton, ex ship. **Oxalic Acid** remains in quiet demand at 6¼d. per lb. on rails. **Copperas,** in fair request at £2. 2s. 6d. per ton, including delivery certain radius. **Arsenic,** rather quiet, and down in price at £71. 2s. 6d. per ton for white powdered. **Turpentine** quiet, with American prompt at £4. 7s. 6d. per cwt. **Linseed Oil** steady, with raw prompt £2. 5s. 3d. per cwt. **Cottonseed Oil** firm, common edible £2. 3s. 6d., and deodorised £2. 6s. 8d. per cwt. **Cocoanut Oil** in fair demand and steady, with Ceylon at £2. 3s. 10d. per cwt. **Olive Oil,** quiet at £67. 7s. 6d. per ton. **Rape Oil** slow; refined, prompt, £2. 7s. 3d. per cwt. net in barrels. **Cod Oil** steady, with Newfoundland scarce and nominal. English, £1. 13s. 6d. per cwt. in barrels. **Palm Oil** very quiet; Lagos, prompt, £35. 10s. 6d.; soft, prompt, £36. 7s. 6d., and forward, £34. 15s. 3d.; mediums, £36. 10s. 6d.; and hards, £36. 15s. 6d. per ton. **Coal** steadier; best Admiralty smokeless, £1. 10s. to £1. 12s. 6d.; seconds, £1. 9s. to £1. 10s.; ordinaries, £1. to £1. 9s. Monmouthshire, black vein, £1. 9s. to £1. 10s., all per ton f.o.b. **Anthracite** firm, with supplies limited; best large, £2. 10s.; seconds, £2. 2s. 6d.; French nuts, £3. 2s. 6d. per ton f.o.b. **Patent Fuel** was rather quiet at £1. 15s. to £1. 17s. per ton f.o.b. **Cokes** on better supplies were offered more freely at £2. 10s. to £2. 12s. 6d. per ton f.o.b.; foundry, £2.; and furnace, £1. 10s. to £1. 12s. 6d., in trucks, at ovens.

LIVERPOOL CHEMICAL MARKET.

WEDNESDAY.

A steady but moderate demand for chemicals of the heavier kinds can again be reported as far as the home branch of the trade is concerned. Business in the textile branches of trade is reported to be quiet, but the few brighter and warmer days that have come have given a better tone to the market as presaging better trade. In the export branch of the trade there have been more inquiries for chemicals, and shipments have been fairly active. **Bleaching Powder** has had a freer inquiry and shipments have been on a fair scale. The price is £10. to £11. per ton for home-trade use and £11. per ton for export. **Calcium Chloride** has been rather more in demand, and is £5. 17s. 6d. per ton. **Caustic Soda** has had a very fair sale on home-trade account, and has been shipped freely for foreign ports. Quotations are: £20. 7s. 6d. to £21. 7s. 6d. per ton for 76 per cent., carriage paid, for the home trade, and £20. 10s. per ton for export. **Bicarbonate of Soda** has been rather more in demand for the home trade, and has had active shipments to overseas ports. It is £10. 10s. per ton, carriage paid, for use in the United Kingdom. **Soda Crystals** have been in fair demand on home-trade account, and are £5. 5s. per ton, carriage paid, for use in the U.K. **Nitrate of Soda** has again had a moderate inquiry, and is £13. 5s. to £13. 10s. per ton. **Borax** has been in very fair request. Commercial crystals are £27. per ton, and powdered, £28. Higher grades are: Crystals, £31. per ton; powdered, £32. per ton, carriage paid, in the United Kingdom. **Saltcake** has been more inquired for, on home-trade account, chiefly for forward dates. The price is £4. 10s. to £5. per ton for the home trade, and £5. 10s. to £6. per ton for export. **Bichromate of Soda** has been but little in request, and is 4½d. per lb. **Ammonia Alkali** has been steadily called for on home-trade account, and has again had a free shipment for foreign ports. It is £7. 12s. 6d. per ton for use by by the home-trade, and £8. per ton for export. **Hyposulphite of Soda** has been in fair request. It is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £17. per ton, in 1cwt. kegs, for photographic. **Sulphide of Soda** has been very quiet. The price is £16. per ton for solid and £10. per ton for crystals. **Chlorate of Soda** has had a limited inquiry, and is 3d. to 3½d. per lb. **Phosphate of Soda** has moved but slowly, and is £15. to £16. per ton. **Prussiate of Soda** has been in moderate demand, and is 7d. to 8d. per lb. **Yellow Prussiate of Potash** has been quieter, and is 1s. 4d. to 1s. 4½d. per lb. **Red Prussiate** has had a limited sale, and is 4s. per lb. **Carbonate of Potash** has been but little called for, and is £26. to £32. per ton, according to quality. **Nitrate of Potash** has been rather more in request, and is £33. to £35. per ton for refined. **Chlorate of Potash** continues quiet, and is 4d. to 4½d. per lb. **Caustic Potash,** has been quieter, and is £32. to £33. per ton. **Permanganate of Potash** has been in good request, and is 10d. to 10½d. per lb. **Bichromate of Potash** has been inactive, and is 5¾d., c.i.f., to usual ports. **Salammoniac** has been rather more in request. First quality is £63. per ton; second quality is £60., and third, £57. **Sulphate of Ammonia** has had a very limited inquiry for use by the home-trade, but has had a rather active shipment for foreign ports. Neutral is £14. 15s. per ton, and ordinary £13. 12s. **Carbonate of Ammonia** has been steadily called for, and is 4d. per lb. **Muriate of Ammonia** has been but little in demand, and is £32. to £33. per ton. **Magnesia** has been rather more in request. **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. 10s. per ton. **Alum** has sold more readily. For the home trade £12. to £13. per ton is quoted, and for export £11. 10s. to £12. per ton. **Sulphate of Alumina** continues quiet, and is £8. to £12. per ton, according to quality. **Sulphur** has been more inquired for; flowers are £10. per ton, roll is £8. 10s., rock £8. to £8. 10s., and American £5. to £5. 10s. per ton. **Tartaric Acid** has had a moderate sale, and is 1s. 4d. to 1s. 4½d. per lb. **Cream of Tartar** has been in good request. It is £4. 10s. to £4 13s. per cwt. **Boric Acid** has been rather more in demand; commercial crystals are £50. per ton, and powdered £53., and £2. per ton more, if in casks. **Citric Acid** has been quieter, and is 1s. 9d. to 1s. 10d. per lb. **Oxalic Acid** has been inactive, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** has been quiet, and is £43. to £44. per ton. **Sulphate of Copper** has been but little in demand, on home-trade account, but has been shipped more largely for foreign ports. It is £26. 10s. to £27. per ton, less 5 per cent., in casks, f.o.b. at Liverpool. **Arsenic** has had a very limited sale; white powdered is £71. per ton.

WEST OF SCOTLAND CHEMICALS.

WEDNESDAY.

The semi-stagnation experienced in this market lately contines to retard business, and trade during the week has been of small dimensions. There is little inquiry either on home or export account, and prices hold steady with the exception of white acetate of lead, which is 10s. lower, and magnesium chloride, which has been reduced to £3. per ton. Quotations at Glasgow, unless otherwise stated, are as follows. **Alum,** little doing, and in small demand; lump £13., and ground £12. 5s. per ton. **Arsenic** continues in short request, and supplies are still very scarce; it is quoted on spot at £77. net. **Barium Chloride** remains very quiet.

despite the recent reduction to £16. per ton. **Bleaching Powder** does not show much movement, and the quotation still stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax**, granulated is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride**, 70—75 per cent. solid, £5. 12s. 6d. per ton **Citric Acid** remains a steady market at 1s. 8¾d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure of £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar** firm, with better inquiry, and the price continues steady at £4. 10s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in quieter demand; brown steady at £40. 10s. per ton, net, and white lower at £40. 10s. per ton, net. The market for **Magnesium Chloride** is slower, with quotation reduced to £3. per ton. **Oxalic Acid**, at 6½d. per lb., is dull, but this price is still held. **Paraffin Wax** experiences a fair export trade at 2¾d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull round about 1s. 5d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 11s. per ton, but business is nominal. **Sodium Bichromate** remains steady, with business on the basis of 4¼d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic**, 43—44%, in fair request at 1s. 1½d. **Tartaric Acid** still shows a quieter tendency at 1s. 3¾d. per lb.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending June 30.

AMMONIA (ANHYDROUS)—
Rouen, 74 cylds.

ANTIMONY SALTS (*otherwise undescribed*)—
Rouen, 5 cks.

BARIUM SULPHATE (BLANC FIXE)—
Bremen, 35 cks.

BARYTES—
Antwerp, 200 bgs.
Bremen, 300 bgs.
Hamburg, 41 cks.

CARBON BLACK—
New York, 25 cs.

CAUSTIC POTASH—
Hamburg, 46 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 325 pkgs.

CITRIC ACID—
Palermo, 20 cks.

COAL TAR PRODUCTS—
Naphthalene
Hamburg, 60 brls.

CREAM OF TARTAR—
Barcelona, 38 brls.

DEXTRINE—
Hamburg, 50 bgs.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 250 bxs.

GELATINE—
Bremen, 7 cs.

GLUCOSE—
Ghent, 100 brls.
New York, 600 brls.

GLUE—
Antwerp, 18 bls.

IRON OXIDE—
Malaga, 147 brls.

LITHOPONE—
Hamburg, 40 cks.

MAGNESITE—
San Marina, 7,683 bgs.

PARAFFIN WAX—
Rangoon, 320 bgs.

PLUMBAGO—
Genoa, 120 bgs.

POTASSIUM CHLORATE—
Rouen, 180 cks.

RED LEAD—
Genoa, 69 cks.

ROSIN—
Jacksonville, 2,830 brls.
Savannah, 250 brls.

SALT—
Hamburg, 300 brls., 270 bgs.

SILVER SALTS (*otherwise undes.*)—
Hamburg, 499 bgs.

SODIUM PHOSPHATE—
Antwerp, 5 pkgs.

SODIUM SULPHATE—
Hamburg, 206 bgs.

SULPHUR—
Catania, 250 bgs.

TANNING MATERIALS—
Chestnut
Leghorn, 100 brls.
Sumac
Palermo, 100 bgs.
Unspecified
Bordeaux, 50 cks.

TARTAR EMETIC—
Rouen, 5 cs.

TARTARIC ACID—
Palermo, 72 cks.

TURPENTINE—
Jacksonville, 600 cks.
Savannah, 350 brls.

WHITE LEAD—
Hamburg, 40 cks.
New York, 9 cks.

ZINC OXIDE—
Antwerp, 56 brls.

GOOLE.

Week ending June 30.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Ghent, 29 cks.

GLUE AND SIZE—
Boulogne, 27 bls.

HYDROGEN PEROXIDE—
Ghent, 80 crbys.

MAGNESITE—
Amsterdam, 50 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 18 drms.

PLUMBAGO—
Boulogne, 4 cks.

POTASSIUM SALTS (*otherwise undescribed*)—
Bremen, 1,000 bgs.

GRANGEMOUTH.

Week ending June 30.

ARSENIC—
Bordeaux, 3 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 1 ck.

FERRO SILICON—
Christiansand, 67 brls.

LITHOPONE—
Rotterdam, 8 cks.

MAGNESITE—
Christiansand, 204 bgs., 186 cs.
Trieste, 13,200 bgs.

OXIDE (*otherwise undescribed*)—
Antwerp, 20 brls.

GRIMSBY.

Week ending June 30.

ASBESTOS—
Dieppe, 4 bls.

CALCIUM CARBIDE—
Rotterdam, 402 drms.

GLUE—
Antwerp, 30 bls., 154 pkgs.

METHYL CHLORIDE—
Dieppe, 1 cs.

NITRIC ACID—
Christiania, 343 drms.

WHITE LEAD—
Antwerp, 5 cks.

HULL.

Week ending June 30.

CALCIUM CARBIDE—
Christiansund, 35 t.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 10 c.; Antwerp, 25 t.; Copenhagen, 20 galls.; Ghent, 5 t.; Hamburg, 31 t. 1 c.; Palermo, 1 t.; Rotterdam, 16 c.

COAL TAR PRODUCTS—
Pitch
Helsingfors, 16 t.
Tar
Gefle, 7 t.

DEXTRINE—
Harlingen, 9 t. 17 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 438 lb.
Rotterdam, 1,207 lb., 9 c.

FERRO MANGANESE—
Gothenburg, 5 t.

FERRO SILICON—
Cruz, 30 t.; Christiania, 102 t.

FERTILISERS (*otherwise undes.*)—
Antwerp, 55 t.

KAINIT—
Antwerp, 50 t.

MAGNESITE—
Amsterdam, 9 t. 17 c.
Trieste, 550 t.

NITRATE OF LIME—
Christiania, 7 t.

ROSIN—
Hamburg, 4 t.
Pasages, 149 t.

SOAP—
Hamburg, 1 c.; Harlingen, 6 c.; Marseilles, 1 t.

STEARINE—
Antwerp, 2 t. 18 c.

SULPHUR—
Catania, 40 t.

TAR (WOOD)—
Gefle, 6 t. 13 c.

LEITH.

Week ending June 30.

ACETIC ACID—
Rotterdam, 16 cks.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 34 cks.

BARYTES—
Antwerp, 250 bgs.
Hamburg, 38 cks.

FORMIC ACID—
Rotterdam, 130 bllns.

GLUE—
Hamburg, 200 bgs.

LITHOPONE—
Hamburg, 50 cks.
Rotterdam, 10 cks.

POTASSIUM PRUSSIATE—
Bordeaux, 16 cs.

SALT—
Hamburg, 100 bgs.

SOAP—
Copenhagen, 3 cs.

SODIUM SULPHATE—
Hamburg, 50 bgs.

SUPERPHOSPHATE—
Ghent, 500 bgs.

LIVERPOOL.

OFFICIAL AMENDMENTS.

To Return for week ending Mar. 17.
Deduct—

TALLOW—
Rio de Janeiro, 270 t.

To Return for week ending Mar. 17,
Add—

TALLOW—
Rio de Janeiro, 1,167 cks.

To Return for week ending April 7,
Deduct—

TANNING MATERIALS—
Quebracho
Buenos Ayres, 1,184 bgs.

Week ending June 30.

ACETIC ACID—
Montreal, 78 brls.

ACETONE—
Hamburg, 31 brls.

ARGOLS—
Oporto, 398 bgs.

BARIUM SULPHATE—
Antwerp, 18 cks., 50 bgs.

BARYTES—
Genoa, 100 cks.
Hamburg, 62 brls., 74 cks.

BEESWAX—
Alexandria, 6 pkgs.

BORAX—
San Francisco, 38 sks., 12 brls.

BORIC ACID—
Leghorn, 156 brls.

CARBON BLACK—
Nantes, 255 bgs.
New York, 220 cs.

CARNAUBA WAX—
Parnahyba, 30 bgs.

CASEIN—
Buenos Ayres, 411 bgs.

COAL TAR PRODUCTS—
Unspecified
New York, 2 cs.

CREAM OF TARTAR—
Bordeaux, 10 cks.
Valparaiso, 74 bgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 100 cks.

FERRO SILICON—
Antwerp, 20 cks.

GLUCOSE—
Newport News, 180 brls.

GLUE—
Antwerp, 4 bls.; Havre, 10 bls.

KIESELGUHR—
Algiers, 207 bgs.

LACTIC ACID—
Hamburg, 87 cks.

MAGNESIUM CHLORIDE—
Hamburg, 36 drms.

MANGANESE ORE—
Calcutta, 3,000 t.
Marmagoa, 2,000 t.
W. C. Africa, 5,901 t.

METHYL ALCOHOL—
Philadelphia, 39 drms.

PARAFFIN WAX—
Blatimore, 452 brls.
New York, 527 brls.
Philadelphia, 220 brls.

PHOSPHATE ROCK—
Sfax, 3,400 t.

POTASH—
Montreal, 23 brls.

ROSIN—
Bordeaux, 211 cks.
Trieste, 1 cs.

SALAMMONIAC—
Hamburg, 14 cks., 39 brls.

SALT—
Hamburg, 50 bgs.

SOAP—
Bari, 200 bxs.

SODIUM BICHROMATE—
Baltimore, 6 cks.

STEARINE—
Antwerp, 8 bgs.; Buenos Ayres, 142 cks.; Hamburg, 300 cs.; Monte Video, 90 trcs., 11 cks.

TALLOW—
Buenos Ayres, 746 ½ pps., 251 pps., 279 cks., 591 trcs.; Fredriksstad, 350 brls.; Monte Video, 166 pps., 574 brls.; Rio Grande, 721 pps., 266 cks., 2,512 hhds.; Wellington, 71 cks

TANNING MATERIALS—
Divi Divi
Calcutta, 521 pkts.
Myrabolans
Calcutta, 9,364 pkts.
Quebracho
Buenos Ayres, 1,596 bgs.
Rosario, 8.418 bgs,

TANNING MATERIALS—
Sumac
Bordeaux, 1,038 cks.
Palermo, 500 bgs.
Wattle
Natal, 9,612 bgs.
Unspecified
Norfolk (Va.), 301 brls., 585 bgs.

TAR (WOOD)—
Danzig, 100 brls.

TARTAR EMETIC—
Havre, 11 cks.

TARTARIC ACID—
Hamburg, 60 cks.

TIN ORE—
Lisbon, 1,200 bgs.

VANADIUM ORE—
Callao, 350 sks.

WAX (*otherwise undescribed*)—
Boston, 5 brls.; New York, 1 cs.

ZINC OXIDE—
Antwerp, 60 brls.

ZINC SULPHATE—
Hamburg, 14 brls.

ZINC WHITE—
Antwerp, 15 brls.

LONDON.

OFFICIAL AMENDMENTS.

Return for week ending May 5,

FERTILISERS (*otherwise undes.*)—
Belgium, 73 t. H. Knight
Should read
PHOSPHATE OF LIME—
Belgium, £628. H. Knight

Week ending June 30.

ACETIC ACID—
Canada, 54 pkgs. Greeff
Germany, 11 Reitmayer, Calburn & Kindersley
,, 100 T. H. Jones

ACETONE—
Yugo Slavia, 10 t. 3 c.

AMMONIA—
France, 2 t. 9 c. Fl. Bourgeois

AMMONIUM PERSULPHATE—*
——— £484.

ANTIMONY OXIDE—
China, £420. Typke & King

ANTIMONY REGULUS—
China, 10 t. Hoare & Wilson

ANTIMONY SULPHIDE—
Germany, £140. J. Schmurmann

ARGOLS—
France, 735 pkgs.

ARSENIOUS ACID—
Portugal, 19 pkgs.

ASBESTOS—
Finland, 34 t. 10 c.
,, 9 17 J. G. Hems
Rhodesia, 165 11 W. Hamsher

BARYTES—
Belgium, 200 bgs. Felton & Crepin
Germany, 150 G. Elliott
,, 58 cks. Dexters
,, 94 W. Harrison
,, 100 pkgs. R. Baker
,, 30 pkgs. Dixon's White
,, 70 Burrell
,, 27 Taylor & Cox

BEESWAX—
Egypt, 17
Spain, 80 pkgs. Davies, Turner & Cocquyt

BLEACHING POWDER—
Germany, 80 t. 14 c. J. M. Steel

BROMINE—
Germany, £301. Scheuer

CAMPHOR—
France, 7 cs. Gerhard & Hey

CANDELILLA WAX—
U.S.A., 24 bgs. P. B. Broomhall

CARBON BLACK—
U.S.A., 25 cs.
,, 25 A. R. Gibbon
,, 22 cs. Taylor &
,, 150 brls. Cox

CARBON TETRACHLORIDE *
——— £300.

CARNAUBA WAX—
Belgium, 47 bgs. Gerhard & Hey
Brazil, 44
,, 111 Weber Smith & Hoare

CASEIN—
Argent. R., £1,618 S. Rogers
France, £920. Brit. Xylonite
,, £2,940. Guesdon
,, £21.
,, 5 t.
,, £320. Jones, Moore
Germany, £20.
,, £269. Cox, Fallas & Eves
Irish F.S., £1,519.
N.Z., £2,530. J. Nathan

CAUSTIC POTASH—
Germany, 28 pkgs. Bush, Beach & Gent
,, 17 J. N. Steel
U.S.A., 2

CHEMICALS (*otherwise undescribed*)
France, £98.
Germany, £59. Greeff
,, £25. Wilkinsons & Wall
Holland, £14.
U.S.A., £97.

CHEMICALS (*undescribed undes.*)*
£1,236.

CITRIC ACID—
Belgium, 4 pkgs. Kemball Bishop
Italy, 40
,, 60 Leach
,, 80 J. Knill

COAL TAR PRODUCTS—
Tar
Poland, 111 brls. T. W. Beard
Sweden, 150
,, 40 cks.
U.S.A., 100 brls. C. F. Bowring
Tar Oil
Finland, 5 brls.
Sweden, 50 cks.
Unspecified
U.S.A., £778. Wailes Dove Bitumastic

COBALT OXIDE—
Canada, £1,575. E. A. Kimpton

CREAM OF TARTAR—
Germany, 100 pkgs. Greeff

DEXTRINE—
Germany, 10 t. K. J. Mulder
,, 2 H. Keller
Holland, 19 c. Rubeck Thew
,, 11 t. 10 c.
,, 1 R. Windmuller
,, 3 7 M. N. Thacker
,, 25 J. W. Cook
,, 1 19 Gough, Kidston

DYESTUFFS (ARTIFICIAL)—
Alizarine
Germany, 1 pkg.

DYESTUFFS (NATURAL)—
Annatto
Denmark, 1 pkg.
Cochineal
Canary Is. 2 pkgs.
Cutch
Belgium, 100 pkgs. Barrow, Hepburn & Gale
Burmah, 450
Turmeric
Brit. India, 727 pkgs.
Unspecified
France, £24.
,, £39. Lazard Godchaux
Canada, 49 pkgs. Knight & Morris
Belgium, £52. Lazard Godchaux
Germany, 20 pkgs. Greeff
,, £21. A. Potter
,, £136. Stott & Hotopf

DYESTUFFS (NATURAL)—
Unspecified
Germany, £412.
,, £36.
Switzerland, £280.
,, 5 pkgs.

FERTILISERS (*otherwise undes.*)—
Egypt, 20 t. H. Knight
France, 15
Holland, £7. Stockwell
Latvia, 29 t. R. Green

GELATINE—
Belgium, £2,571. Duche
France, £40. C. T. Symons
,, £283. Soc. des Prod. Chim.
Germany, £31. W. A. J. Tilleray
,, £26. Crowe
,, £34. Townsend
,, £66.
Holland, £33. Stancourt & Muir

GLUE—
Austria, £432. P. Ingenlath
Belgium, £40. Duche
,, £37.
France, £15. Crowe
,, £250. P. Ingenlath
,, £40. Mory
,, £386.
,, £85. O. Murray
,, £601. Soc. des Prod. Chim.
,, £45. L. Duforest
,, £25. Van Oppen
Holland, £258. P. Ingenlath
,, £75. Stancourt & Muir
Hungary, £1,580. P. Ingenlath
,, £70. Van Oppen
Italy, £750.
U.S.A., £135. H. C. Hackney

GLYCERINE—
Holland, £117.

ISINGLASS—
Brazil, 8 cs. S. Figgis
,, 3
Burmah, 15 Hale
Brit. India, 19 Major & Field
Belgium, 1 blc.
Japan, { 2 brls. W. M. Smith
{ 10 bls.

LITHOPONE—
Belgium, 1 ck. Taylor & Cox
Germany, 60 M. Ashby
Holland, 180 F. T. H. Nye
,, 60 M. Ashby

MAGNESITE—
Holland £29. Scheuer

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slov., 49 cks. Henderson Craig
Egypt, 17 bgs. Hemingway
Portugal, 1 brl.

MONTAN WAX—
Germany, 40 bgs. E. E. Mayer
,, 20 E. Friedlander
,, 100 Holroyds Oil & Cer.

NITRATE OF LIME—
Norway, £350. Perkins & Homer

OCHRE—
France, 200 bgs.
,, 27 cks. L. Le Personne

PARAFFIN WAX—
Burmah, 25 t. Asiatic Petro.
,, 5 Burmah Oil
U.S.A., 64 18 Anglo-Amer. Oil

PITCH (*otherwise undescribed*)—
Finland, 20 brls.

PLUMBAGO—
Ceylon, { 194 cks. A.
{ 147 brls. Bramwell
,, 15 Litchfield & Saundy
Germany, 222 bgs. J. G. Hems
,, 45 dbl. bgs. Hall & Hall

POTASSIUM CARBONATE—
Canada, 5 pkgs. Charles & Fox
Germany, 54 Bush, Beach & Gent
,, 22 J. M. Steel

* Entered under the Safeguarding of Industries Act.

POTASSIUM NITRATE—
Belgium, 50 pkgs. H. H. Poole

POTASSIUM PERSULPHATE—*
——— £118.

PRUSSIAN BLUE—
Holland, 2 cks. Taylor & Cox
,, 16 H. Keller

RED LEAD—
Germany, 36 A. & M. Zimmermann

ROSIN—
France, 25 cks. Lowden, Connell
,, 100 Bigland & Jeffries
,, 27 Rosin & Turp. Imp.
Norway, 55 brls. Stromwall
Portugal, 46 cks. W. R. Green
U.S.A., 100 brls. P. Watts
,, 800 Bigland & Jeffries
,, 100
,, 500 Fox Stockell
,, 200 Rosin & Turp. Imp.

SALT—
Germany, 35 t.
,, 30 Swift
,, 20 S. Best
,, 40 G. J. Kanaat

SHELLAC—
Brit. India, 7 t. 6 c.
,, 17 c. Weber, Smith & Hoare
,, 7 t. 10 c. J. W. Cook
,, 24 12 Litchfield & Saundy
France, 6 c. G. T. Symons
Germany, 5 A. F. Suter
,, 2 E. Friedlander
Holland, .5 W. H. Muller
Straits Setts., 10 Litchfield & Saundy

SOAP—
Belgium, £20. S. Kalisky
Canada, £1,180. Gerhard & Hey
Denmark, £460. Beck & Pollitzer
,, £74.
France, £84.
,, £96. E. Fischel
,, £26. J. & T. Bailey
,, £16. G. T. Symons
Germany, £10.
,, £128. S. Kalisky
,, £23. E. Friedlander
,, £6. Gerhard & Hey

SOAP—
Italy, £6. F. Boehm
,, £90.
Spain, £111. A. D. Bredenerg
U.S.A., £571. Gerhard & Hey
,, £2,191. Knight & Morris
,, £272.
Victoria, £2,400. L. F. Smith

SODA CRYSTALS—
Belgium, 5 t. P. Winn

SODIUM PEROXIDE *
——— £154.

SODIUM SALTS (*otherwise undes.*)
Belgium, 1 t.

STEARINE—
Argent. Rep., 15 cks.

TALLOW—
Argent. Rep., 98 t. 16 c. H. Hill
Belgium, 6 brls. A. C. E. Garnham
,, 25 t.
,, 25 t.
N.S.W., 92 brls.
,, 13 t.
,, 10 H. C. Everett
N.Z., 1,161 t. 16 c.
,, 98 12 Weber, Smith &
,, 12 cks. Hoare
,, 35 t. 9 c. Anning & Cobb
,, 7 15 Phillips & Graves
,, 135 T. W. Renaut
,, 10 Mordaunt
,, 9 10 Weddell
,, 5 10 H. Hill

TANNING MATERIALS—
Chestnut Extract
France, 25 pkgs.
Divi Divi
Brit. India, 316 pkgs. Culverwell & Brooks
Gambier
Straits Setts., 99 A. Everingham
Myrabolans
Brit. India, 4 pkgs. Montgomeric & Workman
Sumac
Italy, 500 pkgs.
Valonia
A. Turkey, 100 t. I. I. Williamson
Unspecified
Cape, 470 t.
Germany, 65 pkgs. Brown & Forth

TARTARIC ACID—
Italy, 162 pkgs.

TIN OXIDE—
Belgium, 208 t. R. Wolff

TURPENTINE—
Finland, 29 drms. Smith & Moeller
France, 3 cks. Hernu, Peron
U.S.A., 150 brls.

ULTRAMARINE—
France, 3 cks. G. Elliott

WAX (*otherwise undescribed*)—
Belgium, 25 pkgs. Gerhard & Hey
Brazil, 113 bgs. ,,
Germany, 73 pkgs. H. Johnson
U.S.A., 28 Gerhard & Hey

WHITE LEAD—
Austria, 35 cks. Schenkers
Canada, 45 L. Bucknell

ZINC OXIDE—
Belgium, 50 cks. M. Ashby
Holland, 250 F. T. H. Nye

MANCHESTER.

Week ending June 30.

BARYTES—
Bremen, 150 bgs.
Hamburg, 150 bgs.

CARBON BLACK—
New Orleans, 785 cs.

CAUSTIC POTASH—
Hamburg, 211 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 50 bgs.

DEXTRINE—
Bremen, 28 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Dunkirk, 16 crts.
Rouen, 11 cks.

FERTILISER (DRIED BLOOD)—
Genoa, 13 bgs.

GLUCOSE—
Rotterdam, 70 cks.

LEAD ACETATE—
Hamburg, 18 brls.

LITHOPONE—
Antwerp, 40 cks.
Bremen, 60 cks.

MAGNESITE—
Rotterdam, 50 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 217 drms.

MAGNESIUM SULPHATE—
Rotterdam, 750 bgs.

MANGANESE ORE—
Calcutta, 3,000 t.

OXALIC ACID—
Hamburg, 6 cks.

POTASH (*otherwise undescribed*)
Hamburg, 26 drms.

ROSIN—
New Orleans, 100 brls.

SOAP—
Rotterdam, 100 kgs.
Valencia, 50 cs.

SODIUM CHLORATE—
Rouen, 100 cks.

SODIUM NITRATE
Rotterdam, 12 cks.

SODIUM PERBORATE—
Hamburg, 64 drms.

STEARINE—
Antwerp, 70 bgs.
Rotterdam, 13 bgs.

SULPHUR—
Galveston, 2,006 t.

TARTARIC ACID—
Genoa, 280 brls.

TIN OXIDE—
Hamburg, 20 cks.

WHITE LEAD—
Antwerp, 30 cks.

ZINC DUST—
Antwerp, 127 cks.

ZINC OXIDE—
Antwerp, 100 cks.
Rotterdam, 10 cks.

NEWCASTLE-ON-TYNE

Week ending June 30.

BARYTES—
Antwerp, 100 bgs.
Bremen, 22 cks.

CALCIUM CARBIDE—
Antwerp, 400 drms.
Christiania, 66 drms.
Stockholm, 600 drms.

GLUE—
Antwerp, 140 bls.

STEARINE—
Antwerp, 7 bgs.

N. & S. SHIELDS.

Week ending June 30.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending June 30.

CHEMICALS (*otherwise undescribed*)
Alexandria, 20 pkgs.; Algoa Bay, 10 pkgs.; Antwerp, 5 pkgs.; Bombay, 20 pkgs.; Boston (U.S.A.), 1,717 pkgs.; Cape Town, 9 pkgs.; Genoa, 45 pkgs.; Montreal, 208 pkgs.; New York, 300 pkgs.; Philadelphia, 50 pkgs. Rouen, 90 pkgs.

COAL TAR PRODUCTS
Pitch
Dunkirk, 573 t.
Tar
Alexandria, 49 t. 4 c.; Cape Town, 10 t. 5 c.; Rouen, 3 t. 17 c. Trieste, 84 galls.; Weaborg, 206 t.
Unspecified
Alexandria, 49 t.

DISINFECTANTS (*otherwise undes.*)
Alexandria, 120 drms.
Cape Town, 76 drms.

MAGNESIA—
Gothenburg, 1 t.
Rouen, 2 t. 9 c.

MAGNESIUM CARBONATE—
Antwerp, 1 t.

POTASSIUM BICHROMATE—
Alexandria, 1 t. 19 c.

POTASSIUM BICHROMATE—
Gothenburg, 1 t. 2 c.

SHEEP DIP—
Algoa Bay, 50 drms.
Cape Town, 150 drms.
East London, 500 drms.

SOAP—
Algoa Bay, 1 t. 3 c.
Cape Town, 4 t.
East London, 1 t. 2 c.

SODIUM BICARBONATE—
Cape Town, 2 c.

TAR (ARCHANGEL)—
Antwerp, 1 t. 10 c.

WAX (*otherwise undescribed*)—
Alexandria, 2 c.
Algoa Bay, qnty.

WOOD PRESERVATIVE—
Algoa Bay, 300 drms.

ZINC ASHES—
Antwerp, 5 t. 10 c.

GRANGEMOUTH.

Week ending June 30.

MAGNESIUM OXIDE—
Antwerp, 5 t. 10 c.

PARAFFIN WAX—
Bordeaux, 10 t.
Nantes, 7 t. 5 c.

SODIUM BICHROMATE—
Antwerp, 1 t.
Bordeaux, 10 t. 15 c.

HULL.

Week ending June 26.

AMMONIUM SULPHATE—
Catania, 100 bgs.; Halmstad, 1 cs.; Naples, 200 bgs.; San Pedro and San Francisco, 210 brls.

ASBESTOS—
Copenhagen, 1 trc.

BLEACHING POWDER—
Rotterdam, 24 cks.

CHEMICALS (*otherwise undescribed*)
Antwerp, 20 drms.; Algiers, 44 brls.; Copenhagen, 87 cks., 324 drms., 1 cs.; Genoa, 2 cks.; Malmo, 159 drms., 3 cs.; Rotterdam, 982 pkgs., 80 drms.

COAL TAR PRODUCTS—
Creosote Oil
Copenhagen, 50 brls.
New York, 1,803,419 galls.
Tar
Alexandria, 3 cks.
Copenhagen, 12 drms.
Tar Oil
Copenhagen, 3 brls.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Copenhagen, 10 cs.; Launceston, 1 ck.; Melbourne, 35 kgs., 1 cs.; Sydney, 7 kgs.

GLUE—
Copenhagen, 22 bgs.

SALT—
Copenhagen, 149 cs.

SOAP—
Copenhagen, 1 ck.
Malmo, 1 cs.

TALLOW—
Antwerp, 10 cks.

TANNING MATERIALS—
Unspecified
Leghorn, 50 cks.

LEITH.

Week ending June 30.

AMMONIUM SULPHATE—
Alexandria, 7,251 bgs.
Valencia, 18,500 bgs.

COAL TAR PRODUCTS—
Pitch
Dunkirk, 50 cks.

GLUE—
New York, 20 brls.

GLYCERINE—
Amsterdam, 16 drms.

* Entered under the Safeguarding of Industries Act.

ROSIN OIL—
Rotterdam, 11 brls.

SHEEP DIP—
Kopasher, 1 cs.

SOAP—
Kollefjord, 3 cs.; Kopasher, 21 cs.; Sandevaag, 2 pkgs.

SODA—
Kopasher, 7 bgs.

LIVERPOOL.

Week ending June 28.

ALUM—
Buenos Ayres, 5 t., £47.

ALUMINIUM SULPHATE—
Calcutta, 40 t., £350.; Canton, 2 t., £37.; Monte Video, 50 t., £357.

AMMONIA—
Pernambuco, 6 c., £12.

AMMONIUM CARBONATE—
Alexandria, 1 t. 7 c., £52.; Auckland, 5 c., £10.; Bari, 1 t., £31.; Bordeaux, 1 t., £36.; Colombo, 5 c., £11.; Copenhagen, 3 t. 9 c., £116.; Calcutta, 2 t., £77.; Hamburg, 1 t. 9 c., £42.; Madras, 3 t. 5 c., £143.; Melbourne, 4 t., £149.; Pernambuco, 19 c., £47.; Pt. Said, 4 c., £11.; Sydney, 2 t., £87.; Yokohama, 1 t., £32.

AMMONIUM CHLORIDE—
Alexandria, 5 t., £207.; Beyrout, 19 c., £41.; Bourgas, 19 c., £41.; Constantinople, 19 c., £41.; Rouen, 20 t. 1 c., £617.; Sydney, 2 t. 5 c., £75.; Valparaiso, 1 t. 19 c., £66.

AMMONIUM SULPHATE—
Hong Kong, 50 t., £912.

AMMONIUM SULPHOCYANIDE—
Havre, 19 c., £110.

ANTIFOULING PAINT—
Bombay, 2 t., £205.; Constantinople, 4 t. 19 c. £312.; Corunna, 1 t., £104.; Lisbon, 10 c., £26.; Montreal, 15 c., £39.; Sourabaya, 4 t. 18 c., £360.; Valparaiso, 1 t., £47.

ANTIMONY SALT (*otherwise undes.*)
Bombay, 2 t., £165.

ARSENIC—
Valencia, 2 t., £143.

BARIUM CHLORIDE—
Rouen, 15 t. 1 c., £510.

BISULPHITE OF LIME—
Amsterdam, 5 t. 3 c., £59.

BLEACHING POWDER—
Auckland, 2 t., £30.; Bombay, 25 t., £310.; Buenos Ayres, 26 t. 9 c., £314.; Constantinople, 1 t. 1 c., £12.; Christiania, 10 t. 2 c., £89.; Calcutta, 22 t. 11 c., £239.; Melbourne, 2 t. 1 c. £28.; Montreal, 13 t. 4 c., £140.; Pernambuco, 3 t., £35.; Reval, 1 t. 19 c., £20.; Sydney, 2 t., £30.; U.S.A., 12 t. 6 c., £348.; Vera Cruz, 4 t., £43.

BLEACHING SOLUTION—
Rio de Janeiro, 11 c., £58.

BOILER COMPOSITION—
Calcutta, 2 t., £18.
Singapore, 5 t., £40.

BORAX—
Monte Video, 2 c., £2.
Sydney, 3 t., £88.

BORIC ACID—
Pt. Limon, 2 c., £7.
Sydney, 2 t., £107.

CALCIUM CARBIDE—
Accra, 17 c., £22.
Bilbao, 1 t. 1 c., £31.
Pt. Harcourt, 19 c., £20.

CALCIUM CHLORIDE—
Adelaide, 5 t. 2 c., £29.; Durban, 10 t., £60.; Fremantle, 2 t. 19 c., £17.; Las Palmas, 2 t. 10 c., £15.; Melbourne, 9 t. 19 c., £57.; Montreal, 5 t. 1 c., £26.; Penang, 5 t. 7 c., £31.; Sydney, 25 t. 2 c., £148.; San Francisco, 10 t. 4 c., £60.

CARBON BLACK—
Antwerp, 2 t., £450.

CHEMICALS (*otherwise undescribed*)
Adelaide, 2 t. 10 c., £70.; Antwerp, 10 c., £45.; Auckland, 2 t. 10 c., £70.; Gefle, 10 t. 2 c., £55.; Genoa, 2 c., £20.; Lyttleton, 7 c., £10.; Melbourne, 10 t. 15 c., £921.; Mossel Bay, 5 c., £46.; Melbourne, 2 t., £22.; Sydney, 3 t. 15 c., £105.; Singapore, 2 c., £31.

CHLORINE—
Cape Town, 1 t. 10 c., £60.

CITRIC ACID—
Vera Cruz, 10 c., £92.

COAL TAR PRODUCTS—
Aniline Salt
Madras, 1 t., £90.
Carbolic Acid
Algoa Bay, 2 c., £21.; Brisbane, 5 c., £43.; Rouen, 10 t., £430.; Sydney, 3 t. 1 c., £98.; Shanghai, 2 t. 10 c., £454.
Creosote
Buenos Ayres, 18 c., £29.
New York, 35 t. 5 c., £1,747.
Mirbane Oil
Cape Town, 4 c., £12.
Naphthalene
Marseilles, 3 t., £40.
Tar
Accra, 3 t. 5 c., £34.
Lagos, 5 t. 2 c., £50.
Unspecified
New York, 27 t., £1,542.; San Francisco, 3 t. 10 c., £105.; U.S.A., 24 t. 15 c., £939.; Valencia, 1 c., £26.

COPPER OXIDE—
Buenos Ayres, 2 t., £143.

COPPER SULPHATE—
Auckland, 5 t., £134.; Bordeaux, 30 t. 6 c., £727.; Christchurch, 5 c., £7.; Dunedin, 3 t., £80.; Hobart, 8 t., £211.; Monte Video, 36 t. 17 c., £930.; San Thome, 5 t. 1 c., £125.; Sourabaya, 20 t., £360.; Wellington, 3 t., £79.

CREAM OF TARTAR—
Algoa Bay, 5 c., £22.; Hobart, 1 t., £95.; Melbourne, 1 t., £92.; Sydney, 1 t., £92.

DISINFECTANTS (*otherwise undes.*)
Alexanria, 1 t. 16 c., £81.; Batavia, 19 c., £32.; Calcutta, 7 t. 8 c., £280.; Hong Kong, 1 t. 3 c., £16.; Kilindini, 13 c., £24.; Lagos, 1 t. 3 c., £57.; La Guaira, 5 c., £16.; Madras, 1 t. 1 c., £51.; Puerto Cabello, 12 c., £42.; Rangoon, 12 c., £12.

DYESTUFFS (ARTIFICIAL)—
Indigo
Hong Kong, 2 t. 19 c., £375.; Shanghai, 12 t. 7 c., £1,590.; Samarang, 2 t. 19 c., £195.; Sourabaya, 2 t. 19 c., £495.; Tsingtau, 3 t., £370.
Unspecified
Boston, 1 t. 1 c., £320.; Barcelona, 10 c., £239.; Calcutta, 8 c., £280.; Lagos, 1 qr., £36.; Mossel Bay, 1 c., £13.; Melbourne, 1 t. 19 c., £497.; Montreal, 2 t. 16 c., £1,029.; Oporto, 1 c., £17.; Sydney, 1 t. 11 c., £539.; Shanghai, 15 c., £336.

ESSENTIAL OILS—
Synthetic
Sydney, 11 c., £685.
Switzerland, 22 lb., £19.

GLYCERINE—
Abo, 10 c., £38.; Bombay, 5 t., £450.; Barranquilla, 2 c., £13.; Cadiz, 19 c., £93.; Christiania, 1 t. 19 c., £149.; Wellington, 10 c., £42.; Yokohama, 30 t. 19 c., £2,398.

HYDROFLUORIC ACID—
Bahia, 3 c., £18.

IODOFORM—
Sapele, 11 c., £15.
Sierra Leone, 7 c., £70.

MAGNESIUM CARBONATE—
Hamburg, 1 t. 10 c., £170.

MAGNESIUM SULPHATE—
Algoa Bay, 1 t., £12.; Axim, 3 c., £6.; Calabar, 6 c., £7.; Fernando Po, 5 c., £7.; Half Assinee, 2 c., £4.; Montreal, 1 t., £10.; Sierra Leone, 1 c., £2.; Sekondi, 4 c., £5.; Winnebah, 3 c., £4.

NICKEL SULPHATE—
Yokohama, 8 c., £33.

PITCH (*otherwise undescribed*)
Montreal, 2 t., £32.
Stockholm, 3 t., £51.

PLATING SALTS (*otherwise undes.*)
Shanghai, 4 c., £67.
Yokohama, 2 c., £26.

POTASSIUM BICHROMATE—
Constantinople, 4 c., £10.
Rio de Janeiro, 15 c., £40.

POTASSIUM IODIDE—
Accra, 2 c., £45.; Calabar, 47 lb., £45.; Duala, 1 t. 17 c., £40.; Pt. Harcourt, 94 lb., £102.; Sapele, 23 lb., £22.

POTASSIUM PRUSSIATE—
Bombay, 11 c., £76.
Rosario, 4 c., £36.

SALAMMONIAC—
Constantinople, 6 c., £16.
Cape Town, 10 c., £24.

SALTCAKE—
Gothenburg, 200 t., £882.

SHEEP DIP—
Algoa Bay, 9 t. 17 c., £699.
East London, 4 c., £25.
Napier, 38 t. 18 c., £1,408.

SULPHUR (FLOWERS)—
Pt. Harcourt, 10 c., £10.

SULPHURIC ACID—
Accra, 4 c., £13.
Singapore, 1 t., £50.

TANNIC ACID—
Oporto, 3 qr., £13.

TANNING MATERIALS—
Unspecified
Antwerp, 1 t. 3 c., £21.; Alexandria, 2 t. 15 c., £51.; Cape Town, 3 t. 7 c., £83.; Copenhagen, 3 t. 7 c., £83.; Christiania, 6 t. 8 c., £95.; Gothenburg, 2 t. 5 c., £37.; Melbourne, 8 t. 4 c., £130.; Piraeus, 1 t. 7 c., £32.; Wellington, 1 t. 3 c., £20.

TARTAR EMETIC—
Antwerp, 2 c., £12.

TIN OXIDE—
Montreal, 4 c., £47.
Sydney, 1 t., £259.

TURPENTINE SUBSTITUTE—
Monte Video, 1 t., £27.

ZINC CHLORIDE—
Bombay, 9 t. 9 c., £200.
Barcelona, 18 c., £27.
Rouen, 2 t., £54.

ZINC OXIDE—
Reval, 2 t., £86.

ZINC SULPHATE—
Shanghai, 5 c., £14.

Week ending June 29.

ALBUMEN—
Rio de Janeiro, 6 t.

CALCIUM CHLORATE—
Bombay, 38 pkgs.
Madras, 11 pkgs.
Melbourne, 141 pkgs.

CARBON (RETORT)—
Baltimore, 128 cs.

CAUSTIC SODA—
Alexandria, 84 drms.; Algoa Bay, 107 drms.; Amapala, 52 pkgs.; Amsterdam, 9 pkgs.; Auckland, 189 drms.; Bari, 202 drms.; Bombay, 44 drms.; Bourgas, 60 drms.; Brisbane, 192 pkgs.; Buenos Ayres, 413 pkgs.; Calcutta, 5 drms.; Cape Town, 82 drms.; Catania, 79 drms.; Christchurch, 25 pkgs.; Dunedin, 50 pkgs.; Fremantle, 46 drms.; East London, 25 drms.; Fiume, 3 pkgs.; Galatz, 68 drms.; Helsingfors, 154 drms.; Iquique, 10 drms.; Jaffa, 54 drms.; Kobe, 1,153 drms.; Lisbon, 20 drms.; Lyttleton, 55 drms.; Madras, 212 drms.; Maryborough, 18 pkgs.; Malta, 1 drm.; Melbourne, 542 pkgs.; Moji, 41 drms.; Monte Video, 60 drms.; Naples, 34 drms.; Oporto, 34 drms.; Perth, 12 cs.

CAUSTIC SODA
Pt. Elizabeth, 15 cs.; Puerto Sucre, 25 drms.; Rio de Janeiro, 448 drms.; Rotterdam, 17 drms.; Shanghai, 118 drms.; Sydney, 89 drms., 370 cs., 100 drms.; Valparaiso, 100 drms.; Vancouver, 75 drms.; Volo, 20 drms.; Wellington, 60 drms.; Yokohama, 217 drms.; Zante, 20 drms.

CHINA CLAY—
Bahia, 10 t.; Bombay, 305 t.; Buenos Ayres, 3 t.; Madras, 50 t.; Montreal, 50 t.; Melbourne, 5 t.; Piraeus, 300 bgs.

FERRO COBALT—
New York, 10 c.

FERRO MANGANESE—
Baltimore, 749 t.; Boston, 25 t.; Hamburg, 50 t.; Los Angeles, 100 t.; New Orleans, 298 t.

FERRO PRUSSIATE—
Buenos Ayres, 2 cs.

FERRO TITANIUM—
Bilbao, 4 t.; Copenhagen, 1 t.

FERTILISERS (*otherwise undes.*)—
Baltimore, 2,313 pkgs.

GLUE, SIZE, AND GELATINE—
Barcelona, 6 cks.; Boston, 357 bgs., 100 cks.; Buenos Ayres, 1 cs., 21 bgs.; Havre, 30 bgs.; Hsin Ho Wharf, 6 cks.; Montreal, 15 brls.; New York, 5 cks.; Perth, 1 pkg.; Rangoon, 41 bgs., 1 pkg.; Tientsin, 100 bgs.

IRON CHROMATE—
Valencia, 1 t.

MANGANESE ORE—
Amsterdam, 3 t.; Genoa, 10 t.

ROSIN—
Bordeaux, 30 brls.

SALT—
Brisbane, 54 t.; Cotonon, 18 t.; Iddo, 10 t.; Koko, 4 t.; Melbourne, 24 t.; Montreal, 3 t.; Norrkoping, 50 t.; Opobo, 20 t.; Rio de Janeiro, 28 t.; Salaverry, 1 t.; Warri, 5 t.

SOAP—
Accra, 724 bxs.; Alexandria, 680 pkgs.; Algoa Bay, 63 bxs.; Amboina, 545 pkgs.; Antigua, 120 pkgs.; Antofagasta, 37 bxs.; Antwerp, 153 pkgs.; Arequipa, 17 pkgs.; Balik Papan, 180 pkgs.; Banda Neira, 50 pkgs.; Bandjermassin, 405 pkgs.; Bangkok, 25 cs.; Barbados, 1,360 pkgs.; Barranquilla, 2 pkgs.; Batavia, 3,240 pkgs.; Beira, 101 pkgs.; Belawan, 1,110 bxs.; Belize, 475 bxs.; Benoa, 80 pkgs.; Boeleleng, 120 pkgs.; Bombay, 1,083 pkgs.; Buenos Ayres, 835 pkgs.; Calcutta, 508 pkgs.; Callao, 71 pkgs.; Canton, 4 pkgs.; Cape Town, 5 pkgs.; Cape Palmas, 20 pkgs.; Cape Coast, 29 pkgs.; Casablanca, 8 pkgs.; Ceuta, 125 pkgs.; Colombo, 1,327 pkgs.; Constanza, 5 pkgs.; Constantinople, 45 pkgs.; Colon, 250 pkgs.; Coronel, 10 pkgs.; Corral, 30 pkgs.; Corinto, 250 pkgs.; Conakry, 14 pkgs.; Cotonon, 25 pkgs.; Curacao, 360 pkgs.; Dalny, 7 pkgs.; Djambi, 345 pkgs.; Dixcove, 450 pkgs.; Dongola, 100 pkgs.; Dunedin, 3 pkgs.; Durban, 330 bxs., 392 bgs.; East London, 24 brls.; Esmeraldas, 212 bxs.; Funchal, 35 pkgs.; Gorontalo, 530 pkgs.; Gothenburg, 274 pkgs.; Gibraltar, 110 pkgs.; Grand Bassam, 50 bxs.; Gravosa, 10 pkgs.; Grenada, 250 bxs.; Iquique, 5 pkgs.; Karachi, 108 bxs.; Kilia, 21 pkgs.; Kingston (Ja.), 19 bxs.; Kuala Lumpur, 200 bxs.; Lagos, 647 bxs.; Langsa, 75 pkgs.; Larache, 320 pkgs.; Las Palmas, 549 pkgs.; Macassar, 1,400 pkgs.; Madras, 29 bxs.; Malacca, 420 bxs.; Malta, 10 cs., 39 pkgs.; Manta, 112 bxs.; Matadi, 3 pkgs.; Melilla, 775 bxs., 24 drms.; Menado, 250 pkgs.; Menlabah, 25 cs.; Merauke, 50 bxs.; Mollendo, 5 cs.; Monrovia, 30 bxs.; Montego Bay, 17 pkgs.; Montreal, 1 ck., 22 bxs.; New York, 18 pkgs.

SOAP –
Olehleh, 310 pkgs.; Padang, 335 pkgs.; Paita, 180 cs.; Palembang, 1,500 bxs.; Panama, 32 pkgs.; Pasir, 10 bxs.; Penang, 439 pkgs.; Pontianak, 306 pkgs.; Pt. Elizabeth, 57 pkgs.; Pt. Madryn, 25 cs.; Port of Spain, 1 bx.; Pt. Said, 501 pkgs.; Pt. Stanley, 49 pkgs.; Punta Arenas, 182 pkgs.; Pt. Harcourt, 224 bxs.; Rabat, 15 bxs.; Rangoon, 733 pkgs.; Rotterdam, 370 pkgs.; Sabang, 50 cs.; Salaverry, 1 cs.; Saltpond, 100 bxs.; Samarang, 760 cs.; Samarinda, 30 cs.; Sandakan, 10 drms.; San Fernando, 551 bxs.; Sapele, 61 bxs.; Sekondi, 436 bxs.; Segli, 50 cs.; Sherbro, 20 bxs.; Sinoe, 100 bxs.; Shanghai, 61 bxs.; Sierra Leone, 7 cs.; Singapore, 2,481 pkgs.; Sourabaya, 972 pkgs.; St. Vincent, 25 bxs.; St. John (N.F.), 961 cs.; Talcahuano, 167 cs.; Tandjong Balei, 450 bxs.; Tangiers, 50 bxs.; Tapatoen, 20 cs.; Teneriffe, 269 bxs.; Ternate, 245 bxs.; Tetuan, 252 bxs.; Tientsin, 226 cs.; Trinidad, 2,776 pkgs.; Valparaiso, 283 pkgs.; Winnebah, 200 bxs.; Yokohama, 4 bxs.; Zanzibar, 1 cs.

SODA ASH—
Beira, 19 cks.; Brisbane, 150 pkgs.; Buenos Ayres, 100 cks.; Cape Town, 200 pkgs., 20 bgs.; Colombo, 1,000 pkgs.; Corfu, 55 bgs.; Delagoa Bay, 500 pkgs.; Durban, 427 pkgs.; Galatz, 2,464 pkgs.; Hamburg, 2,150 bgs.; Hong Kong, 224 bgs.; Kobe, 2,921 bgs., 8,724 pkgs.; Melbourne, 340 pkgs.; Moji, 6,277 bgs.; Monte Video, 50 cks.; Para, 41 cks.; Puerto Alegre, 230 cks.; Rangoon, 1,000 pkgs.; Samarang, 100 bgs.; Santos, 95 cks.; Shanghai, 6,656 bgs.; Sourabaya, 800 bgs.; Sydney, 145 pkgs., 21 cks.; Vancouver, 60 bgs.; Victoria (B.C.), 330 bgs.; Yokkaichi, 619 bgs.; Zante, 200 bgs.; Zanzibar, 20 cks.; Yokohama, 7,844 bgs.

SODA CRYSTALS—
Alexandria, 20 brls.
Colombo, 100 pkgs.
Iquique, 10 pkgs.
Rangoon, 40 pkgs.
Rosario, 100 drms.

SODIUM BICARBONATE—
Abo, 100 pkgs.; Alexandretta, 28 bgs.; Algoa Bay, 12 pkgs.; Antwerp, 508 pkgs.; Bourgas, 80 kgs.; Brisbane, 200 drms.; Calcutta, 850 pkgs.; Colombo, 320 pkgs.; Delagoa Bay, 75 pkgs.; Durban, 30 pkgs.; East London, 10 pkgs.; Famagusta, 20 kgs.; Iquique, 45 pkgs.; Kobe, 538 pkgs.; Las Palmas, 7 pkgs.; Melbourne, 33 drms.; Puerto Alegre, 50 kgs.; Rio de Janeiro, 500 kgs.; Smyrna, 60 kgs.; Sourabaya, 90 kgs.; Sydney, 67 drms., 413 bgs.; Tuticorin, 500 kgs.; Valencia, 5 cs.; Varna, 160 pkgs.; Wasa, 25 kgs.; Yokkaichi, 1,077 bgs.; Yokohama, 2,907 bgs.

SODIUM BISULPHATE—
Rangoon, 10 drms.

SODIUM SILICATE—
Adelaide, 170 pkgs.; Algoa Bay, 40 pkgs.; Catania, 300 bgs.; Auckland, 32 pkgs.; Brisbane, 57 bgs.; Christiania, 33 cks.; Calcutta, 18 drms.; Dunedin, 40 pkgs.; Havre, 6 pkgs.; Leghorn, 33 cks.; Lyttleton, 10 pkgs.; Manzanillo, 15 cks.; Melbourne, 495 pkgs.; Rangoon, 19 pkgs.; Rotterdam, 3 cks.; Singapore, 3 pkgs.; Sydney, 41 pkgs.; Zanzibar, 8 drms.

SODIUM SULPHIDE—
Adelaide, 4 pkgs.
Alexandria, 4 drms.
Cape Town, 42 drms.
Lisbon, 14 pkgs.

STEARINE—
Arica, 62 pks.; Danzig, 150 brls.

TALLOW—
Alexandria, 7 brls.
Antwerp, 60 pkgs.
Hamburg, 173 cks.

LONDON.

Week ending June 27.

ACETIC ACID—
Calcutta, 3 c., £12.; Irish Free State, 4 c., £12.; Launceston, 1 c., £5.; Pt. Sudan, 1 c., £5.

ACETONE—
Bilbao (F.), 24 drms., £1,211.
Irish Free State, 1 drm., £36.

ACETYL SALICYLIC ACID—
Irish Free State, 3 cs. (pt.), £41.; Madras, 1 cs. (pt.), £5.; Montreal, 4 cs. (pt.), £44.

AMMONIA—
Alexandria, 5 cs., £15.; Azores, 2 cs., £9.; Basrah, 5 cs., £13.; Bombay, 8 cs., £14.; Brussels, 4 cs., £7.; Buenos Ayres, 4 cs., £13.; Delagoa Bay, 5 cs., £9.; Durban, 3 cs., £5.; East London, 4 cs., £7.; Hong Kong, 8 cs., £14.; Irish Free State, 28 pkgs., £55.; Jamaica, 3 cs., £5.; Karachi, 4 cs., £7.; Kilindini, 3 cs., £5.; Mombasa, 5 cs., £9.; Mukden, 4 cs. £7.; Sekondi, 4 cs. £7.; Shanghai, 15 cs., £26.; Singapore, 6 cs., £22.

AMMONIA (ANHYDROUS)—
Demerara, 5 pkgs., £50.; Famagusta, 2 cylds., £18.; Irish Free State, 2 cylds., £13.; Kilindini, 1 cyld., £10.; Penang, 28 cylds., £179.

AMMONIUM BICARBONATE—
Yokohama, 19 t. 19 c., £794.

AMMONIUM CARBONATE—
Adelaide, 5 c., £12.; Brussels, 1 t., £29.; Calcutta, 1 t. 14 c., £182.; Durban, 4 c., £9.; Hong Kong, 5 c., £17.; Kobe, 10 t., £308.; Melbourne, 2 t., £77.; Singapore, 1 t. 16 c., £124.

AMMONIUM CHLORIDE—
Bilbao, 14 cks., £175.

AMMONIUM NITRATE—
Harlingen, 241 cks., £1,396.
Kobe, 241 cks., £1,080.

AMMONIUM SULPHATE—
Antigua, 15 t., £227.; Canton, 50 t., £838.; Hong Kong, 350 t., £6,225.; Lisbon, 20 t., £310.

AMYL ACETATE—
Brussels, 1 drm., £54.
Melbourne, 3 drms., £177.
Pt. Elizabeth, 1 drm., £6.

ANTIMONY REGULUS—
Durban, 2 t., £56.

ANTIMONY SULPHIDE—
Bordeaux, 7 cks. £179.; Brussels, 6 cks., £42.; Buenos Ayres, 12 cks., £154.; Stockholm, 7 cks., £66.; Toronto, 2 cks., £26.

ANTIMONY TARTRATE—
Melbourne, 1 cs., £7.

ARSENIC—
Durban, 2 cs., £5.

BENZOIC ACID—
Sydney (F.), 2 kgs., £29.

BISMUTH—
Melbourne, 3 cs., £200.

BISMUTH CARBONATE—
Calcutta, 2 cs. (pt.), £5.
Brussels, 1 cs., £70.

BISMUTH SALICYLATE—
Brussels, 1 cs., £56.

BISMUTH SALTS (*otherwise undes.*)
Cochin, 33 cs. (pt.), £27.
Madras, 9 cs. (pt.), £5.

BISMUTH SUBCARBONATE—
Lyttleton, 5 pkgs. (pt.), £10.

BISMUTH SUBNITRATE—
Antwerp, 1 cs., £31.
Brussels, 2 cs., £118.
Sydney, 2 cs., £121.

BLEACHING LIQUOR—
Irish Free State, 2 brls., £16.

BONE FERTILISER—
Antwerp (F.), 50 t., £3,000.
Dunkirk, 7 t. 7 c., £121.

BONE FERTILISER—
Hamburg, 2 t. 10 c., £33.

BORAX—
Danzig, 3 t. 10 c., £77.; Durban, 1 t. (F.), £28.; Havana, 10 c., £15.; Pt. Sudan, 5 c., £27.

BORIC ACID—
Cochin, 1 c., £2.; Fremantle, 2 c., £10.; Jamaica, 2 c., £11.; Singapore, 1 c., £4.

CALCIUM ACETATE—
Irish Free State, 2 cks., £29.

CALCIUM CARBIDE—
Iddo, 6 cs., £6.

CAUSTIC POTASH—
Pt. Elizabeth (F.), 2 drms., £6.
Suva (F.), 2 c., £7.

CAUSTIC SODA—
Levuka, 2 c., £6.
Liban, 21 drms., £101.

CHEMICALS (*otherwise undescribed*)
Alexandria, 5 cs., £33.; Switzerland (*via* Antwerp), 163 bgs., £470.; Colombo, 2 cs., £21.; Constanza, 20 cks., £53.; Cuba, 5 cks., £34.; Dar-es-Salaam, 1 cs., £96.; Fremantle, 55 cs., £206.; Hamburg, 300 bgs., £883.; Hong Kong, 1 cs., £18.; Kilindini, 1 cs., £6.; Mauritius, 2 cs., £13.; Melbourne, 51 cs. (pt.), £353.; Montreal, 3 cs. (pt.), £105.; Pt. Sudan, 7 cs., £35.; Rotterdam, 22 pkgs., £66.; Santander, 5 bgs., £14.; Sekondi, 18 cs., £69.; Stockholm, 20 bgs., £80.; Sydney, 90 pkgs. (pt.), £1,285.; Tarragona, 200 bgs., £650.

CITRIC ACID—
Canton, 1 c., £6.; Colombo, 1 c., £5.; Gibraltar, 1 c., £11.; Irish Free State, 5 c., £48.; Jamaica, 1 c., £11.; Pt. Elizabeth, 1 c., £8.; Pt. Said, 5 c. £49.; Rangoon, 1 c., £15.; Paris (transit) (F.), 3 t. 4 c., £574.; Rouen (transit) (F.), 2 t. 1 c., £380.

COAL TAR PRODUCTS—
Carbolic Acid
Launceston, 1 cs., £9.
Lyttleton, 5 pkgs. (pt.), £12.

Creosote
Pt. Elizabeth, 2 drms., £7.

Creosote Oil
Galveston, 5 drms., £22.
Irish Free State, 2 brls., £7.

Mirbane Oil
Bombay, 1 drm., £19.
Suva, 2 drms., £9.

Naphtha
Cape Town, 10 drms., £16.

Naphthalene
Canton, 4 kgs., £7.; Cape Town, 5 cs., £23.; Kilindini, 2 pkgs., £9.; Mombasa, 200 cks., £290.; Pt. Said, 38 cs., £84.; Toronto, 30 cks., £98.

Pitch
Bilbao, 49 brls., £200.; Copenhagen, 6 tins, £5.; Granville, 200 t., £1,250.; Irish Free State, 11 cks., £21.; Malta, 8 brls., £24.; Pt. Said, 200 brls., £295.; Rouen, 236 brls., £939.; Smyrna, 120 cs., £126.; Suva, 20 cs., £20.

Tar
Beira, 35 drms., £11.; Cape Town, 77 pkgs., £26.; Delagoa Bay, 100 drms., £10.; Durban, 100 drms., £11.; East London, 50 drms., £6.; Hankow, 3 brls., £9.; Kilindini, 60 brls., £31.; Lisbon, 30 brls., £67.; Pt. Amelia, 3 brls., £8.; Pt. Elizabeth, 326 drms., £51.; Pt. Sudan, 40 drms., £32.

Unspecified
Trinidad, 80 drms., £68.

COBALT OXIDE—
Brussels, 19 cs., £558.
Melbourne, 1 cs., £25.

COPPER ACETATE—
Melbourne (F.), 1 cs. (pt.), £7.

COPPER SULPHATE—
New York, 25 t. 9 c., £618.
Pt. Elizabeth, 1 c., £5.

CREAM OF TARTAR—
Bangkok (F.), 1 cs., £3.; Colombo, 1 c., £5.; Durban, 7 c., £34.

CREAM OF TARTAR—
Fremantle, 10 c., £56.
Hong Kong (F.), 4 c., £26.
Townsville, 2 c., £11.

DISINFECTANTS (*otherwise undes.*)
Ahwaz, 10 c., £25.; Alexandria, 7 c., £7.; Amsterdam, 2 t. 10 c., £80.; Auckland, 1 c., £16.; Barbados, 1 t. 1 c., £22.; Beira, 9 c., £29.; Belgian Congo, 2 c., £8.; Brisbane, 5 c., £9.; Calcutta, 2 c., £7.; Canary Islands, 6 c., £16.; Canton, 4 c., £9.; Cape Town, 8 t. 18 c., £195.; Colombo, 1 t. 5 c., £53.; Delagoa Bay, 6 t. 13 c., £263.; Demerara, 8 c., £12.; Durban, 9 t. 11 c., £371.; East London, 2 c., £16.; Hong Kong, 4 c., £6.; Inhambane, 2 c., £6.; Irish Free State, 1 t. 3 c., £61.; Kilindini, 6 c., £11.; Penang, 2 t. 18 c., £136.; Piraeus, 1 c., £8.; Pt. Elizabeth, 4 c., £40.; Pt. Sudan, 12 c., £69.; Rangoon, 5 c., £7.; Singapore, 1 t. 14 c., £84.; Trinidad, 2 t. 6 c., £47.; Wellington, 5 t., £139.; Winnebah, 2 c., £12.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Brussels, 1 kg., £13.; Cape Town, 1 cs., £13.; Christchurch, 1 ck., £31.; Durban, 3 cs., £35.; Durban (F.), 1 cs. (pt.), £8.; Fremantle, 1 cs., £22.; Irish Free State, 2 pkgs., £5.; Jamaica, 1 cs. (pt.), £8.; Kobe, 1 cs., £80.; Madras, 5 cs., £62.; Melbourne, 1 cs., 8 cs. (pt.), £767.; Montreal, 1 cs. (pt.), £17.; New York, 1 cs. (pt.), £8.; Penang, 3 cs., £179.; Perth, 1 cs., £11.; Pt. Elizabeth, 1 cs. (pt.), £9.; Pt. Swettenham, 4 cs. (pt.), £27.; Sydney, 43 pkgs. (pt.), £23.; Valencia, 6 kgs., £38.

ETHER—
Bombay, 1 cs. (pt.), £9.
Haifa, 18 cs., £53.
Irish Free State, 2 pkgs., £12.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 10 t. 9 c., £99.
Gothenburg, 1 t., £25.
Hamburg, 2 t., £29.

GALLIC ACID—
Calcutta, 2 cs. (pt.), £6.
Sydney, 1 cs., 1 kg., £71.

GLYCERINE—
Amsterdam, 1 c., £6.; Canton, 5 c., £28.; Cape Town, 1 c., £5.; Cape Town (crude), 5 t. 3 c., £240.; Havana, 1 c., £9.; Irish Free State, 4 c., £16.; Mollendo, 19 c., £96.; Philadelphia, 5 t. 2 c., £530

HYDROCHLORIC ACID—
Penang, 1 c., £5.

HYDROFLUORIC ACID—
Irish Free State, 1 bx., £16.

HYDROGEN PEROXIDE—
Accra, 2 cs., £12.
Irish Free State, 4 jars, £6.

HYDROQUINONE—
Melbourne, 2 cs., £43.

HYPOPHOSPHITE SALTS (*otherwise undescribed*)—
Perth, 3 cs., £37.

IODINE—
Calcutta, 2 cs. (pt.), £78.
Barbados, 1 cs., £7.
Rio de Janeiro, 1 cs. (pt.), £16.

IODINE (RESUBLIMED)—
Barcelona, 1 kg., £103.
Brussels, 6 cs. (pt.), £122.
Santander, 1 cs., £52.

IRON SULPHIDE—
Montreal, 2 cks., £5.

LEAD ACETATE—
Buenos Ayres, 1 ck., £6.
Delagoa Bay (F.), 40 kgs., £82.

LEAD NITRATE—
Beira, 1 kg., £8.

MAGNESIA—
Auckland, 10 cs., £24.; Bombay, 2 cs., £18.; Buenos Ayres, 3 cs., £23.; Gibraltar, 1 cs., £38.; Havana, 2 cs., £14.; Irish Free State, 70 bxs., £362.; Lyttleton, 10 cs., £24.; Mombasa, 1 cs. (pt.), £5.; Sydney, 10 cs., £24.; Wellington, 20 cs., £48.

MAGNESIA (CALCINED)—
Constantinople, 2 cks., £13.
Buenos Ayres, 1 cs. (pt.), £13.
Vera Cruz, 5 cs., £37.

MAGNESIUM CARBONATE—
Havana, 3 cs., £11.
Sydney, 43 pkgs. (pt.), £5.
Vancouver, 2 cs., £8.

MAGNESIUM CHLORIDE—
Dar-es-Salaam (F.), 8 drms., £17.

MAGNESIUM CITRATE—
Alexandria, 3 cs., £29.; Barcelona, 20 cs., £300.; B. Ayres, 2 cs. £16.; Calcutta, 14 cs., £141. Santander, 25 cs., £375.

MAGNESIUM SULPHATE—
Accra, 7 c., £15.; Brisbane, 1 t. 6 c., £31.; Buenos Ayres, 3 c., £6.; Canton, 5 c., £5.; Durban, 8 c., £10.; Fremantle, 1 t. 5 c., £34.; Ichang, 5 c., £7.; Irish Free State, 4 c., £17.; Melbourne, 1 t. 5 c., £30.; Melbourne, 4 t. 18 c., £118.; Singapore, 4 c., £12.; Sydney, 2 t. 10 c., £61.

MANGANESE BORATE—
Paris, 12 c., £57.

MERCURY BICHLORIDE—
Penang, 7 cs. (pt.), 1 kg., £30.

METHYL SALICYLATE—
Bombay (F.), 1 cs., £14.

MERCURY OXIDE—
Sydney, 1 cs., £25.

MERCURY SALTS (*otherwise undes.*)
Bilbao, 1 cs., £5.

METHYL ALCOHOL—
Bombay, 2 cs. (pt.), £10.

NICKEL SALTS (*otherwise undes.*)—
Melbourne, 3 cs., £7.

NICOTINE SULPHATE—
Copenhagen, 1 drm., £32.

NITRIC ACID—
Alexandria, 1 c., £5.
Wellington, 1 c., £26.

OXALIC ACID—
Calcutta, 2 cs., £9.

PHOSPHO CITRIC ACID—
Delagoa Bay, 5 cs., £28.

PHOSPHORIC ACID—
Penang, 1 cs., £5.
Pt. Elizabeth, 1 cs., £6.
Sydney, 59 cs., £173.

POTASH (PEARL ASH)—
Dunedin (F.), 2 cks., £28.

POTASSIUM BICHROMATE—
Buenos Ayres, 1 ck., £7.

POTASSIUM CITRATE—
Auckland, 1 cs., £8.
Brisbane, 1 cs., £15.
Sydney, 3 cs., £39.

POTASSIUM IODIDE—
Bangkok, 2 cs., £185.; Bilbao, 1 cs. (pt.), £44.; Brussels, 8 cs. (pt.), £332.; Calcutta, 1 cs., £88.; Christiania, 1 cs. (pt.), £63.; Cochin, 33 cs. (pt.), £28.; Durban, 2 cs. (pt.), £28.; Irish Free State, 2 cks. (pt.), £6.; Jamaica, 4 cs., £333.; Lome, 5 cs., £65.; Melbourne, 1 cs., £13.; Singapore, 1 cs. (pt.), £26.; Trinidad, 1 cs. (pt.), £12.; Wellington, 1 cs., £5.

POTASSIUM PERMANGANATE—
Melbourne, 7 pkgs. (pt.), £23.
Pt. Elizabeth (F.), 3 cs., £14.

POTASSIUM PRUSSIATE—
Hamburg, 10 cks., £290.
Irish Free State (F.), 1 ck., £47.
Shanghai, 1 ck., £16.

POTASSIUM SALTS (*otherwise undescribed*)—
Cochin, 33 cs. (pt.), £8.

POTASSIUM SILICATE—
Bilbao, 20 drms., £35.

POTASSIUM SULPHATE—
Callao, 1 cs., £32.

SALAMMONIAC—
Beira, 2 c., £7.; Havana, 2 c., £5.; Hong Kong, 3 c., £14.; Kilindini, 1 t. £38.; Pt. Elizabeth 2 c., £6.; Singapore, 1 c., £5.

SALICYLATES (*otherwise undes.*)—
Montreal, 1 cs. (pt.), £12.
Sydney, 4 cs. (pt.), £89.

SALICYLIC ACID—
Bombay, 3 cs. (pt.), £6.; Cape Town, 1 cs., £6.; Durban, 1 cs., £8.; Calcutta, 1 cs., £7.; Jamaica, 1 cs. (pt.), £6.; Melbourne, 2 cs., £24.

SALTPETRE—
Beira (F.), 5 c., £9.; Canary Islands (F.), 9 t. 18 c., £280.; Irish Free State, 1 t., £45.; Pernambuco, 1 t., £41.; Pt. Elizabeth, 13 c., £29.; Rio de Jan., 1 t., £39.; Sydney, 3 t. 1 c., £125.; Wellington, 2 t., £78.

SILVER NITRATE—
Bombay, 3 cs. (pt.), £7.
Calcutta, 2 cs. (pt.), £11.
Shanghai, 1 cs., £110.

SPENT OXIDE—
Hamburg, 601 t., £908.

SODA ASH—
Malta, 6 c., £5.
Rotterdam, 6 c., £5.

SODA CRYSTALS—
Shanghai, 1 t. 16 c., £14.

SODIUM ACID PHOSPHATE—
Melbourne, 100 kgs., £400.
Sydney, 60 pkgs., £240.
Toronto, 25 cs., £100.

SODIUM ACID PYROPHOSPHATE
Delagoa Bay, 10 kgs., £35.

SODIUM BICARBONATE—
Bilbao, 2 c., £6.; Durban, 9 c., £14.; Irish Free State, 5 c., £11.; Lourenco Marques, 5 c., £8.; Monte Video, 2 c., £9.; Sydney, 10 c., £20.; Valencia, 10 c., £24.

SODIUM BISULPHITE—
Buenos Ayres, 10 t., £190.
Penang, 1 t. 10 c., £31.

SODIUM HYPOSULPHITE—
Colombo, 11 c., £10.

SODIUM IODIDE—
Bilbao, 1 cs., £49.
Christiania, 1 cs. (pt.), £24.
Sydney, 1 cs. (pt.), £7.

SODIUM METABISULPHITE—
Valencia, 1 t., £20.

SODIUM PRUSSIATE—
Hamburg, 5 brls., £32.

SODIUM PYROPHOSPHATE—
Melbourne, 1 t. 3 c., £51.

SODIUM SALICYLATE—
Pt. Elizabeth, 2 pkgs., £27.

SODIUM SULPHATE—
Barnados, 2 t. 10 c., £16.
Callao, 1 cs., £32.
Irish F. State, 2 t. 6 c., 2 cks., £46.

SODIUM SULPHITE—
Bushire, 1 t., £40.
Penang, 5 c., £7.
Sydney, 20 drms., £50.

SODIUM SULPHITE (ANHYDROUS)—
Rotterdam 1 t. 3 c., £12.

SODIUM TARTRATE—
Sydney, 1 t., £73.

SULPHURIC ACID—
Alexandria, 3 c., £23.; Bombay, 2 c., £10.; Calcutta, 1 c., £5.; Iddo, 4 c., £10.; Colombo 1 c., £20.; Pt. Elizabeth, 5 c., £16.; Santos, 7 c., £20.

SUPERPHOSPHATE—
Hong Kong, 6 t., £49.

TANNIC ACID—
Melbourne (F.), 1 cs. (pt.), £19.

TARTARIC ACID—
Bucharest, 2 c., £17.; Calcutta, 5 c. (F.), £32.; Canton, 1 c., £5.; Colombo, 1 c., £8.; Danzig, 5 t., £687.; Durban, 7 c., £52.; Pt. Elizabeth, 3 c., £22.; Rangoon, 1 c., £11.

THEOBROMINE—
Bilbao, 1 cs., £11.

TIN OXIDE—
Brussels, 3 cks., £81.

TITANIUM POTASSIUM OXALATE
Auckland (F.), 2 kgs., £26.

ZINC AND MAGNESIUM FLUOSILICATE—
Paris (F.), 1 brl., £50.

ZINC CHROMATE—
Melbourne, 1 ck., £25.

ZINC OXIDE—
Boulogne, 2 cks., £12.; Copenhagen, 160 cks., £567.; Durban, 5 cks., £13.; Paris, 100 cks., £440.; Petrograd, 59 brls., £150.; Sydney, 2 cs., £12.

ZINC SULPHIDE—
New York, 2 cks., £98.

Week ending June 30.

ALBUMEN—
Amsterdam, £325.

BEESWAX—
Auckland, 1 t. 3 c.
Rotterdam, 1 t.

CARNAUBA WAX—
Genoa, 10 c.

FULLER'S EARTH—
Dunkirk, 5 t.; New York, 20 t.; Ostend, 1 t.; Philadelphia, 25 t.

GLUE, SIZE, AND GELATINE—
Bombay, 1 c.; Brussels, 2 c.; Calcutta, 4 t.; Colombo, 12 c.; Jamaica, 3 c.; Karachi, 10 c.; Kobe, 5 t.; Melbourne, 1 t. 1 c.; New York, 2 t. 3 c.; Perth, 2 c.; Pt. Elizabeth, 11 c.; Riga, 1 t. 10 c.; Shanghai, 12 t. 11 c.; Sydney, 2 t. 1 c.; Vancouver, 3 t. 5 c.; Wellington, 19 c.

LEAD ASHES—
Antwerp, 6 t. 3 c.

MINERAL WAX—
Brussels, 6 t.

PARAFFIN WAX—
Ghent, 10 c.; Genoa, 2 t. 9 c.; Haifa, 1 c.

PLUMBAGO—
Antwerp, 1 t. 1 c.
Gothenburg, 10 c.

QUININE—
Bombay, £6,036.; Calcutta, £8,548.; Colombo, £5,920.; Durban, £20.; Constantinople, £2,105.; Rio de Janeiro, £501.

ROSIN—
Ghent, 8 c.

SALT—
Delagoa Bay, 7 c.; Fiji Islands, 61 t. 13 c.; Funchal, 1 c.; Lourenco Marques, 2 c.; Madras, 14 c.; Pt. Said, 3 c.; Saigon, 8 c.; Tanga, 3 c.

SHELLAC—
Danzig, 2 c.

SOAP—
Amsterdam, 1 t. 1 c.; Beira, 3 c.; Bombay, 14 c.; Brussels, 2 c.; Boston, 2 t. 16 c.; Calabar, 5 t. 11 c.; Cape Coast Castle, 2 t.; Calcutta, 5 c.; Colombo, 1 c.; Delagoa Bay, 1 c.; Demerara, 2 c.; Durban, 9 c.; Duala, 2 t. 13 c.; East London, 3 c.; Fiji Islands, 4 c.; Genoa, 1 t. 8 c.; Gibraltar, 3 c.; Hong Kong, 10 c.; Irish Free State, 9 c.; Italy, 15 c.; Jamaica, 4 c.; Karachi, 4 c.; Kilindini, 1 c.; Launceston, 2 c.; Madras, 17 c.; Malta, 10 c.; Melbourne, 1 c.; Montreal, 6 t. 18 c.; Opobo, 19 t. 10 c.; Perth, 1 c.; Pt. Elizabeth, 2 c.; Portland (Ore.), 6 c.; Pt. Said, 4 c.; Pt. Sudan, 1 c.; Rangoon, 5 c.; Shanghai, 3 c.; Singapore, 3 c.; Sydney, 4 c.; Tientsin, 2 c.; Tokio, 1 c.; Trinidad, 8 c.; Valparaiso, 15 c.

STEARINE—
Havre, 3 t. 3 c.

TALLOW—
Danzig, 79 t. 1 c., 24 t. 17 c.

TAR (STOCKHOLM)—
Fremantle, 1 t.
Thursday Island, 5 c.

WAX (*otherwise undescribed*)—
Karachi, 5 c.

WHITE LEAD—
Auckland, £235.; Bermuda, £18.; Brisbane, £52.; Calcutta, £1,271.; Cape Town, £47.; Delagoa Bay, £6.; Durban, £177.; East London, £95.; Fiji Islands, £11.; Gibraltar, £8.; Hobart, £25.; Irish Free State, £8.; Jamaica, £245.; Malta, £21.; Madras, £2,340.; Piraeus, £25.; Pt. Elizabeth, £120.; Rio de Janeiro, £28.; Shanghai, £161.; Victoria (Brazil), £45.

MANCHESTER.

Week ending June 29.

AMMONIUM CARBONATE—
Copenhagen, 30 cks.
Hamburg, 10 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
Jerusalem, 3 cks.

BLEACHING POWDER—
Baghdad, 30 drms.; Holland, 20 kgs.; Sydney, 4 cks.

CARBON BLACK—
St. Gall, 1 cs.; Sydney, 25 cs.

CHEMICALS (*otherwise undescribed*)
Boston, 31 cks.; London, 1 ck.

COAL TAR PRODUCTS—
Naphthalene
Philadelphia, 285 bgs.
U.S.A., 1,320 bgs.
Unspecified
Basle, 6 cks., 13 drms.
Hamburg, 56 cks.
Switzerland, 6 cks.

DYESTUFFS (ARTIFICIAL)—
Alizarine
France, 3 cks.
Rotterdam, 2 cks.
Unspecified
Australia, 5 cs., 91 kgs., 33 cks.
Belgium, 1 cs.
Melbourne, 1 kg.

FERRO MANGANESE—
Hamburg, 50 t.; Montreal, 270 t.

GLUE AND SIZE—
Belgium, 1 ck.
Boston, 2 cs., 428 bgs.

LEAD SULPHIDE—
France, 15 cs.

SOAP—
Ahwaz, 19 cs.; Basra, 265 bxs.; Busrah, 4 cs.; Calicut, 12 bxs., 47 cs.; The Hague, 8 cs.; France, 1 cs.; Sydney, 2 cs.

SODA CRYSTALS—
Ahwaz, 80 kgs.

SODIUM BICARBONATE—
Tunis, 25 drms.

SODIUM COMPOUNDS (*otherwise undescribed*)
Mulhouse, 15 cks.

NEWCASTLE-ON-TYNE

Week ending June 30.

AMMONIA—
Barcelona, 14 t.
Copenhagen, 20 brls.

AMMONIUM SULPHATE—
Niralaga, 50 t.

ANTIMONY—
Montreal, 90 cks.

ANTIMONY SULPHIDE—
Rotterdam, 1 ck.

BLEACHING POWDER—
Rotterdam, 75 cks.

CAUSTIC SODA—
Gothenburg, 45 drms.
Rotterdam, 52 drms.

CHEMICALS (*otherwise undescribed*)
Rotterdam, 2 cks.

CHROME ORE—
Gothenburg, 208 bgs.

LITHARGE—
Montreal, 20 cks.
Rotterdam, 39 cks.

MAGNESIA—
Gothenburg, 90 cks.
Rotterdam, 4 cs.

MERCURY OXIDE—
Gothenburg, 7 cks.

RED LEAD—
Copenhagen, 33 cks.
Gothenburg, 24 cks.
Rotterdam, 784 cks.

SODIUM SALTS (*otherwise undes.*)
Copenhagen, 64 drms.

SODIUM SULPHITE—
Copenhagen, 10 bgs.
Rotterdam, 35 bgs.

WHITE LEAD—
Gothenburg, 20 cks.
Rotterdam, 24 cks.

PRICES CURRENT.

WEDNESDAY, JULY 4, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	24/-	&	48/-
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	50	0	0
Citric	lb.	0	1	9
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 30/32 Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6¼
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	2	3
Tartaric (crystals)	lb.	0	1	3½
COAL TAR PRODUCTS.				
Aniline Oil and Salt	*lb.	0	0	10
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	7
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	4
Creosote	*gallon	0	0	10
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9½
Naphtha, solvent (90/160)	gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	6	2	6
Pyridin	*lb.	9	18	0
Tar, crude	ton	4	10	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	2	0
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	118	0	0
Alum, loose lump (delivered)	*ton	12	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	70	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	15	0	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	10½
Bleaching Powder, 35%	*†ton	11	7	6
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	10	0
Carbon Bisulphide	*ton	28	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	26	0	0
Formaldehyde, 40%	ton	94	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	42	0	0
Lead Acetate (brown)	ton	42	0	0
Lead Carbonate (White Lead)	ton	45	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	10	10	0
Lime Acetate (grey), 80%	*ton	21	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	37	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	4	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	50	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	0
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	9
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	30	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	28	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	17	10	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	32	0	0
Potassium Permanganate (commercial)	lb.	0	0	10
Potassium Prussiate (yellow)	lb.	0	1	3
Potassium Prussiate (red)	lb.	0	4	0
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	60/-	&	57/-
Sodium Acetate	ton	25	0	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d.	to	9d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	21	10	0
Sodium Hydrate (70% C. Soda)	†ton	20	0	0
Sodium Hydrate (60% C. Soda)	†ton	19	0	0
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	10	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	26	0	0
Sodium Hyposulphite (commercial)	†ton	10	0	0
Sodium Hyposulphite (photographic)	ton	14	0	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	7	6
Sodium Nitrite, 100% basis	ton	27	0	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	7
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	15	0	0
Sodium Sulphide Crystals (casks)	†ton	8	10	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	5	0
Sulphur (Roll Brimstone)	ton	8	5	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	64	17	6
Lead (Chemical Sheet), delivered	cwt.	1	13	0
Lead (Foreign Pig)	ton	23	15	0
Nickel	ton	130	0	0
Silver	oz.	0	2	7 1/16
Tin, English Ingots	ton	179	0	0
Zinc (Spelter)	ton	27	17	6
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	43	10	0
Linseed, Raw	*ton	45	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	40	0	0
Turpentine	cwt	4	2	9

* *Packages extra or returnable*: otherwise prices usually include

† Makers' prices for home consumption only (packag .

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
Pre-war and Post-war Dyestuffs Prices	31
The New German Mineral Oil Combine	32
Peat Production and Utilisation	32
The Technology of Abrasives	33
The Pickling Process in Tinplate Manufacture	34
The Amino-naphthols	35
The Distillation of Ammoniacal Liquors	36
Power Alcohol in France	37
Nitrate of Soda	38
Our Bookshelf	38
British Dyestuffs Corporation	39
Legal Intelligence	42
Items of Interest	43
Imports of Chemicals into India	44
South Wales Notes	44
Fertiliser News	45
Parliamentary News	46
Correspondence	46
Gazette News	46
Publications Received	46
Reports of Companies	47
The Patent List:—	
Applications for British Letters Patent	48
Complete Specifications Accepted	48
Complete Specifications Open to Public Inspection before Acceptance	48
Abstracts of Latest Complete Specifications	48
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	49
Cumberland Coking and By-product Industries	50
New Companies	50
Thirty-five Years Ago	50
Market Reports:	
London "Open Market" Report	50
London Metal Market	52
Manchester Chemical Market	52
Swansea Market Report	52
Liverpool Chemical Market	52
West of Scotland Chemicals	53
Imports of Chemical Products	53
Exports of Chemical Products	56
Prices Current	60

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CURRENT TOPICS.

PRE-WAR AND POST-WAR DYESTUFFS PRICES.

THE actual position of the British Dyestuffs Corporation, as disclosed by the report and accounts for the year ended October 31, 1922, and by the chairman's speech at the annual general meeting, is not easy to summarise. Although a trading profit of £102,000 is claimed for the year, yet when the unknown amount estimated to be recoverable in respect of E.P.D. and the sums obtained by the liquidation of surplus stocks are taken into account, the trading profit is seen to be more apparent than real. The most optimistic shareholder, however, could hardly have expected a dividend on the year's working, and the general tone of the meeting showed complete satisfaction with the chairman's explanations and encouraging presentation of the facts. In view of the attitude of the Colour Users' Association, the question of the prices at which dyestuffs could be sold by the Corporation came in for detailed review. The colour users have expressed their well-considered opinion that a margin of 200 per cent. over pre-war prices for all dyestuffs should leave an adequate amount of profit to the makers, but Sir William Alexander strongly combatted this view. He pointed out that on the average the selling price of dyestuffs had been reduced from 3s. 5d. per pound in 1921 to 2s. 6d. per pound in 1922, and that in many cases the maximum price limits stipulated by the Colour Users' Association were not exceeded. In many other cases, however, it would be quite impossible to produce colours and sell them at a reasonable profit at three times their pre-war price. Sir William estimated that actual working costs had increased by 170 per cent. over pre-war, and that if the colour users' suggestions were rigidly adhered to, the amount of profit available for development and reserve would be infinitesimal. In arriving at his figure of 170 per cent. the chairman stressed a point which we ourselves have raised on previous occasions, namely, that direct comparison between the pre-war German dyestuffs industry and our own post-war industry is vitiated unless one very important factor is taken into consideration. After all, the world's dyestuff consumption capacity is limited, and whilst Germany prior to 1914 had practically the whole of the world's markets at her disposal, and was enabled thereby to keep her plants running continuously at full capacity, none of the huge dye-making establishments that have been set up in America, France, Italy, or this

country will ever be in this fortunate position. Continuous operation of plant does not only mean lessened overhead charges, including lower depreciation losses, but it is only by continuous operation over a long period of time that both chemists and workmen can acquire that intimate familiarity with the details of plant operation which alone can lead to maximum efficiency. Sir William Alexander estimated the figure of 35 per cent. as the permanent addition to pre-war production costs due to intermittent plant operation, and this is a factor which, so long as international competition in dyestuffs manufacture exists, is bound to persist. The whole position is decidedly difficult. Germany, if presented with the opportunity of unrestricted world trade, and aided by the ridiculous international value of the mark, could certainly undersell and eliminate all her competitors in the dyestuffs industry. Prices of colours would be very low until it served her purpose to raise them, as she undoubtedly would do after all competition had been removed. Even at normal rates of exchange Germany's forty years' experience of intensive manufacture would suffice to enable her to regain her world supremacy in the dyestuffs' trade. But so long as conditions of national security compel the great powers of the world to establish huge dyestuffs factories of their own, each with a capacity very nearly equal to supplying the whole of the world's demands, just so long must prices remain considerably higher than would be the case were the world's production concentrated in one huge combine. This state of affairs, which seems peculiar to the organic chemical manufacturing industry, must not, in fairness to British producers, be lost sight of. The establishment of the British industry demands sacrifice, and the problem is to see that this sacrifice is spread equitably over the colour user, the shareholder, and the tax-payer. Reverting to the affairs of the Corporation, the general conclusion would seem to be that during 1922 the work of consolidation was steadily advanced, the internal friction reduced to a minimum, and the utmost economy effected without prejudice to efficiency. Criticism of the directorate on the grounds of its non-technical personnel was again heard at the meeting. Only the future will prove whether such criticism is justified or not. After all, the information vouchsafed to shareholders at annual general meetings is very limited. Every care must be taken that no important information is allowed to become available to competitors, and shareholders must in most cases accept on trust the generalised statements of the chairman. Sir William Alexander again intimated that the present Board was but temporary, and that when the affairs of the Corporation assumed a sound financial aspect the ranks of the directorate would be recruited from the generation of experienced technical men now growing up in the services of the Corporation, an intimation which augurs well for the future.

THE NEW GERMAN MINERAL OIL COMBINE.

The reports in the German Press to the effect that Hugo Stinnes intends still further to increase his manifold activities by the creation of a vertical trust controlling practically the whole of the German liquid-fuel industry, is of more than ordinary interest to the chemical industry. Two of the four great combines, the activities of which Stinnes contemplates co-ordinating, are the holders of the patent rights of processes which are the most important contributions to liquid-fuel technology that Germany has made within recent years. We refer to the Olea Mineralwerke Aktiengesellschaft, which controls the Melamid patents for the production of light oils by the cracking of crude petroleum, and to the Aktiengesellschaft für Petroleum Industrie, which possesses the sole rights of the Bergius process for the direct hydrogenation of coals and heavy tars. So far as can be deduced from the absence of published results, neither of these two processes has evolved much beyond the experimental stage, but it is known that their inventors and financial backers are confident of ultimate success.

PEAT PRODUCTION AND UTILISATION.

A report on the progress of the peat industry in America during the year 1922 has just been issued by the United States Geological Survey. When compared with the previous year, considerable progress is to be reported, the weight of peat produced in 1922 being 100 per cent. above the 1921 figure, and the increase in value being 52 per cent. As a fertiliser itself, or in the production of mixed fertilisers, the use of peat increased 96 per cent. in quantity, and there has also been a decided growth in its employment as an ingredient in cattle feeding-stuffs. Further, the use of peat as a fuel developed considerably, although this, we should think, has been due to the shortage of coal in the winter of 1922. The total consumption of peat and peat moss was 64,074 tons during the year, valued at 421,000 dollars, and this figure includes some imports. It should be noted, however, that although the figures for 1922 are a considerable improvement on 1921, they do not show any very great increase in production during the last ten years, the record output, for example, being in the year 1918, when the figure was over 100,000 tons. We must confess, though, that the general prospects for the extended utilisation of peat, except in a small way as an ingredient of fertilisers, do not seem to be very bright. There is nothing new in the direction of improved methods to report from America which would tend to alter this opinion. Our own Fuel Research Board is still actively investigating the possibilities of Irish peat, and has appointed Professor Pierce Purcell as peat investigation officer. Air-drying is apparently the only method by which the water-content of the peat can be reduced economically to the point at which the material can be employed as a fuel, and the Fuel Research Board have just published a voluminous report on this subject. The large areas over which the peat must be worked, and the necessity for spreading the material on the ground in thin layers for the purpose of drying, make the problem almost entirely an engineering one, the immediate prospects for the solution of which are not too encouraging.

THE TECHNOLOGY OF ABRASIVES.

NATURAL AND ARTIFICIAL PRODUCTS.

By "INVESTIGATOR."

UNTIL about thirty years ago natural abrasives only were in use, the chief of these being sandstone, emery, corundum, garnet, and the diamond. Since 1890, however, the availability of cheap electrical energy, together with the development of the industrial electric furnace, have led to the establishment of the artificial abrasive industries at Niagara Falls and in the Hautes Pyrénées (Southern France). The principal manufactured abrasives are carborundum, alundum, and corubin, the host of others being substantially the same materials under various trade names.

In the year 1918 the total value of all the abrasives consumed in the United States was close on 11 million dollars, manufactured products accounting for 74 per cent. of this figure, which does not include quartz and felspar. In the same year upwards of 5 million dollars' worth of abrasive products were exported from America, whilst the value of the imports exceeded one million dollars. For 1918 the Canadian production of artificial abrasives was upwards of 70,000 short tons, the U.S.A. producing 58,000 short tons in 1917 (value 8,137,242 dols.). These figures will serve to emphasise the magnitude of the industries.

Natural Abrasives.

Abrasives appear to conform to the rule that hardness and complexity of composition are inversely related, so that the diamond, as an element, stands first with hardness 10 on Moh's scale. Black diamonds ("carbonado") and inferior colourless material ("boart") are used for rock-drills and diamond-cutting respectively. Sandstones consist largely of quartz particles (hardness 7) cemented together by silica, those used in the cut-glass industry being almost pure quartz. The colour of black sandstones is due to manganese dioxide. Compact varieties of quartz such as hornstone are made into oilstones and whetstones. Non-crystalline varieties of silicia, such as tripoli and infusorial earth, are used in the form of compressed tallow cakes for "cutting down," as a preliminary to polishing, while abrasive bricks may be made by baking a mortar composed of infusorial earth (88 per cent.), lime (10 per cent.), aluminium and sodium sulphates 1 per cent. each), (*Brit. Pat.* 129,505 of 1918). Flint is used for making "sand" paper and the "flint-blocks" used for lining tube-mills.

Emery, Corundum, and Garnet.

Emery (hardness 9), the "naxium" of the ancients, consists of alumina, together with magnetite and hematite. It occurs as loose surface masses in the Greek Island of Naxos, where very primitive mining methods are in vogue, masses too large for transport being disintegrated by alternately heating and quenching. At Chester, Mass., the deposits are much less accessible, and extensive tunnelling is necessary. Spinel emery, $MgAl_2O_4$ (hardness 8) is found at Peekshill, in New York State. The density lies between 3.7 and 4.3, with Al_2O_3 content from 30 to 70 per cent. The abrasive power or effective hardness is not rigidly parallel with the Al_2O_3 content, but is affected by the nature of the impurities and the structure. Before grading, the material is examined under the microscope, especially for the presence of mica, which is very deleterious in making vitrified or pottery wheels. Owing to the presence of iron oxide, emery gives a good finish in use, and in the manufacture of cloth, etc., presents a better holding surface for the adhesive than carborundum, because of its rougher fracture.

Corundum (hardness 9, density 3.9—4.1), consists of alumina with traces of silica, iron oxide and water, and is mined in Ontario. The crushed mineral is concentrated by flotation, dried, and after passing over magnetic separators, is screened into twenty sizes (1/8 to 1/200 inch). The sieved material is subjected to a current of air which blows away any silica. Before grading, it is examined by the naked eye for pyrites and hornblende, by the magnet for magnetite, and analysed chemically for alumina and iron content. Corundum is a faster cutting abrasive than emery.

Garnet (hardness 6.5—7.5), comprises a variety of double calcium and aluminium silicates, and is utilised as a wood abrasive in the form of paper or cloth. The so-called "Spanish mineral," which is largely used, is probably an iron aluminium garnet, $Fe_3Al_2Si_3O_{12}$, and is prepared for use by methods similar to those employed for corundum.

Artificial Abrasives.—Carborundum.

The first artificial abrasive, second only to the diamond in hardness (9.5 on Moh's scale), was obtained by E. G. Acheson in 1891, while attempting to crystallise carbon from a bath of molten aluminium silicate. At first it was thought to be a compound of carbon and corundum, hence the name, but analysis showed it to be silicon carbide, SiC.

Petroleum coke and pure white sand (99.5 per cent SiO_2) are the usual raw materials, but charcoal, anthracite, pitch coke and furnace coke (10 per cent. ash) can also be employed. Lampblack, however, cannot be used, so that the suitability for the purpose under consideration is not a question of purity, but seems to be connected with the readiness with which the varieties of carbonaceous material change to graphite on heating. Sawdust and salt are added, the former to maintain porosity, and so to facilitate the escape of the large volumes of carbon monoxide generated, the latter to act as a flux for the impurities until it is volatilised. A typical charge would consist of 1,500lb. petroleum coke, 2,520lb. white sand, 300lb. sawdust, and 40lb. of salt, much of which serves to insulate the central reacting mass, and is recovered. The most recent type of furnace is 30ft. long by 12ft. wide, with a production of 15,000lb. of carborundum per run. A current of 6,000amps. is maintained, the voltage being gradually decreased from 190 to 125 at the end of the run of 36 hours. After cooling 24 hours, the crystalline mass is crushed in high-speed mills provided with 2-ton manganese-steel rolls, treated with sulphuric acid (1:2) for three days at 100° C. in lead-lined vats to remove surface impurities, washed, dried in rotary dryers, and finally screened to sizes from 1/6 to 1/220 inch. After washing the crystals contain 69.1 per cent silicon and 30.2 per cent carbon. The crushing rolls need renewal every six months, while the fine silk screens wear readily, necessitating constant checking of the finer grades. Very fine grades known as "flours" (F, FF, and FFF) are made from the crushed material by levigation methods. Graphite and much amorphous carbide result, the latter by-product ("carbofrax" and "refrax"), being extensively utilised as a refractory and for zinc distillation retorts. In 1918 the production cost per short ton (2,000lb.) amounted to 195 dols., of which 24 dols. was for power.

Carbosolite, a German silicon carbide of a dark grey colour, has been much used for granite finishing, while carbolon, crystolon, electrolon, samite and exolon are trade names of other American and Canadian carborundum products.

Owing to the centrifugal forces developed at high speeds, abrasive wheels work under considerable strain, so that the lighter the abrasive the safer the wheel. In this respect, carborundum, with density 3.2, compares very favourably with denser abrasives. When made from exceedingly pure materials, it is colourless, but as ordinarily produced, the crystals may be black, green, pale-blue or purple. Although harder than corundum, it is more brittle, and breaks down to powder much more rapidly. It has largely replaced corundum for grinding brittle materials such as cast-iron, marble, mother-of-pearl, etc., and for finishing leather. Owing to its low tensile strength and to the fact that its fracture is crystalline and not conchoidal, it is not suitable for steel grinding, the constantly freshly exposed edges tearing into the tough steel surface. As it tends to clog up, carborundum paper is less suitable than flint or garnet paper as a wood abrasive. It is three or four times as fast as emery, in use, but in common with the other artificial products, it is not suitable for glass polishing.

Artificial Alumina Abrasives.

Artificial corundum has been known for nearly a century, from the time true rubies were first made. Hasslacher, in 1894, prepared corundum free from iron by heating crushed emery ore with charcoal or coke in the electric furnace. The commercial material, alundum, is now manufactured from bauxite, by fusing with coke and iron borings for 24 hours in a water-cooled steel electric furnace, a charge consisting of 1,750lb. calcined bauxite, 100lb. coke, and 350lb. iron borings (*J. Amer. Electrochem. Soc.*, 1917). The oxide impurities are reduced and settle to the bottom, together with ferro-silicon, the fused alumina being obtained as a large ingot on taking down the furnace. It is claimed that by regulating the rate of cooling and by stirring the molten mass, an "abrasive temper" can be imparted, analogous to the temper of steel.

Aloxite is an artificial corundum made from bauxite in the Hautes Pyrénées, near supplies of raw materials and

hydro-electric power. Corindite is made from red bauxite by smelting with anthracite and blowing air through. It is a spongy mass containing many fine crystals of alumina (*French Pat.* 471,513 of 1915). Borocarbone is a French aluminous abrasive stated to be capable of being "tempered." Oxalumina consists of small crystals of alumina, while the product of fusing alumina with silicon constitutes another abrasive (*French Pat.* 430,932 of 1911).

The toughness of an alumina abrasive is increased by adding small amounts of oxides such as silica, iron oxide, titanium dioxide, strontia and zirconia. A high-grade product would consist of 97.4 per cent. Al_2O_3, TiO_2 1.38 per cent, Fe_2O_3 0.32 per cent., and SiO_2 0.90 per cent. The abrasive power may be weakened by imparting a cellular structure to the "grain." For this purpose the alumina is fused with a volatile sodium compound (*U.S. Pat.* 1,263,709 of 1918). Unlike carborundum, alundum can be used with good results for grinding hardened steels and malleable iron, the particles becoming polished in use. It is less brittle than natural corundum, and is much more reliable on account of its uniformity. The cost of production in 1918 was 90.5 dols. per short ton, the power cost being 7.8 dols. This comparatively low energy expenditure would render the manufacture feasible in this country.

Miscellaneous Artificial Abrasives.

A product having abrasive properties results when a mixture of aluminium with metallic oxides or peroxides is ignited. Corubin, the slag produced in the manufacture of chromium by the Thermit process forms an excellent abrasive. It contains 72 per cent. of alumina and 13 per cent. of chromium, and is used for lens grinding. Other metallic slags obtained by this process have been utilised.

"Diamond-crushed steel" made by quenching white-hot crucible steel and crushed cast iron are abrasive powders used for cutting granite, marble, and glass. "Angular grit" (crushed chilled iron) is a similar product which has found application as a substitute for sand in sand-blasting, the tendency to form dust being much less pronounced. Ferro-chromium containing about 30 per cent. chromium, together with up to 3 per cent. of silica, has also been patented. Tantalum metal and Moissan's boride and silicide of carbon, CB_6 and SiB_3, may also be of service in this field.

Analytical Methods.

Artificial corundum can be differentiated from the natural product under the microscope, the former containing microscopic bubbles of gas. The presence of carborundum in quantities not less than 5 per cent. can be detected by heating the sample, after ignition, with lead chromate (20 parts) in a tube of hard glass, when the mass becomes red-hot. For abrasives containing a small proportion of carborundum, the material, after ignition, is oxidised with lead chromate and potassium chlorate for one hour in a current of CO_2-free air. The gases after washing with silver-nitrate and ferrous-sulphate solutions, are passed into baryta water and the CO_2 estimated. Another method is to treat the residue insoluble in fused potassium bisulphate with hydrofluoric and sulphuric acids, until a constant weight is obtained.

THE PICKLING PROCESS IN TINPLATE MANUFACTURE.*

THE MECHANISM AND EFFICIENCY OF "RESTRAINERS."

During the process of manufacture of mild-steel plates for treatment in the tinning bath in the production of finished tinplates the surface of the metal becomes coated with oxide-scale, the removal of which is the function of the pickling process. Two varieties of oxide scale are recognised in the trade. The first is a heavy blue-black coating, formed during the production of the plates from steel bars rolled down hot in the mills; the second a thinner layer or scale, formed during annealing processes at a later finishing stage. Oxide-scale or iron-scale, as it is sometimes called, is a compound of ferrous and ferric oxides in varying proportions. The inner layers are not magnetic, and approximate in composition to $6FeO,Fe_2O_3$; the outer layers of the scale are magnetic and are nearer in composition to ferro-ferric oxide FeO,Fe_2O_3 (Fe_3O_4).

It is the object of the pickling process to effect the removal of this scale, as tin will only adhere to a clean metal surface. To remove the scale the plates are immersed in warm dilute sulphuric acid. The heavy blue-black scale is removed by what is known as the "Black Pickling" Process, the lighter scale by the "White Pickling" Process. Both processes are similar in character, save that, in the latter, conditions are made less severe in respect of strength of acid, temperature of bath, and time of contact of the plates with acid. It has been usually supposed that the loosening of the scale is effected by hydrogen produced below the surface of the scale and at the expense of the metal—in other words, that the scale is "burst off" by the evolved gas—and in practice a quiescent bath is an object of suspicion to the "pickler," who likes to see a good seething boil from the plates and has fresh acid and steam at hand to liven up his bath if the process appears sluggish.

The Addition of "Sharps" to the Bath.

From an early date it has been the practice at certain works to reduce the consumption of acid in the pickling process by addition of "sharps" to the acid bath. At a later date proprietary articles were employed on a limited scale for the same purpose, and the fact was established that conditions could be set up in the pickling bath, which reduced the evolution of hydrogen without appreciably increasing the time necessary for complete removal of the scale. This controlling effect of what may be termed "restrainers" remained obscure, and no attempt appears to have been made to elucidate the rationale of the process by detailed research, either in the works or in the laboratory. The conditions at the pickling bath, *qua* evolution of acid fume, have long been a matter of concern to the inspector, quite apart from loss of acid in the process and injury to the surface of the plates caused by excessive action of acid on the metal, and it appeared desirable that research should be undertaken in the laboratory of the chief inspector at Cornwall House, with a view to deciding whether the escape of noxious and offensive gases at the pickling bath could not be lessened without undue interference with the process of manufacture. The scope of the work had necessarily to be limited to a determination of the factors that control the pickling process with or without the addition of restrainers, and under the simplest laboratory conditions, but the results obtained encouraged the belief that a more scientific control of the pickling process would effect notable economies, and it was thought well to place manufacturers at once in possession of the salient facts rather than delay progress by waiting for the publication of the Alkali Report. To this work of elucidation and inquiry Mr. H. J. Bailey has made notable contributions, and, indeed, it is in great measure owing to his industry and perspicacity that the difficulties inherent in the translation of laboratory into large-scale practice have been successfully surmounted, and that the improved process is now in successful operation at so many of the South Wales works.

The Scale Dissolved, not Burst Off.

Test shows that ferric iron is absent from the solution and that ferrous iron alone is present. Further test shows that when a strip of metal freed from scale by preliminary treatment with acid, is employed, the volume of hydrogen gas evolved is equivalent to the loss of weight of metal. Solution of the scale must therefore have been effected by reduction of the ferric oxide contained therein to ferrous oxide. These considerations led to the hypothesis that the pickling process proceeds normally on the lines of the following equations:—

I. (*a*) $Fe + H_2SO_4 = H_2 + FeSO_4$.

(*b*) $FeO,Fe_2O_3 + H_2 + 3H_2SO_4 = 3FeSO_4 + 4H_2O$.

Summarised as—

$$FeO,Fe_2O_3 + Fe + 4H_2SO_4 = 4FeSO_4 + 4H_2O.$$

II. $Fe + H_2SO_4 = FeSO_4 + H_2$.

Reaction II. accounts for the hydrogen gas evolved, and 1 gramme of iron is here equivalent to 400 c.c. of hydrogen (0° C. 760 m.m.).

This fact, combined with the results of a large number of experiments, have led to the conclusion that the scale is *dissolved*, therefore, not *burst off*, as formerly supposed.

Measurement of Hydrogen Evolved.

If a small strip of mild-steel plate, containing oxide scale on its surface, be immersed in warm dilute sulphuric acid

* From the detailed account of investigations conducted by the Alkali Inspectorate given in the Annual Report for 1922. London: H.M. Stationery Office, 1s. 6d. net.

(say, 5 per cent. strength) the scale is dissolved and hydrogen gas is evolved, which may be collected and measured. The rate of evolution of gas increases as the metal dissolves and at higher temperatures becomes tempestuous in the course of 60 to 70 minutes. When a small amount of size, say 0.1 per cent. of size (glue), is added to the acid bath, solution of scale proceeds as before, but the volume of hydrogen evolved is greatly reduced and the rate of evolution remains practically constant. When acid alone is used, the surface of the metal plate is left pitted and rough; with size added, on the other hand, the surface remains smooth. Thus, with a strip of mild steel, 10.9 grammes in weight and of a total area 3,000 sq. mm., the following results were obtained:—

Volume of Hydrogen Evolved, 0° C., 760 mm. 60° C.

Period.	A. Size present.	B. 400 c.c. of Acid only (5.3 per cent. H_2SO_4).
First 15 mins....	3.5	11.5
Second ,, ...	3.5	31.5
Third ,, ...	3.0	44.5
Fourth ,, ...	4.5	61.5
Fifth ,, ...	4.0	69.0
Sixth ,, ...	4.5	72.0
Seventh ,, ...	4.5	78.0
Eighth ,, ...	5.5	82.0
Total Hydrogen.	33.0 (=0.082g. Fe).	450.0 (=1.120g. Fe).
Total loss of weight of metal plate	0.500 gramme.	1.450 gramme.

"Restrainers" and Protective Coating of Hydrogen.

Attention has already been drawn to the effect of traces of size (0.1 per cent.) in restricting the action of acid on clean metal in the pickling process. This property of rendering the iron "passive" or "polarised," so to speak, is one possessed, though in differing degree, by many organic substances, such as dextrin, glucose, gelatine, starch substitutes, and other proprietary articles. In every case the rate of evolution of hydrogen is reduced at all temperatures, while the rate of solution of the scale itself is but little affected. This differential effect is of great importance in the pickling process, as it is essential that complete removal of the scale should be effected with minimum time of contact of the metal with acid. It has been suggested that the specific action noted is due to a modification of the ionisation conditions in the bath; but experiment shows that the effect of the limited amount of restrainer added is minimal under the conditions of the test, and in any case the hypothesis affords no explanation of the fact that the *clean* metal surface alone is rendered "passive," the scale remaining unaffected. A simpler explanation is one based on the fact that the hydrogen gas evolved in Equation I. (*a*) is all consumed in the reduction of ferric to ferrous oxide, while in Equation II. the evolved hydrogen is free to escape from the solution. It appears probable, therefore, that in presence of a restrainer the bubbles of hydrogen are stabilised on the surface of the metal (*cf.* froth flotation process) thus forming a protective coating, which comes into being automatically as the scale is removed, and retards further action of acid on the metal. The correctness of this hypothesis is supported by the facts revealed by an examination of the metal surface under the microscope. If a small strip of clean metal plate, or better a piece of iron wire of fine gauge, be immersed in a drop of size-acid solution placed on a glass slide under a one-inch objective, the surface of the metal is seen to be covered with a "moss" of minute bubbles, that show little or no tendency to enlarge and escape from the solution; while, if acid alone be used, the bubbles enlarge and break away.

Experimental Results and Conclusions.

Comparison was made of the "Efficiency" of various restrainers under controlled conditions. The apparatus employed was of the simplest description and included a large water bath, two Erlenmeyer flasks (capacity about 415 c.c.), each provided with rubber stopper and small-bore tube delivering to an inverted graduated cylinder standing in a pneumatic trough. For the experiments with size (jelly), cylinders of 100 c.c. or 250 c.c. sufficed; when acid alone is used, cylinders of 500 c.c., 1,000 c.c. and even 2,000 c.c. are appropriate. Comparative experiments were made in pairs, to ensure that conditions were equal as regards strength of acid, temperature of water bath, and quality of tinplate tested.

The results of the experiments are presented in the report in a series of tables and graphs.

The "efficiency" of a restrainer was regarded as varying inversely as the volume of hydrogen involved, measured under standard conditions of temperature and pressure. An alternative method of comparison and one yielding a more scientific definition would be a comparison based upon the actual *reduction* in the volume of hydrogen obtained when the restrainer is present. This may be called the "restraining effect." Thus,

If X be the vol. of hydrogen (0° C., 760 m.m.) obtained with acid only.
Y be the vol. of hydrogen (0° C., 760 m.m.) with acid plus "restrainer."
Then X—Y will be the reduction in volume due to the action of the "restrainer,"

and the "restraining effect" is defined by the expression—

$$\frac{(X-Y)}{X} \times 100.$$

The actual "restrainers" tested comprised pickelette-acid, size (jelly), size (glue), tragon, gelatine, and cresol acid. Preliminary experiments had eliminated glucose and dextrine as practical propositions. In all the experiments 400 c.c. of 5.3 per cent. H_2SO_4 (equal to 21 grammes) and steel plate (inside sheets) of area 3,000 sq. mm., and approximate weight 4.0 grammes, were used. Taking the "restraining effect" of size (glue) as 100, the effects of the other bodies tested, in the order as given above, were 103, 99, 100, 99, 97, and nil respectively, at a bath temperature of 60° C., and 104, 97, 100, 99, 97, and nil, at a bath temperature of 77° C.

The results prove that, with the exception of cresol, the effect is very similar for all the restrainers tested. Size (glue) is of special value, as the bath remains clear at all temperatures up to 90° C., the highest temperature used in the experiments. This is an important property, as it permits the use of weaker acid in the bath. The negative result yielded by cresol was not anticipated in view of its use in froth flotation processes. "Sharps," although of high value as a restrainer, give a turbid bath, and the solution is markedly less efficient than size (glue).

THE AMINO-NAPHTHOLS.

NOTES ON THEIR SYNTHESIS AND REACTIONS.

By J. MISSENDEN and F. E. LIECHTI.

SATISFACTORY methods have been devised for the synthesis of all the fourteen amino-naphthols theoretically possible by the fusion of the naphtholmonosulphonic acids with sodamide. The reactions described below have been adjusted to suit commercial conditions, and are the only known methods for direct conversion. The several problems confronting the works chemist have been included under the respective sub-headings:—

(1) 1-*amino*-2-*naphthol:* This substance may be obtained, preferably, by reducing benzene-azo-β-naphthol with hydrochloric acid and stannous chloride. In 1900, Boehringer acquired the patent rights for a means of electrolytic production (*Brit. Pat.* No. 13,542). Beta-naphthaquinone may be obtained by the action of nitrous acid upon an acidified solution of 1-amino-2-naphthol, a reaction peculiar only to the 1 : 2 and 4 : 1 positions. The interaction of neutral solutions with cupric salts produces naphthalene-1-diazo-2-oxide (*Weiler-ter-Meer*; *Ger. Pat.* No. 155,083), although the yield is scarcely profuse, while the brightness of the azo dyestuffs is largely impaired. It is not possible to obtain the substituted amides of 2-hydroxy-3-naphthoic acid with the 1 : 2, 3 : 2, and 8 : 1 positions. Diazotisation does not take place in the presence of mineral acids.

(2) 2-*amino*-1-*naphthol* may be produced by the interaction of sodium amalgam and 2-amino-1-naphthol-5-sulphonic acid[1], or by the interaction of sodium thiosulphate and beta-naphthaquinonephenylhydrazone. The 5-derivative of the monosulphonic acid is formed upon sulphonation with anhydrous acid (10 to 15 per cent.) at 50° C. (*Sandoz*; *Ger.*

[1] The product may also be obtained from – 3 – sulphonic acid (Gattermann and Schulze; *Berichte*, 1897, xxx., 51), but the writers do not consider that, for practical purposes, such a course would be advisable. The inferiority of the sulphur position tends to retard transformation, or else render the reaction incomplete.

Pat. No. 69,228). Treated with nitrous acid in a copper solution, it is changed to beta-naphthaquinone. On agitation with an aërated solution of ammonia, a greenish liquid results, upon which may be detected a violent scum.

(3) 3-*amino*-1-*naphthol* has been prepared by the interaction of 1 : 3-dihydroxynaphthalene and ammonia solutions under similar conditions to those stated for the 3 : 1 positions. The azo-dyestuffs resemble those obtained from the amino-naphthol having the 4 : 1 position. Note should be made of paragraph (1).

(4) 3-*amino*-2-*naphthol*: The only satisfactory method known for the production of this substance is to treat 2 : 3-dihydroxynaphthalene with 30-per-cent. ammonia at a temperature of 150° C., and at a pressure of about 14 atmospheres (*Höchst; Ger. Pat.* No. 73,076). The sulphite treatment inaugurated by Badische[2] we have found somewhat unsatisfactory. Diazo-amino dyestuffs have been known to result from interaction with diazotised bases in alkaline solutions. Note should be made of paragraph (1).

(5) 4-*amino*-1-*naphthol* is best formed by eliminating the carbon dioxide from 4-amino-1-naphthol-2-carboxylic acid at a temperature of 250°—265° C. This compound will not couple with diazotised bases, but sulphonation as described in (2) produces 1-amino-4-naphthol-3-sulphonic acid. By agitating the diacetyl compound with a solution of caustic soda, the 1-acetylamino-4-naphthol (naphthacetol) is obtained. Ortho-azo-dyestuffs are produced by the diazo reaction. Nitrous acid treatment alone produces alpha-naphthaquinone.

(6) 4-*amino*-2-*naphthol* is produced by reducing 4-nitro-2-naphthol with acidified stannous chloride[3]. With diazotised bases and nitrous acid a very unstable diazo-amino compound is formed. Sulphonation produces the 1 : 3 : 4 position. Boiling with weak solutions of ammonia and acids produces, respectively, 1 : 3-diaminonaphthalene and 1 : 3-dihydroxy-naphthalene.

(7) 5-*amino*-1-*naphthol* is produced by subjecting a mixture of α-naphthol-5-sulphonic acid, naphthalene, and sodamide to a temperature of 200°—225° C. It forms monoazo dyestuffs. A good cornflower blue is obtained by the interaction of the 5 : 1-compound with diazotised α-naphthylamine-4-sulphonic acid. A cold mixture with sulphuric acid gives 1-amino-5-naphthol-6-sulphonic acid, which does not change in alkaline solutions. In the case of the sodamide process, this compound, together with the 8 : 1-compound, are the only exceptions to the general rule of the displacement of SO_3H by NH_2.

(8) 5-*amino*-2-*naphthol* is formed when β-naphthol-8-sulphonic acid interacts with naphthalene and sodamide at a temperature of 250° C. (*Brit. Pat.* No. 22,412/1905), or when α-naphthylamine-6-sulphonic acid is treated with caustic potash at a temperature of 300°—325° C. If β-naphthol-7-sulphonic acid is fused with sodamide, the 5 : 2 and 7 : 2 compounds are formed. When β-naphthol-6-or-8-sulphonic acids are used, this does not occur, the 5 : 2 position being the only one in evidence.

In a 10 per cent. solution of ammonia, 5-amino-2-naphthol produces a scintillating bluish fluid which, on admixture with a saturated solution of ferric chloride, gives a very beautiful violet colouration. The original blue liquid, if aërated, changes to a steady royal blue of considerable intensity. It forms azo-dyestuffs in dilute acetic acid.

(9) 6-*amino*-1-*naphthol* is produced by the fusion of β-naphthylamine-5 sulphonic acid with caustic alkali at about 300° C. Two monosulphonic acids may be obtained.

(10) 6-*amino*-2-*naphthol* is produced when 2-amino-6-naphthol-4-sulphonic acid is treated with sodium amalgam[4]. The addition of diazotised ortho-aminophenolsulphonic acid in alkaline solution produces monoazo-dyestuffs.

(11) 7-*amino*-1-*naphthol* is obtained by mixing solutions of 1 : 7-dihydroxy-β-naphthoic acid and ammonia, and heating to 200° C. It formes azo-dyestuffs, and gives two 2-amino-8-naphtholmonosulphonic acids on sulphonation.

(12) 7-*amino*-2-*naphthol*. (See Note 8 for the sodamide reaction.) This isomeride may be formed by heating under pressure a mixture of 2 : 7-dihydroxynaphthalene and ammonia (150° C. and at 4-5 atmospheres). It forms azo-dyestuffs, and gives 2-amino-7-naphthol-3 : 6-disulphonic acid when heated with sulphuric acid.

(13) 8-*amino*-1-*naphthol* is formed when α-naphthol-8-sulphonic acid is heated to 250° C. with naphthalene and sodamide, or when 1 : 8-diaminonaphthalene-4-sulphonic acid is reduced with 25 per cent. sulphuric acid at 150° C. under a pressure of 6 atmospheres. A saturated solution associated with diazo-nitrite gives an 8-amino-beta-naphthaquinoneoxime (*Badische; Ger. Pat.* No. 62,289) It forms azo-dyestuffs, and, in some instances[5], 8-amino-α-naphthyl sulphite has been utilised in azo-dyestuff production. Sulphonation takes place over the following range:—

H_2SO_4	Temp.	Sulphonic Acid Formed.
15 per cent.	105° C.	1-8-5 : 7 (di)
20 per cent.	100° C.	1-8-5
70 per cent.	150° C.	1-8-7

The sulphite is formed by boiling the 8 : 1-compound in a solution of sodium bisulphite.

(14) 8-*amino*-2-*naphthol* is produced by reducing 8-nitro-β-naphthol with hydrochloric acid and tin. It forms azo-dyestuffs and gives, on sulphonation, 1-amino-7-naphthol-4-sulphonic acid; but, occasionally, a disulphonic acid.

[2] *Brit. Pat.* No. 1387/1900.
[3] *Trans. Chem. Soc.*; 1919, cxv., 1133.
[4] Jaccia, *Annalen;* 1902. cccxxiii., 127.
[5] Bayer, *Ger. Pat.*, 211,381.

THE DISTILLATION OF AMMONIACAL LIQUORS.*

DISPOSAL OF THE SPENT EFFLUENTS.

FURTHER work has been done on this subject during the past year, but the research is still in progress, owing to the delay in erection of plant at works where novel features have been introduced that were lacking in the experimental scrubbers erected at the Hornsey gasworks, and described in last year's report. Since their erection in February, 1921, the decolourising and dephenolating scrubbers at Hornsey have successfully dealt with the whole of the effluent liquors produced in the manufacture of 2½ to 3 tons of sulphate of ammonia per 24 hours, and further improvement has now been effected in the character of the final effluent discharged—analysis indicating a volatilisation of 71 per cent. of the phenols with a reduction in the figure for "Oxygen Absorbed" of 42 per cent.

Biological Treatment of the "Dephenolated" Effluent.

Undoubtedly, however, the percentage purification effected cannot be regarded as fully coming up to expectations in view of the results obtained in the laboratory with apparatus of similar design. The improvement in the character of the liquor, *quâ* reduction in the figure for oxygen absorbed, effected by blowing with boiler-fire gases, appears to be due in great part, if not entirely, to the volatilisation of the phenols; thiocyanate and thiosulphate must be regarded as stable under scrubber conditions. All attempts hitherto made to effect the removal of these bodies by chemical action have failed, as the value of the recovered products is negligible. Attempts to deal with the effluent liquor from the ammonia distillation plant by bacterial action on specially prepared filter beds have met with a greater measure of success and encourage the belief that, could the beds be fed with an effluent from which the bulk of "phenols" had been removed by preliminary treatment in a scrubber of approved design, the final effluent discharged from the filters would be relatively innocuous in respect of phenol, thiocyanate, and other oxidisable constituents. Arrangements are now being made at the Hornsey gasworks to submit a portion of the effluent from the ammonia-distillation plant to double treatment on the lines indicated above, whereby the effluent liquor from the dephenolating scrubbers will be discharged on to a filter bed charged with specially activated material for treatment by bacterial action prior to discharge from the works. Facilities are promised for sampling the treated liquor at various stages in the process, and the results of the analyses should afford data of value for those who may be faced with similar problems.

Relation of Volume of Feed Liquor to that of Spent Effluent.

It is not the practice at gasworks or coke-oven works to measure the volume of effluent liquor discharged from the plant, but the volume of any given effluent may be taken as related, within certain limits, to that of the ammoniacal liquor distilled, and can be calculated with some approximation to accuracy if the ammoniacal content of the feed liquor be known, due allowance being made for increase of volume

* From the Alkali Inspectors' Report for 1922 (H.M. Stationery Office, 1s. 6d. net.) Continuation of the work recorded in the report for 1921 (*vide* the *Chemical Trade Journal and Chemical Engineer*, July 28, 1922 (page 105).

due to addition of lime water and admission of steam at the still. Further correction would be necessary for water introduced with acid into the saturator and evaporated therefrom, and for "devil" liquor condensed. Water vapour will also be present in the foul gases leaving the condensing system; but, with this at air temperature, the amount will be negligible. It has been usual to assume that the final effluent is related to the ammoniacal feed liquor as 150 : 100. Proceeding on the assumption that the volume of feed liquor increases by 50 per cent. prior to discharge, it is of interest to calculate the volume of effluent spent liquor for various strengths of feed liquor. Results are stated per ton of sulphate (25 per cent. NH_3) to correspond with average working conditions observed in practice, and are shown in the following table:—

Volume of Effluent Spent Liquor in Relation to Volume of Feed Liquor.

Strength of Gas Liquor.		Gallons of Liquor per ton of Ammonium Sulphate, based on 100 per cent. Conversion. NH_3 Content of S/A—25 per cent.	
Oz. Strength.	Per cent. NH_3.	Gas Liquor Used.	Total Effluent Spent Liquor Calculated for 50 per cent. Increase on G/L.
4	0.868	6,470	9,710
5	1.085	5,170	7,760
6	1.302	4,320	6,480
7	1.519	3,690	4,540
8	1.730	3,230	4,850
9	1.953	2,870	4,310
10	2.170	2,580	3,870
11	2.389	2,340	3,510
12	2.604	2,150	3,230

These figures are consistent with those given by Dr. Maclean Wilson for average coke oven practice (see Annual Report, 1921, page 10): 20,000 gallons of effluent spent liquor are stated to be discharged from works carbonising 200 tons of dry coal per day, corresponding to about 9,000 gallons per ton of S/A made.

Difficulty of Estimating the Volumes.

A correct knowledge of the volume of spent liquor produced is obviously of prime importance in any case where treatment of the effluent by blowing with fire gases is under consideration. Measurement of the feed and effluent liquors would undoubtedly be the most satisfactory way to obtain the necessary data; the collection and measurement of a large volume of boiling liquor highly charged with suspended matter, however, would require the provision of plant not always available, and the use of an alternative and simpler method is to be desired. Mention was made in last year's report of a method of calculation based on an analysis of the inlet and exit liquors concerned, taking the amount of chloride entering and leaving the system as a constant to which volumes are related by simple arithmetical calculation. Unfortunately the amount of chloride present in many liquors is small, and its estimation in complex mixtures, highly charged with organic matter, is an operation by no means easy to effect. It was thought desirable, however, to apply the method in a concrete case, and with this end in view arrangements were made at one of the larger coke oven works to submit the procedure to rigorous test under controlled conditions. The plant employed included a Holmes rectangular still with heater and bottom discharge saturator erected in 1911; the foul gases, after cooling to air temperature, are burnt in the oven flues. Three tests were made. In the first two experiments the spent and "devil" liquors were mixed in a large tank and the effluent sampled on its way to the spoil tip; in the third experiment the effluent from the still and the "devil" liquor were kept separate and the amount of the "devil" liquor was measured. The ammoniacal feed liquor in all three experiments was measured in a large boiler and the lime feed in a drum. In test No. 2 general confirmation of the correctness of the volume data was afforded by the calculated weights of thiocyanate and thiosulphate entering and leaving the system, and in test No. 3 by the figures for phenol; but the volume relationship 113 (total effluent) : 100 (feed liquor) for test No. 2 is admittedly anomalous, and in tests Nos. 1 and 3 the relationship 133 (or 134) : 100 is somewhat lower than the figure one was led to expect. Judgment is suspended, therefore, in the absence of further data obtained at a works where the volume data calculated from the analysis figures could be checked by actual measurement of the spent liquor leaving the system.

Control of Lime Feed to Still.

Speaking generally, the lime feed to an ammonia still should be related strictly to the fixed-ammonia content of the liquor distilled, a due excess of lime being provided to ensure the liberation of the whole of the fixed ammonia prior to discharge of the spent liquor from the still. At the best works periodic analyses are made of the liquor distilled and of the lime used, and due adjustment effected to ensure an excess of 10 to 20 per cent. At many works, however, such analyses occupy no place in routine testing. In general an undue excess of lime is used, which must of necessity adversely affect the production costs and lead to increased labour charges for the cleaning of stills and removal of sludge from spent liquor settling tanks (Works B below). On the other hand, deficiency of lime—as already indicated in Report, 1918, page 27—is often the cause of very serious loss of ammonia (Works D below). The divergency of practice from theory in this respect finds illustration in the following statement, the data for compiling which have been kindly supplied for publication by the management of three typical works, in all of which the process is under the care of a skilled chemist.

Lime Feed in Relation to Fixed Ammonia.

Gas Works Liquor.	Works A.	Works B.	Works C.	Works D.	
	Lime Feed.			Soda Ash Feed.	Equivalent; Lime Feed.
Period	6 months	6 months	One week	Two weeks.	
Ammoniacal Liquor Distilled:—					
Volume ..... galls.	24,189,000	2,736,000	42,770	29,660	
Fixed Ammonia:—					
Per cent. of Total Ammonia	23.5	21.0	16.3	23.3	
Total weight tons	441	31	16.2 cwts.	23.6 (cwts.).	
				As Na_2CO_3	As CaO.
Lime, as CaO—					
Equiv. to Fixed NH_3 tons	726	56	26.7 cwts.	73.5 cwts.	38.8 cwts.
Actually used, ,,	804	162	28.0 ,,	93.0 ,,	49.1 ,,
Excess used ..... ,,	78	10.6	1.3 ,,	19.5 ,,	10.3 ,,
Excess used, per cent.	10.7	190	4.8	26.5	26.5
Used, per 1,000 galls. of liquor distilled cwts.	0.67	1.18	0.65	3.15	1.65
Ammonia in Effluent Liquor,.. Per cent.	0.02	0.05	0.02	Average 0.08 (Max., 0.387; Min. 0.014).	

Note.—The results for Works A and B correspond to ordinary working practice those for Works C and D to special experimental periods, during which the lime (or soda ash) feed would be under closer supervision.

POWER ALCOHOL IN FRANCE.

DIVIDED OPINIONS ON THE NEW REGULATIONS.

A WRITER to the *Engineer*, commenting upon the putting into operation in France of the Bill requiring importers of motor fuels to purchase from the State a quantity of alcohol equal to 10 per cent. of the previous month's importation of mineral spirit, comments that it has raised so much controversy that it is difficult to see how the measure can become effective. The object of creating a "national fuel" is not only to reduce the country's dependence upon foreign oils, but more especially, for the moment at any rate, to enable the State to dispose of the huge stocks of power alcohol it has accumulated since it took over a monopoly of the purchase and disposal of spirit distilled from beet, grain and other produce. While the Union of Gas and Oil Engine Builders has been strongly supporting the Government's policy, others assert that the cost of the "national fuel" must be necessarily higher than petrol, unless the State sells power alcohol at a price considerably below the cost of production, which, indeed, it is doing at the present moment. So far as engine builders are concerned, the compulsory use of alcohol will necessitate certain modifications and adjustments that will induce users to employ French engines constructed for the purpose, and to that extent builders will be relieved of much of the competition from foreign firms. On the other hand, the stimulus given to the production of alcohol is having the effect of utilising huge quantities of beet and grain which could be more profitably employed for the manufacture of sugar and other produce.

NITRATE OF SODA.

INCREASING WORLD CONSUMPTION.

LOOKING back over the past six months, it is clear that strong efforts have been made towards the stabilisation of the Chilean nitrate industry, and with considerable success. The position to-day, viewed in all its aspects, is much more promising than at any time since before the war. Stocks have been reduced to manageable proportions, sales have been stimulated, and the outlook for the coming year, so far as is indicated by orders already booked, is favourable. Nitrate of soda is foremost in importance as a source of soil food for agricultural use, and it is, therefore, essential that its supply should not be restricted and its consumption hampered by an artificially high range of prices. The world demand for nitrogen to-day is very large, and capable of great expansion, so that it behoves the use of the long view in determining the immediate and future methods of dealing with the fertiliser situation.

Production and Prices.

Satisfactory though the position appears, it has still to be remembered that production is much below capacity-output, which factor means the financial burden of stoppage expenses being added to the price. Production for the six months ending June 30 last amounted to somewhere in the neighbourhood of 840,000 tons, which works out at about half of the possible figure. For the same period of 1922, however, the proportion was much lower at 420,000 tons, and as the estimated consumption during the coming nitrate year is variously estimated to be over two and a quarter millions tons, the number of oficinas working should be increased, with consequent reduction in working costs. On this basis, it was not unnaturally expected that producers would publish a slightly lower range of prices for 1923-24 delivery, in order to encourage still further the improving consumption. The continued incidence of the tax of 4d. per quintal due to the "Pool" as compensation for the losses sustained two years ago in connection with the huge stocks, bought at high prices by European importers, and the desire to make good for the depression of the past two years, proved too strong as factors in the calculation of the new price list, with the resulting higher level.

Scarcity of Labour in Chile.

Then, again, it is reported that labour is comparatively scarce in Chile—that is to say, the type of labour which is willing to work in the nitrate fields. The work is not attractive, and with the memory of former treatment still green, the oficinas are finding it increasingly difficult to procure men at a wage rate which will ensure substantial profits. With the more detailed organisation of labour, and the widespread feeling for a higher standard of living, the men are not content to work for the previously low scale of wages. To the Producers' Association this latter fact is probably the main reason for deciding to increase prices at a time when there is an enlarged production of sulphate of ammonia, accompanied by a widespread demand for that product.

The outstanding feature of the consumption figures for the past six months has been the increase in the quantity taken by the United States, due largely to the generally-accepted belief that an early application of the fertiliser was a means of defence against the boll-weevil, which, during the past season, has been so prevalent. Consumption in Europe was not very much larger than in the same period in last year, while in Japan and other countries deliveries inland from ports were some 70 per cent. higher. The statistics given above are for the past two years, with the figures for the corresponding six months of 1914 added for purposes of comparison.

Six Months ended June 30.		1923.	1922.	1914.
Production	tons	840,000	420,000	1,455,000
Shipments :—				
To Europe (including Egypt)	,,	495,000	103,000	831,000
,, United States	,,	484,000	141,000	310,000
,, Other countries	,,	78,000	37,000	41,000
Total shipments	,,	1,057,000	281,000	903,000
Port Deliveries :—				
In Europe (including Egypt)	,,	782,000	752,000	1,494,000
,, United States	,,	658,000	403,000	295,000
,, Other countries	,,	83,000	49,000	47,000
Total deliveries	,,	1,523,000	1,204,000	1,836,000
Visible Supply at June 30 :—				
Europe (including Egypt)	,,	171,000	228,500	416,000
United States	,,	54,000	38,000	84,000
Other countries	,,	25,000	6,000	11,000
Stocks in Chile	,,	1,008,000	1,601,000	754,000
Total supply in sight	,,	1,258,000	1,873,500	1,265,000

So far as the European consumption is concerned, there were rumours early in the year that Germany, and possibly Russia, would become important purchasers. Indeed, the Government of the former country endeavoured to negotiate the purchase of a quarter of a million tons of nitrate, but, as might have been expected, such arrangements fell through. Any faint hopes that might have been entertained by merchants were, however, scattered by the sudden slump of the German mark and the occupation of the Ruhr by the French. At the moment of writing the mark is quoted, if at all, at over a million and a quarter to the pound sterling. Currency having lost all significance, it remains to be seen what efforts will be made to resuscitate the demand in that quarter. The recent occupation of the German factories by the French, and the seizure of current stocks, which amounted, it is believed, to some 45,000 tons of synthetic products, mostly sulphate of ammonia, have resulted in a severe restriction in the output of nitrogen. There should be, therefore, a large opening for the Chilean fertiliser, could a satisfactory basis of payment be arranged. Altogether only about 10,000 tons were sold into that market, and, as a leading broker puts it, "under existing conditions it appears unlikely that any important quantities will be sold there." Consumption in the United Kingdom, although gradually rising since 1921 on agricultural account, is not of a nature to enthuse merchants in this country.

Time Extension of the Producers' Association.

An interesting event which took place during the half-year under review was the decision to extend the life of the Producers' Association for a further six months until June 30 next. There were some dissentients to the scheme for continuation, but a stringent boycott was imposed, with the result that one of the Chilean producers has given his consent to the new arrangement, and the early adhesion of the others is expected. It is generally thought among producers that a further term of five years of life for the Association would benefit the industry considerably. Complete unanimity on this point is not obtainable, however, but when it is considered that the idea is supported strongly by the Chilean Government, upon which many of the producers are dependent for financial support, there is little doubt that it will ultimately come to pass.

OUR BOOKSHELF.

Chemistry, Inorganic and Organic. Charles Loudon Bloxam. London: J. and A. Churchill; 36s. net. (10th edition).

Ten years have elapsed since the last edition was published, and very strenuous work has been devoted successfully to the construction of an edition which would worthily maintain the high reputation of its predecessors. Bloxam's was always a very safe work of reference and commanded more than passive esteem amongst chemists and technologists. A great point in its favour is the very wide range (inorganic and organic) it has always managed to cover in the single volume without any undue compression.

Theoretical and Applied Colloid Chemistry. Ostwald and Fischer. London: Chapman and Hall, Ltd.; 12s. 6d. net.

This work, now in its 3rd edition has done much to promote and stimulate a better appreciation of colloid phenomena. There can be no doubt about the modern demand for knowledge in this direction and the increasingly important part it must take in the general scheme of scientific and industrial progress. Technical Applications occupy nearly 70 pages, brimful of practical detail, simply expounded. Reference to the region of colloid dimensions as "the world of neglected dimensions" is a happily conceived phrase, which is a key-note representative of the spirit and aspirations of this very excellent volume.

BRITISH DYESTUFFS CORPORATION, LTD.

ANNUAL GENERAL MEETING.

THE fourth ordinary general meeting was held in Manchester on Tuesday, July 10. Sir William Alexander, K.B.E., chairman and managing director, presided over a large attendance of the shareholders. Mr. D. R. Mackay (secretary) read the notice convening the meeting and the report of the auditors.

The Chairman, after furnishing a comparison between the balance-sheet before the meeting and that of the previous year, proceeded: "We will now turn to the year's results as shown on the directors' report. The balance of profit (after providing a total of £411,000. for depreciation and crediting the further amount estimated to be recovered in respect of excess profits duty) amounts to £102,656. The balance of loss carried forward from the previous period was £803,355. This leaves to be carried forward to next year a deficit of £700,699. The volume of trade in the home market has shown a substantial increase, which your directors have endeavoured to stimulate by reducing prices —in many instances even below the present level of cost. The possibility of trade with overseas markets has been very limited, and business has been carried on under great difficulties. Although we are preserving a position in the more important foreign markets it is more with a view to development in the future than to the realisation of any immediate benefit. So long as colours from German sources can be offered in neutral markets at prices against which no country with a stabilised currency can compete, I am afraid this unsatisfactory condition of our overseas trade must continue.

Our trading results for the year ended October 31, 1921, were affected by two items of an exceptional nature—namely, the large amount required to be written off stocks to reduce them to current market prices, and a substantial amount estimated to be recovered on excess profits duty. The further amounts brought into the current year's accounts in respect of these two items are comparatively small, and if we take the two trading periods and ignore in both cases the amounts credited for refund of excess profits duty and the amounts written off stock values, we find that the trading results for the year ended October 31, 1922, show an improvement of £778,000. as compared with the previous year. I think you will agree that this result, which has been obtained notwithstanding an average reduction of 17½ per cent. in our selling prices, constitutes the best justification for the policy adopted by your Board and reported to you at the last ordinary general meeting. I propose briefly to recapitulate the manner in which we have endeavoured to deal with the problems we were then called upon to face.

The Year's Achievements.

I shall first refer to the excessive stocks of raw materials, stores, and colours accumulated in previous periods. With the exception of certain stocks of engineering stores, all these surplus stocks have been liquidated. This step, by releasing a large amount of capital previously tied up, has contributed to the strengthening of our financial position, with the result that we have to-day a total of over £2,000,000. in cash or invested in readily-realisable securities. For some time past all items of expenditure have been periodically reviewed with the object of securing reductions and bringing our standing charges into closer relation with the present restricted volume of trade. It is satisfactory to report that the economies effected have contributed in no small degree to the improved trading results which are now before you.

In research and technical development we have continued the policy of concentrating our efforts mainly on raising the standard and quality of our production and improving our processes of manufacture, through which our trading operations have materially benefited. This improvement arises not only from the application to works processes of the results obtained in our research laboratories, but also from the more intimate knowledge of plant operations which our process chemists are acquiring. I am convinced that it is to this cause we must look more and more in the future to secure economical working and improved efficiencies. A loyal and contented staff, working together with a common aim, is essential to our plans, and during the year we have consolidated our technical staffs and given the new organisation a fair chance of establishing itself.

Trading Prospects.

In my speech of last year I pointed out that the main hope of obtaining a reasonable return on our capital must lie in our ability to keep our plants well employed. I am afraid that I must repeat this warning. The present volume of trade is still too restricted to allow our plants to be used as economically as is possible, and until normal conditions of trade are restored in the consuming industries no marked improvement in our trading results can be anticipated. In the meantime, your directors are continuing to conserve the financial resources of the undertaking and to effect such further economies as are possible in both productive and administrative charges.

To one item of expenditure I desire to make special reference. During the four years ended October 31, 1922, your Corporation and its associated companies have spent a total amount of over £400,000. on research. Much of this expenditure has been incurred in establishing the constitution of colours not previously made in this country, and in working out processes for the manufacture of the new and necessary intermediate products. This field has now been well covered, and expenditure in this direction is diminishing. Henceforth our principal aim will be to utilise our research organisation for the purpose of securing better efficiencies and increased yields of products in actual manufacture and of introducing such new colours as are in steady demand by the consuming trades. It is with this object that the consolidation of our technical staffs has been carried out, and your directors feel that the time has come when further economies can be effected in our research department. We are fully alive to the necessity of research, not only for the improvement of current operations, but for the working out of new problems which, although not immediately remunerative, will, it is hoped, enable us, as time goes on, to take a more independent line in the development of dyestuffs and allied organic products. I promise you that this aspect of research work will not be neglected in any steps which are taken to effect economies.

Effect of the Ruhr Occupation.

A word now on reparation dyes and the effect of the Ruhr occupation. In September, 1922, the Corporation was appointed agents for the Board of Trade for the distribution of dyestuffs received under the reparation clauses of the Treaty of Versailles. The organisation established for importing, warehousing, and distributing such dyestuffs is working efficiently and we have every reason to state that it has given satisfaction to consumers and others interested. Considerable and changing difficulties have been experienced in maintaining contact with German suppliers since the occupation of the Ruhr valley by France early this year. So far, however, we have succeeded in obtaining the great bulk of the supplies awaiting delivery, and have every hope that the balance still available for us will be received. Very considerable disturbance to the German dyestuff industry has been caused by the French occupation. Whilst some works have been able to maintain output others are entirely closed, and it is estimated that German production has already been reduced by over 50 per cent. Difficulties are increasing, and it is impossible to forecast what the end may be. The position has become more confused by the action of France and Belgium in seizing large stocks of dyestuffs, which have been conveyed to French and Belgian territory. An indiscriminate distribution of these dyestuffs might materially affect the interests of your Corporation, and strong representations, which are not being disregarded, have been made to the Government on the difficulties and dangers of the situation.

The Prices of Dyestuffs.

I now turn to a matter to which prominence has recently been given by consumers and others—namely, the prices charged for our dyestuffs. At our last meeting I stated that our average price was then 3s. 5d. per pound. The average price to-day is 2s. 6d. per pound—a reduction of 25 per cent. Your directors consider that the demands of the consumer for price reductions have been met to the utmost of the resources of the company. The consumers, through their organisation, the Colour Users' Association, have expressed disappointment that we cannot go further, and they have suggested that we should take a bolder line and reduce prices to a level of not more than three times the pre-war price as a maximum on each individual colour, relying upon the Government to make good any loss by a grant in aid from the proceeds of the sale of reparation dyes or by a direct subsidy. Discussions have been pro-

ceeding for some time past with the Council of the Colour Users' Association, but, unfortunately, we have not been able to see eye to eye with them.

I believe I am correctly stating the attitude of the large majority of consumers when I say that they are as determined as ever to have a dye-making industry in this country as security against such a position as now exists owing to the disorganised state of Germany. Where we part company is in the contention they put forward that a three times pre-war factor as a maximum is sufficient not only to cover the economic advance in the cost of production, but also to yield a handsome contribution towards the development and establishment of the industry.

The Three Parties to the Industry.

I think that we are all agreed that no industry of the complexity of ours can be established without some sacrifice on the part of those most vitally interested in it. In our case there are three parties with a common interest, the Government, the user, and the shareholder. The industry is of interest to the Government in that it provides the only school in which a large and competent body of chemists can be trained in the technology of organic substances. The industry is of interest to the user because it is the only security he has against a repetition of the position in which he found himself in 1914. The industry is of interest to the shareholder because he has a large financial stake in it. It is only by maintaining the common interest of the three parties—the Government, the user, and the shareholder—that any progress can be made, and it is imperative that there should be equal readiness to contribute towards that progress.

So far the contributions of the Government have been, first, the subscription of 1,700,000 preference and preferred ordinary shares in the company, and, second, the passing of the Dyestuffs (Import Regulation) Act prohibiting for a term of years the importation of dyestuffs except under licence. It is important to remember that this Act was passed to put into effect the declared policy of each successive Government since 1914, which policy took concrete form when in May, 1918, the President of the Board of Trade announced in the House of Commons that protection would be afforded to the dyestuffs industry by means of a control of imports.

The contribution of the consumer of dyestuffs has been assent to a restriction of access to foreign sources of supply through the operation of the Act. This assent was given subject to the right to demand a licence for importation in cases where the prices quoted by the home manufacturer placed the consumer in an unduly disadvantageous competitive position.

The Shareholders' Contribution.

The contribution which the shareholder in this Corporation is making towards the establishment of the industry is one which is apt to be entirely overlooked. Those who subscribed £5,000,000. of new capital are entitled to expect under normal conditions of trade an adequate return on the capital so invested. Let us examine the return which the shareholder has actually obtained from 1914 onwards. The Corporation and its predecessors rendered an invaluable service to the colour-using industries in this country—a service which enabled these industries not only to maintain their position in the world's trade, but to make profits which were certainly not less than those made in pre-war periods. From 1914 to date the shareholders of British Dyes, Limited, of Levinstein, Limited, and of British Dyestuffs Corporation, Limited, have in all received by way of dividend a total sum equivalent to 2 per cent. per annum on the average share capital employed, and are now faced with a trading loss amounting to more than £700,000. (a sum slightly in excess of the total dividends previously paid) and also with the necessity of continuing to set aside for some time to come large sums for depreciation, research, and development. During the same period an expenditure of more than £7,000,000. has been incurred in the provision of land, buildings, plant, and machinery for development purposes.

It is true that the bulk of this expenditure took place during a period of exceptionally high costs, but I ask you to remember that this expenditure would not have been entered into had it not been considered by all parties concerned that the need was urgent and that heavy expenditure, at whatever cost, must be immediately faced if a dyestuffs industry was to be established in this country. By way of provision for this abnormal cost of construction and for the heavy depreciation inseparable from chemical plants a total sum of £3,500,000. has been set aside to date. Much of this sum might have been legitimately distributed in past years by way of dividend. The sounder view of working for the ultimate establishment of the business on the basis of a moderate capitalisation has been taken, and I think with these figures before you you will agree both as shareholders, and many of you as users, that the shareholders have more than done their part in assisting to establish the industry.

The Suggested Maximum Price for Dyestuffs.

I will now return to the proposals of the Colour Users' Association to establish a three-time pre-war factor as a maximum price at which dyestuffs should be sold. It is not easy to ascertain the pre-war price of dyestuffs owing to the practice adopted by the German firms of granting price concessions to large consumers, but we have prepared a statement showing what we consider to be the average pre-war price of each of the colours now sold by us. This statement has been furnished to the Council of the Colour Users' Association, and, although they may not accept every one of the prices we have adopted, I think they will agree that we have endeavoured to be as impartial and as fair as possible. Working on the basis of this statement, we estimate that the application to our present rates of a three-time factor as a maximum would adversely affect our trading results to an extent of something between £300,000. and £350,000. The effect of the application of this factor to future trading results is best realised when I tell you that by its adoption the Corporation could double its turnover and still show no profits available for distribution amongst its shareholders. That, ladies and gentlemen, is a situation which we, as directors, cannot recommend our shareholders to accept.

It may be replied that this result arises because we are either inefficient in our production or extravagant in our management. This I deny. Since our last meeting we have placed on the market, in addition to 21 improved brands, no fewer than 45 new colours equal to the best German type. We have no reason to feel ashamed of the progress we have made in securing increased efficiencies, but you cannot, in such a highly complicated industry as ours, build up a technically perfect organisation within a few years. On the administrative side we have rigidly curtailed expenditure, and any further economies that may still be effected (and there will be no relaxation of our efforts towards this end) would make a relatively small contribution towards the reduction of our costs.

Manufacturing Costs: A Comparison.

I do not think that the magnitude of the increase in costs of manufacture in the dyestuff industry to-day as compared with pre-war costs is fully realised. The chairman of the Colour Users' Association has kindly furnished me with a copy of the speech recently delivered by him to the Council of that Association. In that speech he gives the present wholesale price index figure at 61.4 per cent, above pre-war rates, and deduces from this that the colour-user is not unreasonable in asking that the British manufacturers' prices should not in any instance exceed 200 per cent. above pre-war prices. The wholesale price index figure does not, unfortunately, assist us in considering the advance in our manufacturing costs. I have had prepared a comparison between pre-war and present prices for the principal items entering into our costs, and these I will give. Raw materials, based on a weighted average of the 25 principal raw materials used, show an advance of 133 per cent. over pre-war costs. Salaries of our chemical, technical, and engineering staffs show an advance of 174 per cent. Wages show an advance of 142 per cent. Coal, services, stores, and general charges show an advance of 130 per cent., making an average advance of 135 per cent., which is more than double the wholesale price index figure quoted by the chairman of the Colour Users' Association. A factor of 2.35 times pre-war is, therefore, required to cover these increases.

There is a further point involving an increase in the cost of manufacturing dyestuffs throughout the world which cannot be ignored. Before the war the German dyemaking firms controlled directly or indirectly over 90 per cent. of the world's production of dyestuffs, and having the whole world as their market, they were able to keep their plants in continuous operation. Since the war dyestuffs plants have multiplied, particularly in France, the United States, and this country, and no group of dye manufacturers in any country can in future expect to obtain such

a predominant share of the world's trade as was enjoyed by the German firms in the past. Standing expenses in the dyestuffs industry are heavy, and in comparing pre-war with present costs some allowance must be made in all dye-producing factories for the fact that plants cannot be worked as intensively as in pre-war days, and costs must be fixed on a production materially below available capacity. I estimate that even in a period of normal trade an increased factor of at least .35 is necessary for this purpose, and adding that to the price factor of 2.35 previously given we obtain a factor of 2.7 times the pre-war price which is required to cover the increased cost in present manufacturing conditions as compared with those prevailing before the war.

Objections to a Rigid Price.

The factor offered by the Colour Users' Association is a three-time maximum factor with no minimum. A number of our cheaper colours are at present sold below this price factor, and if we take our actual sales and apply to them the three-time factor or the present selling price, whichever is lower, we obtain an average factor of 2.75. Therefore, by offering us a three-time factor as a maximum the Colour Users are only offering a factor sufficient to cover the difference between economic conditions of cost to-day and those prevailing before the war. They are giving us nothing towards the establishment and building up of the industry.

Many colours can be, and are being, sold within the factor suggested by the Colour Users' Association. Many other colours will, with a return to normal working, automatically come within this factor limit, but there are many colours which, owing to heavy expenditure on research, works trials, and the lack of technical experience, we are unable to produce at a price calculated on this basis. To sell them on these terms would mean a heavy financial loss to the Corporation and an unreasonable sacrifice on the part of our shareholders.

The high degree of technical skill attained by the Germans was only reached through many years of research and continuous operations of very large plants. Our experience in this sense only began after the war, and we have, unfortunately, owing to the depression in trade, not been in a position to work our plants in such a continuous manner as to enable our chemists to acquire the detailed knowledge and the technique of the small adjustments in methods of operation which often mean the difference between success or failure to produce at a low cost. Further, it must be remembered that in 1914 keen competition existed between the two groups which now constitute the German Interessen Gemeinschaft, and this led to the prices of ordinary ranges of standard colours being cut to a level which yielded little or no profit. For the bulk of their profits the German firms relied upon specialities, some of them new colours and some of them products outside the dyestuffs industry proper, such as the heavy chemical production of the Badische Company, the serums and fine drugs of Meister Lucius and Brüning, and the photographic products of the Bayer Company.

These undertakings, secure in their main purpose, have had time and energy to spare for new fields of manufacture. The strength of *our* technical and research staffs has of necessity been given to the production of the colours immediately needed by customers. *We* must first be satisfied as to the range and quality of our colours, and as to the efficiency of our processes, on which our very existence depends. Developments on new lines, for which we have both the ideas and the ability, will follow.

The Licensing Committee.

I must here refer to the Licensing Committee appointed under the terms of the Dyestuffs (Import Regulation) Act. This Committee consists of five nominees of the user, three nominees of the maker, three independent members. You will see, therefore, that the makers, in order to secure a majority on any question affecting their interests, must have the support of all the independent members.

The Licensing Committee is the battle-ground of the user who desires to import a colour and the maker who objects to its importation on the ground that the equivalent is already manufactured by him. Both makers and users are assisted by a technical staff, and the bulk of applications put forward are readily dealt with by agreement between the various interests.

In September last, as a temporary measure, the Licensing Committee agreed to grant applications to import where the British prices were more than three times the pre-war level or were higher than the current foreign prices. In other words, the British maker was given the opportunity to take the business, either at the foreign price quoted or at three times the pre-war price, whichever was higher. The nominees of the makers agreed to this temporary arrangement on the understanding that financial assistance, in some form or other, would be forthcoming from the Government. The expectation has not been fulfilled, and the makers are in many instances faced with the alternative either of selling their products at a loss or refusing orders and ceasing to manufacture. Under these circumstances we have advised our nominee on the Committee to withdraw our assent to the arrangement made, and to request that all applications be dealt with strictly in accordance with the procedure laid down under which the user must prove that the price quoted by the British maker places him in an unduly disadvantageous competitive position.

New Colours: Effect on German Prices.

Your directors regret exceedingly that they have been compelled to take this step, but when I give you a few examples of the manner in which the present arrangement has operated I think you will agree that, failing the compensation which has not up to now been forthcoming, we were unable to take any other action. In May, 1920, we introduced on the market an important acid colour at 25s. per pound in competition with the German type then selling at the same price. In March, 1921, we introduced an improved brand, slightly superior to the German type, and were able to reduce the price to 13s. 6d. a pound. We are to-day prepared to accept bulk orders for this colour at 8s. a pound, although at this figure we are barely covering actual works cost. Licences for the importation of the equivalent foreign colours are being applied for to-day at prices varying from 4s. 8d. to 6s. 6d. a pound. We have, consequently, been compelled to close down our plant and cease manufacture.

In March, 1922, we introduced a vat colour, of which we are the only manufacturers in this country, in competition against the German product which was then selling in powder form at 68s. per pound. Our colour, which is equal in strength and properties to the German type, but admitted by consumers to be rather superior in shade, was introduced at 45s. per pound. The effect of our entering the market has been to reduce the German product to 34s. a pound. In 1919 we introduced in response to a general demand by users, a direct cotton colour at 12s. 3d. per pound. We have offered to take contracts for large quantities at 4s. 3d. per pound—a price considerably under works cost. Applications to import the German equivalent at 2s. 9d. per pound have been put into the Licensing Committee.

Those, and many other examples which I could give, are new products on which a large amount has been spent on research and development and on the provision of plant. In the case of one important colour alone the special plant to be provided cost over £80,000. The effect of our policy has been to secure to the colour user an enormous reduction in price, which he could not have obtained in the absence of our competition. The result to ourselves has been heavy expenditure, on which we are unable to obtain any return owing to the prices which the German firms are now quoting, assisted as they are by the almost vanishing value of the mark as a medium of international currency.

The application of a three-time pre-war factor is quite insufficient to cover the cost of producing a new product, and under these conditions it is obvious that further development of the industry must come to a standstill. We suggest that colour consumers generally should agree to stabilise, for a reasonable period, the price they are willing to pay for a new British product, provided such price is not in excess of that quoted by the foreign maker prior to the introduction of the British product on the market. A strong opinion in this direction has already been expressed by an important section of colour users.

Capitalisation.

Many shareholders and colour users have expressed the opinion that, in view of the heavy debit balance carried forward on trading, and to the large amount still carried in our accounts for goodwill, trade-marks, and preliminary expenses, a scheme should be formulated for reducing the capital of the company. In some cases it has been further urged that, in spite of the large amounts written off to date, the book value of our fixed assets is excessive, and in

the event of a reconstruction they should be still more drastically written down. I may say at once that your directors do not consider the present time opportune for considering any scheme of reconstruction. From the accounts placed before you, you will see that, including the debit balance on trading account, we have in non-tangible assets a sum of something approaching £2,000,000., which will require to be dealt with in formulating any scheme of reconstruction. With regard to our fixed assets, these stand to-day in our books at a figure of under £3,500,000. Your directors will not hesitate to come before you with a scheme, when they consider the time ripe, for wiping out the heavy debit balance accumulated on trading and dealing with the value of goodwill and patent rights in respect of which deferred ordinary shares were issued to the shareholders in the merger company.

At the present time it is impossible to see far ahead and to estimate the conditions under which we will require to carry on our business in the future. For the information of the shareholders, I may state that the Corporation's financial position to-day is such that, if we went into voluntary liquidation, we estimate that we have sufficient assets in cash, investments, book debts and stocks, after paying off our trade creditors, to give every preference shareholder 20s. in the pound. This could be done without taking any value for our land, buildings, plant, and machinery, which have cost £7,000,000, and which, as I have already told you, stand to-day in our books at £3,500,000, or one-half their total cost. The proceeds from the disposal of these properties would be available for distribution amongst the preferred ordinary and deferred ordinary shareholders.

Progress and Prospects: A Summary.

I apologise for trespassing at such length on your time and indulgence, but your directors desire to be frank in every detail, both to shareholders and consumers, and before closing I should like to summarise very briefly the position as we find it to-day.

(1) The dyemaking industry has now been definitely established in this country. (2) The quality of our production is equal to that of the best German types. (3) In conjunction with other British makers we are able to satisfy the bulk of the requirements of the colour-using industries. (4) The majority of the colours not yet made in this country are of a special type requiring not only close research, but in many instances the provision of special plants. Before makers can be induced to incur the heavy expense involved in the production of these colours there must be security against competition from foreign sources of supply. I have already suggested that consumers should in these cases agree to stabilise prices for a reasonable period. In the absence of such support you may take it that no British maker can afford to face the heavy loss which the introduction of a new colour must inevitably entail.

(5) The British industry has given to the consumer a security of supply which was lost to him in 1914, and which is enabling him to face with equanimity the present uncertainty of foreign supplies. (6) The fixing of a three-time pre-war factor as a maximum price without other compensation would ultimately involve the closing down of plants and the cessation of the manufacture of many of the more important dyestuffs placed on the market by British makers in recent years. In the main, only the cheaper grade of colours could to-day survive this test. (7) The dyestuffs industry is the only industry which, during times of peace, is capable of equipping and maintaining an adequate body of chemists trained in the methods of organic chemistry.

(8) This country has in the past built up its industrial supremacy and its national security by maintaining a lead in the iron, steel, and heavy chemical industries. To maintain this position we are now compelled to take a leading part in the exploitation of the organic chemistry field. Without the protection afforded by the Dyestuffs (Import Regulation) Act the dyestuffs industry in this country, under present world conditions, could not survive. With the adherence without compensation to a price factor of the rigid nature proposed by the Colour Users' Association, its development must cease, and the industry will be slowly but surely strangled. (9) Security, with adequate safeguards against inefficiency is essential, and we claim on the strength of our performance and resources that both the Government and the colour-using industries shall take their share in providing this security.

(10) The Corporation, and I doubt not other British dyemakers on their side, are prepared to throw the whole of their energies into the development of the industry so that they may be prepared to meet the world competition which will arise from stabilised conditions of trade and currencies.

I should like just to say a word or two to express the grateful appreciation of the Board, and, also, I am sure, of the shareholders, of the devotion and labours of all our staff during the past year.

I now move "that the Report of the Directors and the Statement of Accounts for the year ended October 31, 1922, be received and approved."

Mr. Parker Smith objected to the non-disclosure in the accounts of the amount estimated to be recovered in respect of excess profits duty. He further criticised the constitution of the Board as containing no representative technically competent to control the manufacture of dyestuffs, and expressed his views as a colour user on the high prices charged for the Corporation's products. In his opinion, under competent management, there was no need to charge more than three times the pre-war price for any colour.

The Chairman, in reply, stated that the amount which had been taken credit for in respect of excess profits duty was less than the amount required to be written off for fall in stock values, and that he had already furnished a comparison between the two trading periods, excluding the amount received for refund of excess profits duty, and the amount required to be written off for stock depreciation. There had been no unnecessary writing down of stocks. As the trading position was to-day, he would not be ashamed to come before them with his report next year.

Th motion adopting the report and accounts was passed with three dissentients.

Mr. G. V. Clay was re-elected director, and Messrs. Thomson, M'Clintock and Co. re-appointed auditors.

A vote of thanks to the chairman, moved by Mr. H. Sutcliffe Smith, chairman of the Colour Users' Association, and seconded by Mr. G. Collis, was carried.

LEGAL INTELLIGENCE.

BRITISH-PRODUCED OIL.

George Edward Heyl.

The debtor has been closely associated with the oil industry for a number of years, and his affairs came before Mr. Registrar Hope, at the London Bankruptcy Court, on Wednesday, July 4, on the re-hearing of his application for an order of discharge. He was adjudged bankrupt on March 13, 1918. He had been engaged in inventing different processes for and in research work in connection with the production of oil from British natural resources, and a company was ultimately formed to finance his undertaking for the manufacture of oil at Barking and Corton. In May, 1917, the Rapid Distillation and Power Company, Limited, with a nominal capital of £1,000,000, was formed, and it acquired his entire interests in his business and inventions at Barking and Corton. According to the trustee in bankruptcy the ranking indebtedness amounts to £50,407., and on May 4 the debtor applied to the court for his order of discharge. The Official Receiver then opposed the application on the grounds that the debtor's assets were not of a value equal to 10s. in the £ on the amount of his unsecured liabilities, and that he had been guilty of misconduct in failing to attend his adjourned public examination on July 25, 1919. The court upheld these submissions of the Official Receiver, and suspended the debtor's discharge for one year. In an affidavit that had since lodged the debtor said that his assets had paid a dividend of 6s. 6d. in the £, and a further 3d. or 4d. might be paid. He asked the court to revoke the order of May 4 and to grant him an immediate discharge subject to his consenting to judgment in a sum of £200, of which £100 would be paid forthwith and the balance in six months. Mr. Registrar Hope granted the debtor this application, saying that the £100 would have to be paid before he signed the order of immediate discharge.

Tin-plate Exhibition.—The Welsh plate and sheet manufacturers are holding a special exhibition of their products at their bureau at 3, Northumberland Avenue, W.C.

ITEMS OF INTEREST.

Bank Rate Increased.—On Thursday of last week, the Bank rate, which for the past 51 weeks, has remained at 3 per cent. was raised to 4 per cent.

British Cyanides Company.—An illustrated booklet has been published by the British Cyanides Co., Ltd., containing some excellent views of their extensive works, and considerable detail concerning their organisation and general aims is given.

Research Endowment.—The Council of the Royal Society have decided to use the recent gift by Sir Alfred Yarrow of £100,000 in founding a number of professorships, the holders of which will be expected to devote their whole time to scientific research.

Trade Inquiry from Canada.—The Montreal Branch of an important British firm of engineers desire to act as agents for saltcake. Further information can be obtained from the Department of Overseas Trade, 35, Old Queen Street, S.W.1, quoting reference number 7.

Blast Furnaces Close Down.—Two blast furnaces which were started at Palmer's Works, Jarrow, about three months ago, on the making of hematite, have been closed down again owing to depression in the iron and steel trades. A third furnace had also been made ready for lighting.

Imports of Dyestuffs.—During June applications for licences under the Dyestuffs (Import Regulations) Act, 1920, numbered 512, of which 393 were from merchants and dealers. Of the total applications 80 per cent. was dealt with within four days of receipt.

Coke Plant Explosion.—An explosion which occurred in the coking plant of the Birchenwood Colliery, Kidsgrove, on Tuesday caused the death of Richard York, of Stoke-on-Trent. The explosion took place in the exhauster-house, in which York was the only person present at the time. The explosion was followed by a fire, which was extinguished by the works fire brigade.

U.S. Tariff on Calcium Arsenate.—A report from Washington states that the interests endeavouring to obtain the placing of arsenic on the free list have abandoned the idea of appealing direct to the President. Although a Bill is to be introduced into Congress in December next, to place the product on the free list, it is said that there is little hope of the measure receiving favourable attention. The present import duty is 25 per cent.

Overseas Trade in June. — Preliminary figures of the overseas trade of the United Kingdom during June show that imports amounted to £89,307,683, as compared with £89,478,996 in the preceding month. Exports of produce and manufactures of the United Kingdom amounted to £62,883,559, as compared with £71,554,864, and re-exports of foreign and Colonial merchandise amounted to £10,954,932, as compared with £11,773,426.

Preservatives in Food.—The Minister of Health has appointed a committee consisting of Sir H. C. Monro (chairman), Professor W. E. Dixon, Sir A. D. Hall, Dr. J. M. Hamill, Mr. O. Hehner, Professor F. G. Hopkins, Dr. G. R. Leighton, Dr. A. P. Luff, Dr. C. Porter, and Mr. G. Stubbs, to report whether the use of materials for the preservation and colouring of food is injurious to health; and, if so, in what quantities does their use become injurious; and whether it should be required that the presence of such materials and the quantities present in food offered or exposed for sale should be declared. The secretary of the committee is Mr. A. M. Legge, of the Ministry of Health, Whitehall, London, S.W.

University News.—The following have been appointed by the Council of Manchester University to be Assistant Lecturer in Chemistry: Mr. E. L. Hirst and Mr. G. N. Burkhardt.—Professor John Reid, Professor of Organic Chemistry in the University of Sydney, has been appointed to the vacant Chair of Chemistry in the United College and to the Directorship of the Chemistry Research Laboratory at St. Andrews University, in succession to Professor Robinson. The Council of Liverpool University, on Tuesday, decided to use the bequest of the late Professor Campbell Brown of the residue of his estate, approximately £36,000, in founding a Campbell Brown Chair of Industrial Chemistry and a Campbell Brown Fellowship for senior and honours chemistry students. The balance of the bequest will form a fund for the provision of entrance scholarships.

Explosion of an Oxygen Cylinder.—An oxygen cylinder exploded in one of the operating theatres at King's College Hospital, Denmark Hill, on Monday. The explosion, which caused damage to the theatre estimated at several hundred pounds, was caused, it is thought, by the excessive heat.

Motor Fuel from Potatoes.—A company has been formed in Guadeloupe for the purpose of manufacturing motor fuel from sweet potatoes. It is expected that 5,000 litres will be distilled daily, and the product will be available for local consumption in October or November next.

British Coal Output.—During the week ended June 30 the coal output from the mines of Great Britain was 5,400,700 tons, compared with 5,588,200 tons for the previous week and 4,530,000 in the corresponding week of last year.

Unclaimed Cask of Arsenic.—An announcement in the personal column of *The Times* states that unless the cask of arsenic, the name and address of the owner of which is unknown, is claimed and all charges paid before Monday next, the proprietors of Rennies Wharf, Ltd., of 60, Holland Street, E.C., will sell same to defray expenses.

Oil in Spain.—In the valley of Burunda at Alsásua (Navarre), investigations of a Spanish engineer have confirmed the existence of a hitherto unknown petroleum zone, states a Reuter report. The geological formation of the zone indicates deposits which, judging by all appearances, may prove to be of great importance. The land belongs to the Compañia Franco-Española de Petróleos of San Sebastian, which proposes to undertake boring operations at once.

Belgian Radium Producers' Progress.—At the general meeting of the Union Miniere du Haut Katanga, held in Brussels, on Monday, Mr. J. Jadot, the president, stated that the accounts showed a net profit of 20 million francs. Dividends of 35 francs (less tax) on the ordinary shares and 30 francs net on the preferred shares were declared. The extraction of radium from uranium ore is proceeding at the Oolen Works in Belgium, which have been established with great success.

Fire.—Damage estimated at £250. was caused on Monday by an outbreak of fire in the works of Messrs. Turnbull and Co., wood distillers, 16, Great Eastern Road, Glasgow. A corrugated iron shed and a brick building were damaged, and a quantity of wood was destroyed. During a fire at Messrs. Marshalsea Brothers' motor works at Taunton on Wednesday, cylinders of oxygen exploded with great force, the damage being estimated at over £10,000.

Coal-dust Explosion Experiments.—The Mines Department, in a letter to the Secretary of the Institution of Mining Engineers, announce that the Safety in Mines Research Board propose to arrange for a series of coal-dust explosion experiments at the Experimental Station, Eskmeals, Cumberland, with the object of impressing upon mine-workers the importance of the coal-dust problem. The demonstration will be made each Sunday from the 15th inst. to September 30 (inclusive).

Clouds and Smokes.—An important new book entitled "Clouds and Smokes; the Properties of Disperse Systems in Gases," will shortly be published by Messrs. J. and A. Churchill. The author is Dr. W. E. Gibbs, chief chemist to the Salt Union, Ltd. There will be about 30 illustrations. The author describes the various ways in which such disperse systems in gases can be formed, and deals fully with their mechanical, thermal, optical and electrical properties, and the conditions which determine their stability. This information is then applied to the practical problems of meteorology, fume condensation, gas filtration, the manufacture of substances in a finely-powdered condition, and the use of smoke in warfare.

Personal.—Dr. Francis William Aston, who has rendered valuable contributions to the science of physics during the past ten years at Cambridge, was made an honorary LL.D. on Saturday last at Birmingham University Degree Congregation. Dr. Aston graduated at Birmingham, and has already been awarded the Nobel Prize.—Mr. Hugh F. Marriott, who is leaving for Australia this week to attend the Pan-Pacific Congress as a representative of the British Government and various professional and scientific institutions, announces that he has ceased to be actively concerned in the reorganisation of the Magadi Soda Company.—Dr. F. G. Banting, of Toronto University, the discoverer of insulin, has been awarded an annuity of $7,500, to permit him to devote his life to medical research.

New Czechoslovakian Glass Company.—A new company —under the title of "Resista"— has just been formed at Prague, Czechoslovakia, to manufacture the so-called unbreakable glass invented by Dr. V. Horak at the time he was general manager of the Cavalier Glass Co., at Sazava Buda, which company manufactures a somewhat similar glass under the trade name "Silex." The new Resista Co. is capitalised at 1,200,000 crowns (6,000 shares at 200 crowns each).—*U.S. Com. Report.*

Salt Production in the U.S.—According to a statement issued by the U.S. Department of the Interior, compiled from statistics collected by the Geological Survey, the quantity of salt produced and marketed in the United States in 1922 (classed by the varieties) was as follows:—Evaporated, 2,276,683 short tons; in brine, 2,569,042 short tons; and rock salt, 1,947,124 short tons. The total value was $27,461,839. These figures show an increase of 36 per cent. in quantity but of only 12 per cent. in value over those for 1921.

Chemicals for Cuba.—His Majesty's Consul at New York reports that a local firm are desirous of purchasing the under-mentioned chemicals in England, primarily for sale in Cuba:—Refined pyridine, amonium carbonate (lump and powdered), castor oil of the No. 1 or medicinal grade, whiting (Blanco Espana), tartaric and citric acids, naphthalene flakes and balls. British firms desirous of receiving further particulars regarding this inquiry should apply to the Department of Overseas Trade, 35, Old Queen Street, S.W.1, quoting reference 20039/F.W./C.C.2.

Electrolytic Copper.—Blum and Rawdon, of the Bureau of Standards, presented a paper at the forty-third meeting of the American Electrochemical Society in May, 1923, in which they reported some experiments as to the effect of a rolled or cast copper base upon the copper electrolytically deposited thereon. Statements have been made that the structure of the surface has no influence on the deposit, but Blum and Rawdon found that if the base has been cleaned with nitric acid an influence is exerted, but if cleaned with alkali no effect is produced.

German Chemical Industry Developments.—We are informed by Messrs. Ronsheim and Moore, of 11a, Wormwood Street, London, E.C.2, general agents in the U.K. and Colonies for the Saccharin-Fabrik, A.G., that the Upper Silesian Coke Works and Chemical Works and the Saccharin-Fabrik, A.G., have agreed to work in conjunction without either firm in any way forfeiting its independent character. The arrangement for the furtherance of the companies' joint interests will be effected by an exchange of shares and the nomination of members of the Board of one company to sit on the Board of the other and *vice versa*.

Wood Distillation in Mysore.—A charcoal blast-furnace with a capacity of 60 tons per day, combined with a wood-distillation plant, has, states a correspondent to *The Times Trade Supplement*, been erected and put into operation at Birur, on the Bhadra River, Mysore, India. The plant, which was designed by Messrs. Perrin-Marshall, of New York, and erected by the Tata Iron and Steel Company, is owned by the Mysore State Government. The distillation plant has been laid down to deal with 240 tons of wood daily, with provision for increasing the capacity to 400 tons per day. The crude pyroligneous acid is separated from the tar, which is used as a wood preservative, and worked up into crude acetate of lime and marketable methyl alcohol. The Government are desirous of interesting private capital in the provision of plant for the manufacture of acetic acid from the lime acetate.

German Dyestuffs Manufacturer's Profits.—The reports of all the large German dyestuff makers, comprising the I.G., have now been issued. Considerably increased profits, in paper marks, are shown, and all the companies are paying 300 per cent., as against 30 per cent. last year. The reports mention that the dividend is less than one gold mark (80 gold pfennigs) per 1,000 mark share. Very few particulars regarding the course of trade are given by any of the concerns. The A. G. für Anilinfabrikation, Berlin, states that the new works for the manufacture of artificial silk are now producing. It is also said that the company intends to build two large new factories for the manufacture of dyestuffs, one near Bitterfeld and one which will specialise in the production of azo colours at Greppin. The Chemische Fabrik Griesheim-Elektron, Frankfort-on-Main, states that the works were well employed last year. The A. G. Farbwerk Mülheim vorm A. Leonhardt and Co., states that sales last year were good, particularly in Germany.

IMPORTS OF CHEMICALS INTO INDIA.

NEW TARIFF VALUATION.

REVISED schedules of tariff valuations have been issued by the Department of Commerce of the Government of India for the purpose of levying Customs duties in British India during the period ending December next. The new schedule took effect on April 1 last.

Articles.	Per	Tariff Valuation	Duty.
		Rs. a.	
Alum, lump	cwt.	12 0	15%
Ammonium carbonate	,,	40 0	,,
Ammonium chloride, crystals	,,	32 0	,,
Do. salammoniac	,,	48 0	,,
Do. other sorts	,,	44 0	,,
Arsenic (China mansil)	,,	85 0	,,
Do. other sorts	—	*ad val.*	,,
Bleaching powder	cwt.	13 8	,,
Calcium carbide	,,	20 0	,,
Sodium silicate	,,	13 0	,,
Soda ash, including calcined natural soda and manufactured sesqui-carbonates	,,	7 0	,,
Sodium bicarbonate	,,	10 8	,,
Caustic soda, solid	,,	17 8	,,
Do. flake	,,	25 0	,,
Do. powdered	,,	26 0	,,
Soda crystals, in bulk	,,	7 8	,,
Copperas, in bulk	,,	5 0	2½%
Do. otherwise	—	*ad val.*	,,
Copper sulphate	cwt.	24 0	15%
Sulphur, flowers	,,	7 0	,,
Do. roll	,,	8 0	,,
Do. rough	,,	6 0	,,
Trona, or natural soda, uncalcined	,,	3 8	,,
Fertilisers, all sorts	—	—	Free
Alizarine dye, dry, not exceeding 40%	lb.	1 12	15%
Do. do. 40% to 50%	,,	2 0	,,
Do. do. 50% to 60%	,,	2 1	,,
Do. do. 60% to 70%	,,	2 8	,,
Do. do. 70% to 80%	,,	2 12	,,
Do. do. over 80%	,,	3 4	,,
Do. moist, not exceeding 10%	,,	0 6	,,
Do. do. 10% to 16%	,,	0 8	,,
Do. do. 16% to 20%	,,	0 10	,,
Do. do. over 20%	,,	1 8	,,
Aniline dye, moist	,,	2 4	,,
Aniline dyes, black, of sulphur series	,,	1 0	,,
Do. Congo red	,,	1 4	,,
Do. dry, all other	,,	2 6	,,
Aniline salts	—	*ad val.*	,,

SOUTH WALES NOTES.

[Specially Contributed.]

The tone of the tinplate industry is rather weaker, orders being of small dimensions and business for forward delivery scarce. Although the majority of the works are in fair activity at the present, contracts over the current quarter are at a low ebb. With slight reductions in prices, the galvanised sheet trade has improved, and the demand seems to be expanding. The patent fuel trade is steadily improving, though the pitch position hinders rapid development. Home supplies of this commodity are scarce and quotations are again soaring. Fortunately most of the briquette manufacturers have plentiful supplies of foreign pitch, which places them in rather an independent position, while the supplies of small coals are abundant, with indications of lower prices. Fresh orders have been received for patent fuel from Brazil, Spain, and Denmark, and the outlook is generally much better. Cokes are in better supply, the outputs being much heavier, especially of the furnace qualities. All the ovens are working satisfactorily, and the supply of products is on the increase. So far as the latter are concerned there is little or no difficulty in finding ready markets for the residuals, with the exception of sulphate of ammonia, which at present is rather dull.

Among the exports were—From Newport 58 tons sulphate of iron to Antwerp, 70 tons ammonium nitrate and 8 tons zinc ashes to Hamburg, 10 tons sulphate of iron to L'Orient. The imports for the week to Cardiff included 63cwt. red powdered arsenic from Antwerp, 209 tons burnt ore from Dublin; into Swansea, 197cwt. barytes from Hamburg, a cargo of copper ore from Lisbon, 266 bags precipitate of copper from Pomeron, 51 tons spelter from Copenhagen; to Newport, 200 tons crude zinc from Hamburg, 2,580 tons iron pyrites from Huelva, 105 tons calcium carbide from Antwerp; to Port Talbot, 2,600 tons manganese ore from Abuzemiuma.

FERTILISER NEWS.

Nitrate of Soda.—The preliminary statistics, as issued by the leading brokers, relating to the half year which has just ended, were naturally based on the estimated shipments and port deliveries for the month of June, seeing that the half-yearly reports were issued immediately at its close. Subsequent cabled figures, however, rather modify the large figure of 165,000 tons exported from Chile during the month, and the shipments are now given at 143,000 tons—a difference of over 15 per cent. With production at 153,000 tons, stocks on the West Coast, as was anticipated in this column a fortnight ago, reach over a million tons. The European quota was more or less correctly forecasted, but the American figure, and the quantity destined for "other countries" were overestimated by 11,000 tons each! Total exportation for June, 1914, reached 183,000 tons. From America it is reported that the situation is very quiet. The increasing price scale is, of course, in operation there, but it is stated that despite the fact of plentiful money the spot market is showing little business. As the quotation for second-hand spot material is at a much lower figure, the future is rather cloudy. Compound fertiliser manufacturers do not appear to be buying, in spite of the fact that later prices are bound to be higher. Total sales so far effected by the Producers' Association for delivery after July 1 amount to about 890,000 tons, of which 3,000 tons is for delivery next spring. This quantity is more than covered by the existing stocks on the West Coast. Production, which is gradually on the increase, should provide a further 950,000 to 1,000,000 tons, even at the 60 per cent. of capacity output now obtaining. The first half of next year should see yet another million tons, making in all, an available quantity of 3 million tons. Orders are at present falling off, and it is not likely that heavy buying will set in, if at all, until nearer the consuming season. In the meantime, supplies of nitrogen from other sources, including the "despised" synthetic plants, are increasing, and selling at a lower unit price. Failing the recurrence of the favourable external market conditions, it seems as if the price—or the consumption—of nitrate will drop during the coming season.

Sulphate of Ammonia.—The reduced prices, announced in this column last week, have attracted more attention to the fertiliser. The value of the neutral quality, containing 25¾% of ammonia, works out at 13s. 11d. per unit of nitrogen. This compares very favourably with 16s. 7d. per unit for nitrate of soda when the latter is £12. 17s. per ton. The export trade continues of fair dimensions, and the general outlook is still very favourable. Recent advices from the United States point to the fact that the output, large though it is expected to be, will be mostly absorbed by the domestic demand, which gives indications of being larger than ever during the coming fertiliser year. Some second-hand material has been exported from the States to the West Indies and Cuba, but the volume of British trade in that quarter has never been considerable. Prices are on the high side and likely to remain so in view of the good demand. The spot price, f.o.b. works is $3.20. to $3.25., with small resale lots at $3.10. per 100lb. For export, in double-bags, f.a.s. New York, $3.55. to $3.60. is quoted, which is equivalent to about £17. 14s. per ton at current exchange rates. It is clear that there is a market therefore, for all the British sulphate that can be produced. It is the high margin of profit thus afforded to exporters of British sulphate which has permitted the considerable reduction of home prices. Some dissatisfaction has been expressed anent the rigid clause, insisted on by the Federation, which deals with the ultimate exportation of sulphate originally sold for home requirements at the scheduled price. In view of the looseness of commercial morality among a certain type of merchant, many of whom have figured in the courts during the past two or three years, a wholesome tightening-up, even to the extent shown, is definitely needed, and the very fact of the prominence given to the clause by the Federation points to its necessity.

General Notes.—On account of many blast furnaces in the Ruhr district of Germany having become idle, production of basic slag in Switzerland has been greatly curtailed, and its price has materially advanced, according to consular advice to the U.S. Department of Commerce. Authentic reports state that production is being reduced daily and the lack of new stocks will be seriously felt as soon as the demand in Switzerland becomes strongest, which will be the case shortly.

The Minister of Agriculture has appointed a small Departmental Committee to inquire into the operation of the Fertilisers and Feeding Stuffs Act, and to advise whether, and if so, what amendments are necessary to render the execution of the Act more economical and effective. The Committee consists of Lord Clinton (Chairman), Mr. E. Richards Bolton, Mr. E. G. Haygarth Brown, Dr. Charles Crowther, Mr. Thomas Kyle, Mr. Brian S. Miller, Mr. George Stubbs, Dr. J. F. T. Osher, Dr. J. A. Voelcker. Mr. H. J. Johns, of the Ministry of Agriculture and Fisheries, 10, Whitehall Place, S.W., has been appointed secretary.

In April, for the first time this year, the exports of fertilisers and fertiliser materials from the United States exceeded that of the corresponding month of 1922, having totalled $2,256,139. (98,236 tons) as compared with $1,666,956 (87,161 tons) in April, 1922. Heavier shipments of sulphate of ammonia and superphosphates were made, but smaller amounts of phosphate materials and prepared fertiliser mixtures were exported.

Sir Robert Harvey, speaking on Tuesday at the annual meeting of the Nitrate Railways Co., Ltd., said that during the year 1922 the railway had had no labour troubles, although in the ports and in Tarapaca generally there were, occasionally, signs of discontent among the workmen. "I regret to say, however," Sir Robert continued, "that at the present moment there is considerable labour unrest in the Port of Pisagua."

American Sulphur Exports.—A decrease of 14 per cent. was registered in the shipments of sulphur from the United States during April, 1923, as compared with April, 1922, exports having declined from $793,746 (53,501 tons) to $679,151 (42,034 tons). Canada was the best customer, with Germany a close second, and France, Spain, and Australia following in the order named.

MAGNESIUM CHLORIDE

JACKSON BROS. & CO., (Late of Miles Platting), Trafford Park, Manchester

Telegraphic Address—"Epsoms, Manchester." Telephone—Trafford Park 637.

PARLIAMENTARY NEWS.

Patents in the Irish Free State.

In the House of Commons, on Thursday, July 5, Lieut.-Colonel Buckley, replying to Col. Newman, said: The Government are in communication with the Irish Free State as to the course to be adopted by the latter as regards the granting of patents in future. In the meantime, so far as I am aware, the position of licensees under patents granted with validity throughout the United Kingdom has not been affected.

Reparation Dyestuffs.

Mr. Attlee, on Tuesday, June 10, asked the President of the Board of Trade whether he is aware that the British Dyestuffs Corporation, Limited, charge 10 per cent. commission on reparation dyestuffs, whereas, when the distribution was undertaken by the central importing agency, only 2½ per cent. was charged; and will he state for what reason this high rate of commission is permitted.

Sir P. Lloyd-Greame: I am not aware that the British Dyestuffs Corporation charge 10 per cent. commission on reparation dyestuffs and would refer to an answer which I gave on this matter on December 4 last to the effect that the Corporation receives a commission of 6½ per cent. on the actual turnover, plus a further 1 per cent. for guaranteeing accounts, and a grant which is limited in amount towards the charges which they incur relating to the importation of the dyestuffs. The central importing agency undertook the duty of distributing and distributing the dyestuffs for a commission of 3½ per cent., the rate to be adjusted if prices fell. But this charge proved to be inadequate, and was considerably increased with the approval of the Treasury by various allowances made to the central importing agency upon the final adjustment of their accounts.

Mr. Attlee: Is the President of the Board of Trade aware of the high prices charged for reparation dyestuffs by the British Dyestuffs Coroporation, Limited; that the price of diamine fast yellow F.F., a dye for which there is no satisfactory British substitute, has been raised from 4s. per pound to 7s. 6d. per pound and to 10s. per pound, although this dye could be imported from Germany for 4s. 6d. per pound?

Sir P. Lloyd-Greame: No complaint about the price of this dye has been received by the Board of Trade, but the arrangements as to the pricing of reparation dyestuffs are being reconsidered, and the price of this particular dye will come under review.

Mr. Attlee: Is it not a fact that these very high prices are put on in order to enable the Corporation to foist inferior substitutes on the colour-users?

Sir P. Lloyd-Greame: There is no truth in any of the many allegations in that short statement.

Mr. Collison: It is a question not only of price but of the inferior nature of the dyes as shown in the qualities of the manufactured article.

Sir P. Lloyd-Greame: I think not.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

CEMENT FROM SPENT OIL SHALE.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—It may interest your readers to learn that a first experiment with spent shale from the Scottish Oilfields at the Building Research Board's experimental station has produced a puzzolanic hydraulic cement of a tensile strength at three months' age greater than that required for Portland cement by the B.E.S.A. standard specification. My attention was directed to this waste material by Dr. A. P. Laurie, of Edinburgh. Samples were obtained from the Research Association of the Shale Oil industry. The cement is of a pleasant light red colour, and is much harder than ordinary Portland cement.—Yours, etc.,

H. O. Weller,
Director of Building Research.

Department of Scientific and Industrial Research,
July 4, 1923.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Holders (London) Ltd., London, E.C., chemical merchants.—Registered June 22, (£1,000. debs. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £300.

Morris and Co. (Stockwith) Ltd., chemical manufacturers.—Registered June 22, £15,000. deb., to Westminster Bank, Ltd.

Vegetable Oils and Margarine, Ltd., London, E.C.—Registered June 25, £15,000. 2nd debs.

SATISFACTIONS.

Bleachers' Association Ltd., Manchester. — Satisfaction registered June 25, £65,000., balance of amount registered April 20, 1910.

Neuchatel Asphalt Co., Ltd., London, S.W.—Satisfaction registered, June 25, £2,000., registered July 5, 1920.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Anglo-Continental Oil Co., Ltd., London, E.C.—Resolved May 23, confirmed June 12 that the company be voluntarily wound up. V. C. Bianchi, 34, Nicholas-la., E.C., C.A. liqr.

Ineson Gibbs Oil and Chemical Co., Ltd., Birmingham.—R. L. Biggs ceased to act as receiver. June 6.

London Dye Manufacturing Co., Ltd., London, E.—W. G. Wilson, 37/39, King William Street, E.C. Appointed receiver June 23.

Schultze Gunpowder Co., Ltd.—Resolved June 7, confirmed June 25, that the company be voluntarily wound up. W. Morris and ano. lqrs.

DISSOLUTIONS OF PARTNERSHIP.

(*Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.*)

Tebbutt, Strange and Co. (Lionel Francis Tebbutt, Lionel Hastings Strange and Chas. Horace Ivinson), Imperial Buildings, New Bridge Street, E.C., manufacturing and research chemists and chemical and general manufacturers, merchants, traders, brokers, and agents. May 12. L. H. Strange continues. (June 29.)

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Barends, H., 124, Warbreck Road, Blackpool; manufacturing chemist; £26. 1s. 4d. May 15.

Hall, Harry H., Sladen Dyeworks, Littleborough; dyer; £12. 7s. 6d. May 7.

London Hygienic Chemical Co. (1922) Ltd., 5, Wine Office Court, Fleet Street, E.C.; £11. 3s. 5d. April 21.

PUBLICATIONS RECEIVED.

Pneumatic Collection and Conveying.—Publication No. 1,093 of the Sturtevant Engineering Company, Ltd., 147, Queen Victoria Street, London, E.C. 4. An attractively produced booklet dealing exhaustively with the whole subject, and illustrating the well-known and well-tried machinery of the Sturtevant firm. Copies may be obtained by readers by application, mentioning the *Chemical Trade Journal and Chemical Engineer*, to the Publications Committee at 149, Queen Victoria Street.

Forge Plants and Forges. — Another publication of the Sturtevant Company dealing with the principles underlying successful smithy plants, the design of forges, the supply of adequate blast and the efficient removal of smoke and fumes from the smithy; together with details of Sturtevant forges and equipment. Copies may be obtained by readers as mentioned above.

REPORTS OF COMPANIES.

W. J. Bush and Co., Ltd.

The annual general meeting was held on Monday, in London, Mr. J. M. Bush (chairman and managing director) presiding. The Chairman, in moving the adoption of the report and accounts, said: The past year has shown no great revival in trade activity, and several of the continental markets have remained practically closed to us on account of depreciated currencies. The cold and wet summer also lessened the demand for many of our products. In spite of these adverse factors the figures present an agreeable comparison with those of the previous year. The improvement is due mainly to the fact that the depreciation in the value of our stocks which took place in 1921 was not continued into the period under review. Our subsidiary company in the United States, which, in common with the parent company, made a loss in 1921, became on a profit-earning basis again during the past year. Our Canadian company also made a moderate profit.

During the latter part of the year Dr. R. C. Farmer received an invitation from the Government to resume his position at the Woolwich Research Laboratory. He felt it his duty to accept, and resigned his directorship of this company. This we much regret, as during the comparatively short period he was with the company he had gained the esteem of all with whom he came into contact, and the company still continues to derive benefit from the improved methods which he introduced.

The motion, which was seconded by Sir G. Hayter Chubb, was carried unanimously.

Benzol and By-Products, Ltd.

Sir H. O. Bax-Ironside, presiding over the third ordinary general meeting held on Thursday (July 5) in London, said: It is anticipated that the ensuing period will show no loss. The actual loss due to the strikes and depression in the industry is reduced to £29,292. 18s. by writing back the amount of £8,000. out of the income-tax reserve and by £7,201. 0s. 9d. brought forward from the previous profit and loss account. The period covered was undoubtedly one of the worst in colliery history. It was even followed by several months of universal trade depression in our industry. As to the outlook, I may say that while an important long-term contract has been entered into having direct bearing upon our raw material supplies, we are negotiating a twenty-years' contract to light another, and more important, adjacent town with our coke-oven gas. You are aware that we already have a fifteen-years' contract to light the neighbouring town of Ossett. Our profits in the past have been chiefly derived from our coke-ovens and by-product works. It is proposed to extend our present battery of coke-ovens and to add requisite by-product plant. It is intended to strengthen our board by the appointment of a well-known Yorkshire colliery director as local director, he being chosen by the representatives of the largest collective body of preference shareholders,

The report and accounts were adopted.

Welsbach Light Co., Ltd.

The report for the year ended March 31, states that the question of reimbursement of E.P.D. by the revenue authorities is still unsettled, pending which, income-tax and corporation tax for the past two years have not been paid. Including profit on realisation of investments and debenture stock redemption (together £18,093.), the net profit for the year was £26,397., and adding £18,412. brought forward, there is a total of £44,810. It is proposed to pay a dividend of 5 per cent., less tax, and a bonus of 2½ per cent., less tax. The transfer to general reserve is also proposed of unappropriated discounts on debenture stock redeemed, amounting to £7,520., leaving £17,945. to be carried forward, subject to taxation settlement. The net profit for the preceding year was £9,726., the dividend was the same, but no bonus was paid.

British Cyanides Co., Ltd.

The profit for the year ended April 30 was £17,204., which, with the amount brought forward, makes a total of £17,697. This compares with a total profit last year, including the amount brought in, of £3,342. After the payment of the dividends on the preference shares for the year, there remains a sum of £14,847., as compared with £492. for 1922, which is carried forward. The report states that the profits realised were almost entirely earned during the last few months of the period under review. The balance-sheet shows, apart from loans to subsidiary companies, that stocks of materials, etc., amount to £52,267.; sundry debtors, £30,421., as against creditors, £27,379.; cash in hand and at bankers, £9,850.; as against £4,880. last year; whilst the bankers' overdraft has been reduced from £47,402. to £30,001.

Amalgamated Zinc (De Bavays), Co., Ltd.

Report for the half-year states that the balance of the appropriation account at June 30, 1922—viz., £25,000., was absorbed by the payment of the thirty-first dividend of 1s. per share. During the period under review the working account showed a profit of £38,920., after transferring £6,965. to reserve for depreciation. Taking into consideration the profit and loss debits, and after adding the amount of dividends received from shares in other companies, revenue from interest, discounts, exchanges and rents, the profit for the half-year transferred to appropriation account amounted to £39,078. Since the close of the half-year the thirty-second dividend has been declared, and will absorb £25,000. of the above-mentioned profit, leaving a balance of £14,078. to carry forward.

Mond Nickel Co., Ltd.

The report for the year to April 30 last, states that the balance-sheet shows a balance to the credit of profit and loss account of £330,268., which it is proposed to deal with as follows:—Interim dividend on the preference capital at 7 per cent. per annum paid March 3, less tax, £87,500.; dividend now to be paid on the preference capital at 7 per cent. per annum, £87,500.; interim dividend on ordinary capital of 6d. per share, paid March 3, free of tax, £22,500.; dividend now to be paid on ordinary capital of 1s. 6d. per share, free of tax, £67,500.; balance to be carried forward, £65,268. The demand for nickel improved during the year, and sales have been satisfactory. As a result, production has been increased.

Ebbw Vale Steel, Iron, and Coal Co., Ltd.

Accounts for the year to March 31 last show that the gross profit amounted to £426,117., making with balance brought in a total of £442,575. Legal and general expenses absorb £10,041., and interest on debentures and loans £363,402., leaving £69,131. to carry forward. The directors are unable to recommend a dividend on the 7 per cent. cumulative preference shares or on the ordinary shares of the company for the year.

DIVIDENDS.

Boots Pure Drug Co., Ltd.—The directors have declared an interim dividend of 9 p.c. (less tax) on the new ordinary shares with respect to the quarter ended June 30.

Canadian Explosives Co., Ltd.—Dividend of 1¾ per cent. for the quarter to June, 30, 1923, on the 7 per cent. cumulative preferred shares.

Canada Cement Co., Ltd.—Dividend of 1½ per cent., less tax, on common stock for quarter.

Kinta Tin Co., Ltd.—During 1922, after allowing £4,200. for depreciation, the net profit was £18,491. (against £15,973.). Dividends have been paid during the year amounting to 10 per cent. (against 5 per cent.), leaving a balance of £6,491., which has been written off investments account, reducing it to £5,297.

Broughton Copper Co., Ltd.—Report for past year states that the profit, after providing for taxation, amounted to £51,594., plus £3,061. brought in, making £54,655. Final dividend of 10 per cent. (actual).

Amalgamated Photographic Manufacturers, Ltd.—Accounts for 1922 show net profit £25,049., including £10,507. in respect of adjustment of taxation reserves. Preference dividends up to June, 1921, absorb £14,047., leaving £11,002. to be carried forward.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

June 25 to 30 (inclusive).

Plastic Compositions for Acid-proof Materials. Abrey, R. H. 16,421.
Transportable Apparatus for Developing Sulphur Dioxide. Boving, C. M. 16,448.
Distilling Carbonaceous Material and Producing Portland-cement Clinker. Colman, D. M.; Colman, L. M.; and Perry, W. P. 16,813.
Gold Leaf. Demel, F. 16,721.
Sulphonation of Fatty Substances of Animal Origin. Guilleminot, P. L. 16,479.
Rotary Distillation Retorts. Heyl, G. E. 16,691.
Controlling Water Gas Apparatus. Humphreys and Glasgow, Ltd. (*Gartley and Evans*). 16,453.
Derivatives of Ethane. Imray, O. Y. (*Farbwerke vorm. Meister, Lucius, and Brüning*). 16,587.
Dyeing Cellulose Esters. Johnson, J. Y. (*Badische Anilin- and Soda-Fabrik*). 16,458.
Dyeing Cellulose-acetate Fibres. Kilby, W.; and Morton Sundour Fabrics, Ltd. 16,532.
Drying Granular Material. Lang, A. M. (*Paterson*). 16,487.
Catalysts. Lewis, G. P. 16,446.
Augmenting Yield of Alcohol in Fermentation of Amylaceous Washes. Ling, A. R.; and Nanji, D. R. 16,781.
Treating Starch for Production of Maltose. Ling, A. R.; and Nanji, D. R. 16,782.
Beta Naphthol 2 : 3 : 6 and 2 : 6 : 8 Disulphonic Acids. Masters, C. L. 16,634.
Alpha and Beta Naphthols. Masters, C. L. 16,635.
Dewatering Coal. Minerals Separation, Ltd. 16,956.
Recovering Fine Coal from Wash Water, Sludges, etc. Sinnatt, F. S.; Slater, L.; and Burrows, R. A. 16,659.
Freeing Coal Wash Water, etc., of Suspended Solids. Sinnatt, F. S.; Slater, L.; and Burrows, R. A. 16,660.
Drying. Techno-Chemical Laboratories, Ltd.; Soderlund, O.; and Testrup, N. 16,861.
Disinfectant Preparations. Truttwin, H. 16,943.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1*s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.*

1921.

Partial Combustion Methods for Treating Aliphatic Hydrocarbons. Byrnes, C. P. 34,424. **173,750**

1922.

Hydrocarbon Oils from Oils, Fats, or Fatty Acids. Nihon Glycerine Kogyo Kabushiki Kaisha. 4,617. **175,974**
Desulphurising Metals. Walter, R. 8,153. **179,146**
Neutral Sulphate of Ammonia. Lessing, Dr. R. 8,615. **199,475**
Explosive. Hawkins, T. 8,903. **199,489**
Nortropinone Derivatives. Merck, E. (firm of); Wolfes, O.; and Maeder, H. 9,461. **177,807**
Tanning-agents. Moeller, W. 9,995. **199,528**
Cement. Nickel, O.; and Markwitz, R. 14,746. **199,575**
Zinc Furnaces. Horion, E. 14,818. **182,777**
New Carbonyl Derivatives of α naphthol. Soc. of Chemical Industry in Basle. 15,190. **181,009**
Basic Magnesium Carbonate. Chemische Fabrik Griesheim-Elektron. 16,271.
Pure Sodium Chloride. Westermann, J. T. 17,760. **199,607**
Calcining Cement. Lanhoffer, I. E. 19,149. **195,585**
Copper and Zinc Alloys. Allgemeines Deutsches Metallwerk Ges. 25,199. **186,337**
Refining or Separating Metals. Harris, H. 28,370. **199,660**
Dissociation of Aluminiferous Substances in Combination with the Fixation of Nitrogen. Gerber, Dr. V. 30,133. **199,667**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Titanium-nitrogen Compounds. Titan Co. Aktieselskabet 14,508. **199,713**
Fertilising with Carbonic Acid. Reinau, Dr. E. 14,729. **199,716**
Producing Intimate Mixture between Gases and Liquids. Farbenfabriken vorm. F. Bayer and Co. 15,547. **199,718**
Dinitro-perylene-quinone. Pereira, H. 15,643. **199,720**
Amino-perylene-quinones. Pereira, H. 15,644. **199,721**
Perylene Vat Dyes. Pereira, H. 15,645. **199,722**
Treating Silk. Carpenter Chemical Co. 16,009. **199,729**
Gas Electrode. Schmid, Dr. A. 16,265. **199,736**
Sulphonation of Fatty Substances of Animal Origin. Guilleminot, P. L. 16,479. **199,743**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Separating Gases and Vapours. Plauson's (Parent Co.), Ltd., London. H. Plauson, Hamburg, Germany. British Patent, **197,353,** of 1922.

Vapours or gases are separated by selective passage through a porus diaphragm in an apparatus in which a difference of electric potential (about 20-100 volts) is maintained between the diaphragm and the vapours or gases by applying an electric charge either to the diaphragm or to the gases. The diaphragm may have fairly large pores and may be formed of loose-powdered material such as sand, glass, carbon, graphite, carborundum, metal, china clay, silicic acid, cement, chalk, gypsum, feldspar, etc., or of these materials treated to form a rigid diaphragm by addition of a binding agent, or by ignition, chemical decomposition, etc., or of superimposed slotted or corrugated metal plates or wire netting between which porous material may be placed. Vapours generated by heating a liquid in the lower part 2, Fig. 1, of a still rise into contact with a porous diaphragm 3 clamped by insulated connections 5, 6 between the lower part 2 and the upper part 1. A perforated electrode 7 is arranged below the diaphragm and connected to the part 2. Electrical connections 15, 16 are made with the parts 1, 2. A diaphragm in the form of a number of connected porous cylinders and an electrode having arms projecting into the cylinders, may be used.

FIG 1.

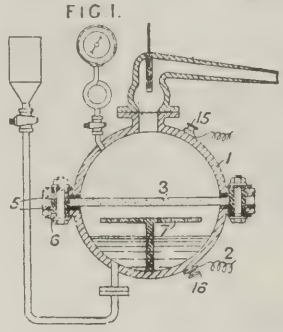
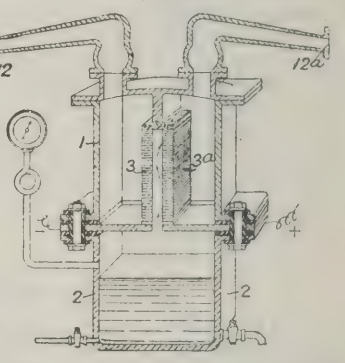


FIG 14.



Two diaphragms may be placed in series, and may be formed of loose material resting on perforated plates in electrical connection with the parts of the still. The diaphragm may be cleaned during use by removing impurities which settle on its surface, as, for example, during the distillation of oils containing wax, naphthalene, anthracene, asphalt, etc., either by forming the diaphragm as a hollow rotary cylinder, against which a scraping knife or rotary cleaning brush is held, or as a hollow fixed cylinder containing a rotating cleaning-worm. The vapours generated in the still 2, Fig. 14, pass into the space between two diaphragms 3, 3*a*, one of which is charged positively and the other negatively, and the vapours which pass through each diaphragm are removed by separate outlets 12, 12*a*. The apparatus may be used for the distillation of petroleum, and for the separation by distillation of two liquids having about the same boiling-points but of different polarities. According to the Provisional Specification, the diaphragm may also be made of blood-charcoal or kieselguhr.

Iron Oxide in Glass Manufacture. Chance Bros. and Co., Ltd. and A. L. Forster, Smethwick, Staffordshire. British Patent, **197,500,** of 1922.

Relates to glass of the kind in which iron oxide is combined in the ferrous state to enable the glass to act as a good absorber of thermal radiation. According to the invention, the proportion of iron oxide is such that the amount of ferrous oxide per unit area of the glass will give the desired absorption and transmission of thermal and luminous radiations. For example, hammer scale or iron oxalate is added in such quantity that the finished glass sheet contains about .01 of a gramme of ferrous oxide per square centimetre of surface. It is found that with such a glass, the ratio of luminous radiation transmitted to thermal radiation absorbed is a maximum, and the glass is suitable for window and roofing purposes in hot countries.

Organic-mercury Compounds. M. E. Wolvekamp, Oakland, California, U.S.A. British Patent, **196,431,** of 1922.

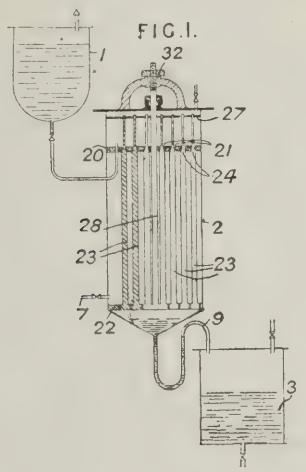
Mercury derivatives of aurintricarboxylic acid and alkali salts thereof are obtained by heating with mercury compounds a solution of an alkali salt of the acid, or a suspension of the acid in a solution of sodium chloride. The products, which may contain one, two, or three atoms of mercury in the molecule, are substitutes for mercury salicylate; the free

acids are insoluble in water, but soluble in sodium chloride solution. According to examples, products containing sodium chloride are prepared by boiling aurintricarboxylic acid with sodium bicarbonate, mercuric chloride, and water, filtering, and evaporating; products not containing sodium chloride are obtained by replacing the mercuric chloride by mercuric oxide, the mercuric aurintricarboxylates being precipitated by acidifying with sulphuric acid.

Treating Liquids with Gases. A. H. Shaw, and Peachey Process Co., Ltd., London. British Patent, **197,368,** of 1922.

In the impregnation of liquids or solutions with soluble gases, the liquid descends in fine streams in a closed vessel into which the gas is introduced, the flow of liquid being adjusted in such a manner that, by this adjustment, the capacity of the closed vessel is appreciably increased or decreased as the flow of liquid is increased or decreased. The apparatus comprises a closed vessel 2 provided with a plate 20 having apertures 21, which are controlled by conical shoulders 24 on a series of rods 23 secured to or formed integrally with a movable false bottom 22, which

FIG. I.



may be raised or lowered by a central spindle 28 and screwed nut 32. The false bottom is perforated to allow the impregnated liquid to pass, by a pipe 9, to a collecting vessel 3. The liquid to be treated is introduced, from a supply vessel 1, to the closed vessel above the apertured plate 20, over which is fitted a second apertured plate 27, which guides the upper ends of the rods 23. Gas enters the vessel 2, through a pipe 7, above the highest position of the false bottom. The apparatus may be used for the vulcanisation of caoutchouc according to Specification 129,826, the rubber solution or benzine being contained in the vessel 1, and sulphur dioxide and hydrogen sulphide being admitted to the closed vessel 2 separately through pipes such as 7; or, alternatively the solution or liquid may be treated with each of the gases in a separate vessel.

Decolourising Liquids. A. C. Cumming and Klarit, Ltd., Liverpool. British Patent, **196,002,** of 1921.

"Carbon-black" substantially free from oil is used for decolourising fats, oils, sugar solutions, and other liquids. Solid adsorbents such as kieselguhr or china clay may be mixed with it. The "carbon-black" may be freed from oil by heating to redness out of contact with hydrocarbons. Specification 25571/99 is referred to.

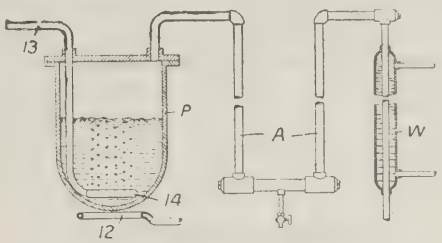
Desulphurising Oils. A. C. Nesfield, London. British Patent, **196,680,** of 1922.

Minerals oils are desulphurised by impregnating them with hydrochloric acid gas and air, or a mixture of hydrochloric acid gas, hydrogen, and air, washing the treated oil with caustic soda or lime water, and filtering by centrifuge or otherwise to remove the sulphur, etc. The oil may be treated in gaseous form, or may be exposed to the gases as a film or spray, or the gases may be bubbled through it. Crude shale oil or spirit may be distilled into two fractions terminating at about 392° F. and 750° F., each fraction being separately treated. To obtain white spirit, the oils, after washing with alkali, may be further washed with 2 per cent. of sulphuric acid; if emulsification occurs, the oil is washed with sodium chloride solution.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Benzaldehyde and Benzoic Acid. Carbide and Carbon Chemicals Corporation, New York, U.S.A. (Assignees of H. R. Curme, New York, U.S.A.) British Patent, **197,319.** Convention date, May 4, 1922.

Benzaldehyde and benzoic acid are obtained by bringing free oxygen into contact with dibenzyl at elevated temperatures. The dibenzyl may be employed in the liquid or vapour phase; oxygen or oxygen-containing gases, such as air, may be used; and the oxidation may take place at normal or increased pressure. In the form of apparatus



shown, P is a covered vessel containing liquid dibenzyl, which is heated by a burner 12 and into which the oxygen-containing gas is introduced through a pipe 13 and perforated ring 14; the bulk of the reaction product is condensed in the air condenser A, and the remainder in the water condenser W. A scrubber may be employed in replacement of or in addition to the condenser W. The dibenzyl may be fed continuously into the reaction vessel, whilst a series of reaction vessels may be employed in cascade.

Coating Aluminium. Aluminium Company of America, Pittsburgh, U.S.A.—(Assignees of A. Pacz, East Cleveland, Ohio, U.S.A. British Patent, **197,306.** Convention date, May 8, 1922.

An oxide coating is produced on aluminium or aluminium alloys by treatment with ammonia solution, preferably nearly at boiling point, the solution containing, for example, one volume of concentrated aqua ammonia to nine of water. Alloys with nickel, tungsten, silver, iron, copper, zinc and copper, in specified proportions, and with other metals and silicon in unspecified proportions are referred to as producing a wide range of characteristic colourings, or specified amounts of salts of such metals as will produce the desired colour are dissolved in the bath. The coating on pure aluminium may be darkened by hanging a metallic plate, *e.g.*, of silver or nickel, in the bath, silver, in the former case, being deposited on the aluminium. The coating is electrically insulating, and serves as a basis for painting or electro-deposition.

Alcohol and Ammonium-Sulphate Manufacture. Compagnie de Béthune, Pas-de-Calais, France. British Patent, **197,315.** Convention date, May 4, 1922.

Ethyl alcohol is obtained from sulphovinic acid by treatment with a reagent which fixes the sulphuric acid content with evolution of heat, thereby determining the distillation of the alcohol without the application of external heat. Ammonia, either as gas or in the form of solution, is described as the reagent, in which case ammonium sulphate is obtained as a by-product. According to the example, a stream of ammonia gas is conducted into sulphovinic acid or sulphuric acid containing sulphovinic acid; the alcohol distils off to a dephlegmator and is condensed; ammonium sulphate settles out or remains dissolved in the ammonia-saturation vessel. The operation may be carried out at normal or reduced pressure

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The efforts to arrive at a settlement of the dispute at the Whitehaven Collieries had not in mid-week proved successful, and as the pits are still idle, the production is not sufficient to meet requirements. The import of smalls has ceased, and the Whitehaven coking plant has only ten ovens in operation. The other ovens are all working, but not at full pressure. So far the entire make continues to be absorbed by the furnaces that are smelting ordinary iron in West Cumberland, but the Newcastle pig-iron trade is so poor that it would occasion no surprise were one or two furnaces to be damped down in this district as well as in the Furness area. The hopes of any immediate recovery in the iron trade on the North-West Coast are of the slenderest. Newcastle pig-iron has fallen now to £5. 18s. 6d. per ton delivered at Glasgow and Sheffield, but even that figure does not tempt any flow of business other than that of a hand-to-mouth character. The prospects have not been poorer for seven or eight months past, and no one can say that the depression will be of short duration. The coal trade has not yet been adversely affected, any diminution in the needs of local landsale and industrial purposes having been compensated for by the willingness of Irish consumers to take all the coal they can get hold of. Prices are fully maintained. By-products and chemical products are a fairly good trade. East Coast coke supplies this week are short by 7,200 tons.

NEW COMPANIES.

New Motor Spirit Co., Ltd. Capital, £50,000., in 30,000 8 per cent. cumulative participating preference shares of £1. and 200,000 ordinary of 2s. Office: Finsbury House, New Blomfield Street, E.C.2.

A. G. Collins and Brother, Ltd.—Private company. Capital, £5,000. Oil refiners and blenders, soap, grease, tallow and candle manufacturers, etc. Solicitor: A. C. Hooper, Post Office Chambers, Bute Docks, Cardiff.

Bideford Storage, Ltd.—Private company. Capital £1,000. Manufacturers and dealers in fertilisers, seed crushers, and warehousemen, etc., Solicitors: Linklaters and Paines, 2, Bond Court, Walbrook, E.C.

Carlton Laboratories, Ltd.—Private company. Capital £5,000. Office: 6, Norwich Road, Triangle, Bournemouth.

Doughty-Richardson Fertilisers, Ltd.—Private company. Capital £50,000. Solicitors: Toynbee, Larken, Mason and Co., 7, Bank Street, Lincoln.

Hardy, Brown and Co., Ltd.—Private company. Capital £500. Manufacturers of and wholesale and retail dealers in paints, colours, etc. Office: 3, Charles Street, West Hartlepool.

London Lead Oxide Co., Ltd.—Private company. Capital £25,000. Office: 107, Bishopsgate, E.C.

Mann and Bishop, Ltd.—Private company. Capital £25,000. Dealers in chemicals, dyestuffs, fertilisers, etc. Office: 36-7, Mincing Lane, E.C.

Thos. S. Sutton and Sons, Ltd. Private company. Capital £10,000., £1. shares (9,000 vendors' and 1,000 ordinary). Tin and solder and by-products manufacturers and merchants. T. S. Sutton is permanent managing director. Office: Mill-Lands Works, Neath, Glam.

Paisley Oil and Chemical Co., Ltd.—Private company. Capital £5,000., £1. shares (1,500 preference). Office: Minerva Works, Linwood Road, Paisley.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," July 14, 1888.)

Patent Office in 1887.—The fifth report of the Comptroller-General of Patents, Designs, and Trade Marks for the year 1887 was published recently as a Parliamentary paper. The total number of applications for patents in 1887 was 18,051, for designs 26,043, and for trade marks 10,586. These numbers are considerably in advance of the average of the three previous years. It appears from a table given that the proportion of applications made by persons resident in the United Kingdom was 76 per cent.—a total which varies but slightly from the average. Of the applications made during the year 53 per cent. were proceeded with. There were twenty-six applications made under the provisions of the International Convention, which was joined during the year by the Government of the United States. With regard to trade marks, 4,916 marks were advertised and 4,740 were registered. The total receipts for the year amounted to £124,279., of which £105,599. was for patent fees, £4,855. for designs, and £8,463. for trade marks, while £5,360. was received from the sale of publications. The chief items of expenditure were £47,110. for salaries, £2,304. for pensions, £3,050 for stationery, and £22,300. for printing specifications, lithographing, drawings, and other such expenses. A balance of £42,702. was left at the end of the year.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Another week of very poor business is reported from all quarters. Prices, however, are keeping up to their former levels and there is no change of material importance to comment upon. **Acetic Acid,** 80% technical, £47.; 80% pure, about £50.; 98% glacial, £60. in casks and about £75. in glass demi-johns, ex wharf, London; quoted prices for the little material available on spot seem very firm; business has been very limited. **Acetone,** British Government specification, about £120. per ton; with very little material about this price is fully maintained; some inquiry on the market. **Arsenic,** Cornish white powdered, about £71. per ton; there is perhaps a slightly easier feeling in this market. **Alum,** lump, in casks, about £10. 10s. per ton, dealers offering Continental material at about these figures find business very slow. **Anhydrous Ammonia,** 99.95, 1s. 5d. to 1s. 5½d. per lb.; importers are offering at about these rates. **Barium Chloride,** 98—100%, £15. to £15. 5s. per ton; last week's easier prices are being quoted with little business about. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; Continental material is offering at about these prices, but the demand is small. **Borax,** commercial, granulated, £26. 10s.; crystals £27., powdered £28, extra fine £29.; B.P., crystals £31., powdered £32., extra fine £33. per ton, for home trade only, in free 2cwt. bags, carriage paid to destination. British makers' prices show no change on the week. Importers are offering under similar conditions, commercial granulated at £25. 10s., and powdered £27. per ton. **Borax Glass,** lump, £74., powdered £75. per ton, in tin lined cases; British makers' prices are unchanged at these rates for home trade only, packages free, carriage paid to destination. **Boric Acid,** commercial, crystals, £50., powdered, £52.; B.P., crystals £56., powdered £60.; extra fine £62.; in bags, free, carriage paid to destination; British makers are selling for home trade only at these prices; dealers are competing at about level figures. **Cream of Tartar,** 99—100%, 92s. to 94s. per cwt., less 2½%; a fair volume of business continues, with quoted prices steady. **Citric Acid,** B.P., crystals, about 1s. 9d. to 1s. 9½d. per lb.; there has been a little better inquiry of late and the market seems quite steady. **Epsom Salts,** commercial quality, about £5. per ton, in bags; there is still but very little business doing in this product. **Formaldehyde,** 40%, about £96. per ton, nominal; there is little if any business passing in this product, and the market is likely to remain idle until the referee's decision is published. **Glauber's Salt,** commercial quality, about £3. 15s. to £4.

per ton, in bags; scarcely any inquiry on the market—quoted rates unaltered. **Lead Acetate,** brown, about £42.; white crystals, about £43. to £43. 10s. per ton; quoted rates are now quite steady, but business has been slower. **Litharge,** pure flake, British, about £37. per ton; dealers are offering Continental material at about £35. 10s. per ton. **Lithopone,** 30% Continental red seal, £22. 10s. per ton; this market is very steady and a fair volume of business continues; supplies are still rather restricted. **Ammonium Chloride,** grey galvanising, about £30. 10s.; spot stocks are still offering at about this price, but business is slow. **Nickel Sulphate,** home trade, single and double salts, £38. delivered; export, single and double salts, £38. per ton, f.o.b.; British makers' prices show no change on the week. **Oxalic Acid,** about 6d. to 6¼d. per lb.; this market remains a dull feature and prices are none too steady. **Bichromate of Potash,** about 6d. per lb.; little in the way of good business has come to dealers—quoted rates are unchanged. **Carbonate of Potash,** 90—92%, about £28. 10s. to £29.; 96—98%, about £32. per ton; the market seems a shade easier again this week and is still lacking good business. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; quoted steadily, but not much doing. **Caustic Potash,** 88—92%, about £33. per ton; dealers offering at these rates, which seem unsteady, are doing very little business. **Permanganate of Potash,** commercial quality, about 9¾d. to 10d. per lb.; conditions in this market are dull, and prices seem to be cheapening. **Prussiate of Potash,** yellow, about 1s. 3¼d. per lb.; merchants are quoting at slightly easier rates again this week—some little business has been done. **Sulphate of Potash,** 90%, £11. 10s. per ton, ex ship; quoted rates show no change on the week. **Mercury,** about £11. per bottle of 75-76lb., net; this market has been rather quiet this week, but prices seem quite steady. **Red Lead,** imported, about £35. 10s. per ton, c.i.f. London; dealers are offering at about this rate, with some little business about. **Salammoniac,** dog-tooth crystals, £49.; medium, about £43.; fine white crystals, about £27. to £28. per ton; spot supplies are available—prices are unchanged, with the market dull. **Saltcake,** ground and unground, home trade, about £5. per ton; delivered; export, about £5. 10s. per ton, f.o.b.; makers are said to be sold out to end of the year. **Acetate of Soda,** about £25. per ton; dealers are quoting for forward delivery at about this level. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid to destination; British makers are quoting at this level for home trade only; their prices for export vary as to destination. **Soda Crystals,** £5. 5s. per ton, in bags, carriage paid to destination; British makers quote at about this rate for home trade only and dealers are selling at very competitive prices. **Caustic Soda,** 70—72%, £18. 10s.; 76—77%, £20. 10s. per ton, ex wharf, shipping port; dealers have reduced their quoted rates by £1. per ton, but still find business slow. British makers quote for home trade only from £19. to £21. 10s. per ton, in drums, carriage paid; prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination; British makers' prices given; dealers are offering at competitive rates. **Chlorate of Soda,** crystals and granular, 2¾d. per lb.; dealers are doing but little—prices are fairly steady. **Cyanide of Soda,** 98—100%, 8½d. to 9d. per lb. for export; home trade, 10½d. to 11d. per lb.; British makers quoting at about these prices. **Nitrate of Soda,** 96%, about £13. 7s. 6d. per ton, f.o.r. Liverpool; there is no change to record. **Nitrite of Soda,** 100%, about £27. per ton; the market keeps steady at this unchanged rate. **Prussiate of Soda,** about 7d. per lb.; the tone here is not at all good, and business has been very poor. **Hyposulphite of Soda,** pea crystals, about £15. per ton, in 1cwt. kegs; commercial quality, about £10. 10s. per ton, in casks; prices are a little easier this week—some moderate business has been done. **Sodium Sulphide,** 60—62% solid, £14. to £14. 10s. per ton; ditto, broken, about £15. to £15. 10s. per ton, in drums; 60—65 concentrated, in casks, about £15. per ton; dealers are offering Continental material at about these prices, with not much business about. **Sulphate of Copper,** about £26. to £26. 5s. per ton, for home and export; British makers quoting at about these rates, delivered and f.o.b. **Tin Crystals,** 1s. 4d. per lb.; quoted rates unaltered—market steady. **White Lead,** imported, about £43. to £44. per ton; dealers prices are well maintained and some limited orders have been booked. **Zinc Oxide,** B.P., about £52.; white seal, about £44.; 99.5%, about £37. per ton, delivered in the United Kingdom; British makers continue to quote at these prices, with very little business doing.

Pharmaceutical Chemicals. Dealers continue to complain of the lack of good business, and again this week the little done has been mostly for small quantities. There is not much sign of any general break in prices, and the market continues fairly steady. **Acetanilid,** crystals and powder, about 1s. 6d. per lb.; the demand has been very slow—prices are easy. **Acetyl-salicylic Acid,** B.P., about 3s. 1d. per lb.; at this rate the market is fully maintained, and fair inquiry has been received. **Benzoic Acid,** B.P., about 2s. 6d. per lb.; this product is seldom asked for. **Diethylbarbituric Acid,** B.P. (barbitone), about 21s. per lb.; buyers are few—quoted rates are unchanged. **Salicylic Acid,** B.P., about 2s. 3d. per lb.; quotations seem to vary round about this figure. **Tannic Acid,** leviss, about 3s. 6d. per lb.; large quantities could be obtained for less—very little doing. **Amidopyrin,** about 14s. per lb.; this market seems steadier after last week's cheaper prices. **Ammonium Bromide,** about 7¾d. to 8¼d. per lb.; business remains slow and the market seems irregular on quotation and inclined to be weak. **Benzonaphthol,** about 5s. per lb.; no movement reported—quoted nominal. **Benzaldehyde 03,** about 3s. per lb.; the demand has been very limited—quoted unchanged. **Betanaphthol,** resublimed, about 1s. 10d. per lb.; at this rate the market is easy. **Calcium Lactate,** about 1s. 10d. to 2s. per lb.; some cheaper offers are being made for big lots. **Chloral Hydrate,** duty paid, 4s. to 4s. 3d. per lb.; some little inquiry has been dealt with at about these figures. **Creosote Carbonate,** about 8s. 6d. per lb.; the market rate is maintained, but there has been little doing. **Creosote,** B.P., about 2s. 2d. per lb.; things remain very quiet in this product. **Guaiacol Carbonate,** about 8s. 3d. per lb.; nominal; the market has been idle. **Hexamine,** about 4s. per lb.; business again has been restricted, and the market seems to be rather unsteady. **Hydroquinone,** 3s. 8d. to 3s. 9d. per lb.; the demand continues fairly good—prices are steady. **Methyl Salicylate,** about 2s. 6d. per lb.; matters remains very slow in this item, and prices are rather easier. **Methyl Sulphonal,** about 15s. per lb.; inquiry has been of the smallest—prices are unchanged. **Paraformaldehyde,** about 3s. 9d. per lb.; some limited business continues, with quoted rates level on the week. **Paraldehyde,** about 1s. 5d. per lb.; this rate is fully maintained, with fair inquiry about. **Phenacetin,** about 6s. 6d. per lb.; the market has been dull—quoted rates unchanged. **Phenazone,** about 7s. 6d. per lb.; the demand has slacked off—quoted rates so far unaltered. **Phenolphthalein,** about 6s. 3d. per lb.; there is very little offering on spot below this rate. **Piperazine,** about 3s. 6d. per oz., in kilo lots; spot material available, with very little demand. **Potassium Bromide,** B.P., crystals and granular, 6¾d. to 7½d. per lb.; offers are plentiful, with the demand showing no improvement. **Potassium Permanganate,** B.P., about 10¼d. to 10½d. per lb.; this market is not nearly so firm, and business has been slower. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; nominal—no business reported. **Salol,** about 2s. 9d. per lb.; this easier rate is being maintained on a dull market. **Sodium Benzoate,** about 2s. 6d. per lb.; things are very quiet—quotations are nominal. **Sodium Bromide,** crystals and granular, 7½d. to 8d. per lb.; quoted rates on spot are irregular, with the market well stocked and offers from the Continent plentiful. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; nominal—market idle. **Sodium Salicylate,** powder, about 2s. 5d.; crystals, about 2s. 7d. per lb.; business during the past week has been quiet, and prices have rather an easier feeling. **Sulphonal,** about 15s. per lb.; nominal; the market remains stagnant. **Terpin Hydrate,** about 1s. 9d. per lb.; quoted rates from dealers are unchanged. **Thymol,** about 15s. per lb.; last week's easier rate is still quoted.

Coal-tar Products, Intermediates, Etc.—This market continues very depressed in the majority of products. Pitch is a shade firmer and in fair demand for forward delivery. Other products are quoted unchanged. **Aniline Oil,** about 9½d. per lb.; drums free; this market has been showing a little more activity of late. **Aniline Salt,** 9½d. per lb., casks free; the price quoted seem a little easier, business is slow. **Betanaphthol,** about 1s. 1d. per lb.; there has been some buying on a small scale of late. **Benzol,** 1s. 7d. per gallon, f.o.r. makers' works, in buyers' packages; some business for export has been done of late—home demand remains poor. **Toluol,** 2s. per gallon, f.o.r. makers' works, in buyers' packages; quoted rates are level on the week, with the market dull. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; the demand remains slow—quoted rates are

level on the week. **Naphtha**, about 1s. 5d. per gallon, after last week's decline in values this market seems a little steadier, but is still very dull. **Solvent Naphtha**, 90—160, 1s. 5d. per gallon, drums extra; this price is still quoted, but the market is not at all steady. **Heavy Solvent Naphtha**, 90—190, 1s. 4d. per gallon, drums extra; business has again been dull—quoted rates unsteady. **Special Oil**, for Diesels and motors, 10d. per gallon, barrels free; there is no change in this market—business flat. **Burning Oil**, crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; there has been but little inquiry of late—quoted rates unchanged. **Creosote Oil**, 10d. per gallon, naked, f.o.b.; dealers are offering at level figures with business lacking. **Carbolic Acid**, crystals, about 1s. 2d. per lb.; last week's decline in price seems to have steadied the market, but there is still but little good business about. **Naphthalene**, about £20. per ton; the market has been neglected and prices are easier; crude, £7. to £13.; crystals, £21.; powder, £17. 10s.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants**, 3s. 9d. per gallon, barrels free; the market has been idle. **Pyridine**, about 18s. per gallon; supplies on spot are still acutely short, and the price quoted is given as a nominal level. **Hexamethylene**, 4s. to 4s. 3d. per gallon; quoted rates from dealers are firm at these levels. **Pure Methyl Alcohol**, £100. per ton, ex wharf, London; the position remains firm—a fair inquiry about for the limited supplies available. **Pitch**, about 132s. 6d. per ton, spot London; about 145s. per ton is being quoted for forward delivery, and some good business is still being done in this direction.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £65. 15s. to £65. 17s. 6d., cash; £66. 7s. 6d. to £66. 10s., three months; electrolytic, £72. 15s. to £73. 5s. **Tin**: Standard, £181. 2s. 6d. to £181. 5s., cash; £182. 2s. 6d to £182 5s., three months; Straits, £184. 5s.; English, £181. 12s. 6d. **Lead**, soft foreign, £24. 10s. prompt; English, £25. 15s.; chemical sheet, 33s. per cwt. for 2-ton lots, delivered. **Spelter**, prompt, £28. 12s. 6d.; hard, £24. **Antimony**, English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35 **Aluminium**, 98—99%, £115. to £120.; foreign, £110., c.i.f **Nickel**, £130., delivered; £125. to £130. for export, f.o.b **Mercury**, £10. 5s. to £10. 7s. 6d. **Bismuth**, 10s. **Platinum**, 500s. per oz. **Wolfram**, spot, 13s. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust**, quotations are lower, as follows: Highest grade Englsh, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. Wednesday.

Business all round still continues on the quiet side, and there is no improvement in demand for heavy chemicals; values on the whole continue unchanged. For alkali products, current quotations are as follows:—70% **Caustic Soda** £20. on rails, **Bicarbonate of Soda**, usual bags, £10. 10s. net per ton on rails. **Ammonia Alkali**, 58%, £7. 12s. 6d. per ton makers' works. **Bleaching Powder**, soft wood casks, quiet at £11. 7s. 6d. per ton, on rails. **Chlorates** continue in small request—**Potash** at 3d. per lb. and **Soda** 2¾d. **Bichromates** are unaltered at 5¾d. and 4½d. for **Potash** and **Soda** respectively. Roasted **Saltcake** continues in good demand for export, but for home trade there is little or no inquiry, and price is stationary at £4. 10s. to £4. 15s., carriage paid. There is only small inquiry for **Sulphate of Copper**, and quotations are nominal at £26. per ton f.o.b. Liverpool for usual brands. American imported **Sulphur** steady at £5. 5s. per ton on rails. **Phosphate and Commercial Hyposulphite of Soda** are only moving off slowly, and values show no improvement. **Nitrite of Soda** easier, at £26. 10s. net, ex store, basis 100%. Concentrated **Sodium Sulphide** weak at £14. 10s. to £15. per ton. White powdered Cornish **Arsenic** is offering for July delivery at £70. per ton on rails at works, but much lower prices are quoted for foreign supplies to come forward. Yellow **Prussiate of Potash** is weak at 1s. 3d. per lb.; **Soda** steady at 6¾d. to 7d. per lb., carriage paid. **Carbonate** and **Caustic Potash** have a higher tendency owing to scarcity of spot supplies. Grey and brown **Acetate of Lime** are unaltered in position or value. **Acetic Acid** and **Acetate of Soda** are firmly maintained at recent rates. In **Lead** Products, white **Acetate** is easier at £40. per ton, ex store; brown is firm and scarce at £42. to £43. per ton; **Nitrate** unchanged at £42. delivered. **Chloride of Barium** steady, at £15. per ton, ex store. There is fair inquiry for **Zinc, Tin,** and **Ammonia Salts,** and prices are fairly steady. **Green Copperas** is in good request, but prices are unchanged at 37s. 6d. to 40s. per ton, carriage paid in sellers waggons. **Oxalic Acid**, dull at 6d. to 6¼d. per lb. **Permanganate of Potash**, steady at 9¾d. to 10d. per lb.

SWANSEA MARKET REPORT. Wednesday.

Business in **Tinplates** was very indifferent, and few sales were notified on the basis of £1. 3s. 1½d. per standard box f.o.b. **Galvanised Sheets** in better demand, with easier prices at £18. 2s. 6d. per ton. **Copper** firmer at £64. 17s. 6d. per ton for prompt, and £65. 12s. 6d. three months. **Tin** easier, with prompt at £178. 12s. 6d. per ton, and three months £181. 7s. 6d. **Lead** dull at £23. 17s. 6d. per ton prompt, and £24. 2s. 6d. three months, for foreign; English, £25. **Spelter** dull, being, prompt, £27. 2s. 6d. per ton, and three months £28. 2s. 6d. **Zinc Sheets,** in fair request at £38. 2s. 6d. per ton. **Sulphate of Ammonia,** quiet, with home trade prices over quarter at £13. 12s. to £14. 15s. per ton. **Sulphate of Copper** dull, at £26. 7s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda** slow, at £13. 12s. 6d. per ton in bags. **Bone Meal** in little demand, with Indian prompt at £8. 12s. 6d. per ton ex ship. **Cottonseed Oil,** common edible, £2. 4s. 9d., and deodorised £2. 7s. 9d. per cwt. net. **Rape Oil** slow, with refined prompt at £2. 7s. 3d. per cwt. net, in barrels. **Oxalic Acid** very quiet at 6¼d. per lb. f.o.r. **Pitch** dearer, but scarcely any business done at £6. 12s. 6d. per ton ex ship for best qualities. **Sulphuric Acid** cheaper, with steady demand at £3. 7s. 6d. to £6. 17s. 6d. per ton f.o.r. **Arsenic** meets with poor sale, with white powdered round £70. 17s. 6d. per ton f.o.b. **Copperas,** £2. 2s. 6d. per ton, including delivery. **Palm Oil** rather quiet, Lagos, prompt, £35. 2s. 6d.; softs, prompt £34. 2s. 6d., and forward £34.; mediums £35. 2s. 6d., prompt and forward £35. 5s.; hards, £35. 2s. 6d. per ton. **Turpentine** easier, American prompt £4. 3s. 6d. per cwt. **Coals** quiet and steady; best Admiralty smokeless £1. 10s. to £1. 12s. 6d.; seconds, £1. 9s.; ordinaries £1. 8s.; Monmouthshire, black vein £1. 9s.; cargo smalls 17s. 6d., all per ton f.o.b. **Anthracite** very firm, with small supplies only available; best large, £2. 10s.; seconds, £2. 2s. 6d. Paris nuts, £3. 1s. 6d. per ton, all f.o.b. **Patent Fuel** quiet, from £1. 14s. to £1. 16s. per ton, f.o.b. **Cokes,** freely active; export, £2. 5s. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton f.o.r., at ovens.

LIVERPOOL CHEMICAL MARKET. Wednesday.

The demand for chemicals of the heavier kinds has again been on a moderate scale, the increasing unrest in important branches of industry tending to retard progress in the home trades. In the export trade business has been fair, and shipments have again been fairly active. **Bleaching Powder** has had a moderate inquiry, and is £10. to £11. per ton for use in the United Kingdom, and £11. per ton for export. **Calcium Chloride** has been in fair request, and is £5. 17s. 6d. per ton. **Caustic Soda** has been rather more in demand, and has again been shipped freely on export account. The price is £20. 7s. 6d. to £21. 7s. 6d. per ton for 76%, carriage paid, for the home trade, and £20. 10s. per ton for export. **Bicarbonate of Soda** has been in good request for home-trade uses, and has had a fair shipment for exportation. It is £10. 10s. per ton for use in the United Kingdom. **Soda Crystals** have been steadily called for. The price is £5. 5s. per ton for the home trade. **Nitrate of Soda** has been quiet, and is £13. 5s. to £13. 10s. per ton. **Borax** has sold rather freely; commercial crystals are £27. per ton, and powdered £28. Higher grades are: Crystals £31. per ton, powdered £32. per ton, carriage paid in the United Kingdom. **Saltcake** has been in fair demand for home-trade uses. It is £4. 10s. to £5. per ton for the home trade, and £5. 10s. to £6. per ton for export. **Bichromate of Soda** has been quiet, and is 4½d. per lb. **Ammonia Alkali** has been rather more in demand for use in the U.K., and has had an active shipment for foreign ports. It is £7. 12s. 6d. per ton for use by the home trade, and £8. per ton for export. **Hyposulphite of Soda** has been more inquired for; it is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £17. per ton, in 1cwt. kegs for photographic. **Sulphide of Soda** has

been but little in demand; solid is £16. per ton, and crystals £10. **Chlorate of Soda** has been very quiet, and is 3d. to 3½d. per lb. **Phosphate of Soda** has had a limited sale, and is £15. to £16. per ton. **Prussiate of Soda** has again been in moderate request, and is 7d. to 8d. per lb. **Yellow Prussiate of Potash** has had a small but steady sale, and is 1s. 4d. to 1s. 4½d. per lb. **Red Prussiate** has been quieter, and is 4s. per lb. **Carbonate of Potash** has had a limited demand, and is £26. to £32. per ton, according to quality. **Nitrate of Potash** has had a very fair sale, and is £33. to £35. per ton for refined. **Chlorate of Potash** has been but little in request, and is 4d. to 4½d. per lb. **Caustic Potash** has been inactive, and is £32. to £33. per ton. **Permanganate of Potash** has been steadily called for, and is 10d. to 10½d. per lb. **Bichromate of Potash** has had a moderate inquiry, and is 5¾d. per lb. c.i.f. to usual ports. **Salammoniac** has been quieter; first quality is £63. per ton; second quality is £60., and third £57. **Sulphate of Ammonia** has been but little in request; the reduced prices are—£14. 15s. per ton for neutral, and £13. 12s. per ton for ordinary, to the end of August. **Carbonate of Ammonia** has been in fair demand, and is 4d. per lb. **Muriate of Ammonia** has moved but slowly, and is £32. to £33. per ton. **Magnesia** has had a very fair inquiry. **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. per ton. **Alum** has had a steady sale; for the home trade £12. to £13. per ton is quoted, and for export, £11. 10s. to £12. per ton. **Sulphate of Alumina** has had a very moderate inquiry, and is £8. to £12. per ton, according to quality. **Sulphur** has been in good request; flowers are £10. per ton, roll is £8. 10s. per ton, rock, £8. to £8. 10s. per ton, and American £5. to £5. 10s. per ton. **Tartaric Acid** has sold rather more freely, and is 1s. 4d. to 1s. 4½d. per lb. **Cream of Tartar** has been in good request, and is £4. 10s. to £4. 13s. per cwt. **Boric Acid** has been steadily called for; commercial crystals are £50. per ton, and powdered £53., and £2. per ton more, if in casks. **Citric Acid** has been more in request, and is 1s. 9d. to 1s. 10d. per lb. **Oxalic Acid** has been inactive, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** has been but little in demand, and is £42. to £43. per ton. **Sulphate of Copper** has moved but slowly for use by the home trade, but has had a fair shipment for overseas ports; the price has eased; it is £26. 2s. 6d. to £26. 5s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been neglected; white powdered is £71. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

Business in chemicals still remains quiet, both on home and export account. Prices are inclined to be easier, but inquiry continues to be a negligible quantity. The general situation does not promise an immediate revival in the chemical-using industries, but there is some little activity in the export branch, mainly in fulfilling contracts. Quotations at Glasgow, unless otherwise stated, are as follows. **Alum,** little doing, and in small demand; prices have been reduced and now stand at £12. 10s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; it is quoted on spot at £77. net. **Barium Chloride** remains very quiet, despite the recent reduction to £15. 15s. per ton. **Bleaching Powder** does not show much movement, and the quotation still stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax,** granulated is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride,** 70—75 per cent. solid, £5. 12s. 6d. per ton. **Citric Acid** is a declining market, and the price has been further lowered to 1s. 8¼d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure of £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar** firm, with better inquiry, and the price continues steady at £4. 10s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in quieter demand; brown steady at £40. 10s. per ton, net, and white lower at £40. 10s. per ton, net. The market for **Magnesium Chloride** is slow, but last week's quotation of £3. has reached to £3. 5s. for spot material. **Oxalic Acid,** at 6½d. per lb., is dull, but this price is still held. **Paraffin Wax** experiences a fair export trade at 2¾d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the rather easier figure of 1s. 4½d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 11s. per ton, but business is nominal. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic,** 43—44%, in fair request at 1s. 1½d. **Tartaric Acid** still shows a quieter tendency at 1s. 3¼d. per lb.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending July 7.

ACETIC ACID—
Hamburg, 17 crbys.

BARIUM SULPHATE—
Antwerp, 250 bgs.

BARYTES—
Seville, 34 brls.

BLEACHING POWDER—
Hamburg, 42 drms.

CALCIUM CARBIDE—
Gothenburg, 600 drms.

CARBON BLACK—
New York, 11 cs.

CHROME ORE—
Karachi, qnty.

COAL TAR PRODUCTS—
Pyridine
Bremen, 1 cs.

CREAM OF TARTAR—
Tarragona, 12 brls.

DEXTRINE—
Baltimore, 2,182 brls.

DYESTUFFS (NATURAL)—
Unspecified
New York, 100 brls.

FORMIC ACID—
Hamburg, 220 crbys.

FULLER'S EARTH—
Norfolk (Va.), 38 bgs.

GLUCOSE—
Baltimore, 660 brls.
Newport News, 480 brls.

IRON OXIDE—
Valencia, 596 pkgs.

IRON PYRITES—
Huelva, 3,600 t.

MAGNESIUM SULPHATE—
Hamburg, 100 kgs.

OCHRE—
Norfolk (Va.), 342 brls.

OXIDE (*otherwise undescribed*)—
New York, 1 brl.

PLUMBAGO—
Antwerp, 10 cks.

POTASSIUM BROMIDE—
Hamburg, 1 ck.

ROSIN—
Lisbon, 214 brls.
Pasages, 129 brls.

SALT—
Bremen, 1,200 bgs.
Hamburg, 700 bgs.

SALTPETRE—
Hamburg, 60 kgs.

SILICO MANGANESE—
Gothenburg, 18 brls.

SOAP—
Antwerp, 1 cs.; Hamburg, 14 cs.; New York, 1,000 cs.

SODA—
Hamburg, 25 cks., 3 brls.

SODIUM SULPHATE—
Hamburg, 100 kgs.

STEARINE—
Hamburg, 100 cs.
New York, 182 brls.

TAR (WOOD)—
Gothenburg, 50 brls.

TARTARIC ACID—
Hamburg, 20 cks.

ULTRAMARINE BLUE—
Antwerp, 3 cks.

ZINC OXIDE—
Antwerp, 8 brls.

GOOLE.

Week ending July 7.

CAUSTIC POTASH—
Bremen, 18 drms.

GLUE AND SIZE—
Antwerp, 40 bls.
Boulogne, 5 cks.

POTASSIUM SALTS (*otherwise undescribed*)—
Bremen, 2,000 bgs,

GRANGEMOUTH.

Week ending July 7.

ACETIC ACID—
Rotterdam, 8 cks.

CASEIN—
Dunkirk and Rouen, 67 bgs.

CHEMICALS (*otherwise undescribed*)—
Christiansand, Christiania, and Drammen, 18 cks.; Rotterdam, 5 cs.

FERRO CHROME—
Bergen, Trondhjem, and Halesund, 100 cs.

FERRO SILICON—
Bergen, Trondhjem, and Halesund, 30 cs.

GLYCERINE—
Rotterdam, 5 cs., 2 drms.

IRON PYRITES—
Huelva, 2,914 t.

OXIDE (*otherwise undescribed*)—
Antwerp, and Ghent, 60 brls.

TALLOW—
Christiansand, Christiania, and Drammen, 100 brls.

ZINC OXIDE—
Rotterdam, 5 cks.

GRIMSBY.

Week ending July 7.

CHEMICALS (*otherwise undescribed*)
Antwerp, 52 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 44 cks.

GALLIC ACID—
Antwerp, 10 cks.

POTASSIUM CARBONATE—
Hamburg, 4 cks.

HULL.

Week ending July 7.

CALCIUM CARBIDE—
Christiania, 21 t.

CHEMICALS (*otherwise undescribed*)
Antwerp, 14 t.; Bremen, 10 t. 17 c.; Copenhagen, 48 galls.; Genoa, 10 t.; Hamburg, 4 t. 19 c.; Montreal, 24 t. 1 c.; Naples, 5 t.; Rotterdam, 20 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 3,420 lb.

FERRO CHROME—
Gothenburg, 37 t.

FERRO MANGANESE—
Gothenburg, 5 t.

FERRO SILICON—
Christiania, 34 t.
Christiansand, 55 t.
Gothenburg, 183t.

FERTILISERS (*otherwise undes.*)—
Christiania, 20 t.

FULLER'S EARTH—
Bremen, 49 t. 5 c.

GLUE—
Genoa, 4 t.; Marseilles, 10 c.

MAGNESITE—
Amsterdam, 2 t. 3 c.
Hamburg, 25 t.

MAGNESIUM CHLORIDE—
Amsterdam, 8 t.

MANGANESE ORE—
Bombay, 900 t.

POTASSIUM NITRATE—
Rotterdam, 2 t.

ROSIN—
Jacksonville, 62 t. 8 c.

SILICO MANGANESE—
Dunkirk, 20 t.
Gothenburg, 150 t.

SILICON CARBIDE—
Christiania, 4 t.

SOAP—
Genoa, 5 t.; Rotterdam, 3 t.

TALLOW—
Rotterdam, 15 t.

TANNING MATERIALS—
Wattle
Amsterdam, 150 t.
Unspecified
Bremen, 5 c.
New York, 3 t. 15 c.

TAR (WOOD)—
Helsingfors, 240 galls.

TURPENTINE—
Bordeaux, 5 t.

LEITH.

Week ending July 7.

CARBON (DECOLOURISING)—
Amsterdam, 22 bgs.

CAUSTIC POTASH—
Hamburg, 19 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 176 cs.
Gothenburg, 200 drms.

COAL TAR PRODUCTS—
Tar Oil
Gothenburg, 21 brls.

CRYOLITE—
Copenhagen, 500 bgs.

DEXTRINE—
Amsterdam, 100 bgs.

GLUCOSE—
Amsterdam, 10 cks.

KIESELGUHR—
Copenhagen, 625 bgs.

LITHOPONE—
Amsterdam, 160 cks.
Antwerp, 20 cks.

OCHRE—
Norfolk, 320 brls.

SALT—
Hamburg, 50 bgs.

ZINC OXIDE—
Antwerp, 48 cks.

LIVERPOOL.

Week ending July 7.

ACETIC ACID—
Amsterdam, 13 cks.
Montreal, 642 brls.

ALUMINIUM SULPHATE—
Marseilles, 1,000 bgs.

AMMONIA—
Havre, 2 cs.

AMMONIUM CHLORIDE—
Hamburg, 13 cks.

ANTIMONY ORE—
Melbourne, 1,424 bgs.

ARGOLS—
Oporto, 293 bgs.

ARSENIC—
Bordeaux, 29 cks.
Yokohama, 100 cs.

BARYTES—
Bremen, 20 cks.
Hamburg, 150 bgs., 35 cks.

BEESWAX—
Marseilles, 5 cs.

BISMUTH ORE—
Hong Kong, 84 bgs.

CALCIUM CHLORIDE—
Hamburg, 60 drms.

CARBON (DECOLOURISING)—
Amsterdam, 10 bgs.

CARBON BLACK—
New Orleans, 150 cs.
Philadelphia, 50 bgs.

CARNAUBA WAX—
Rio de Janeiro, 107 sks.

CASEIN—
Buenos Ayres, 167 bgs.

CAUSTIC POTASH—
Hamburg, 15 drms.

CAUSTIC SODA—
Hamburg, 14 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 2 cs.; Havre, 7 cs.
New York, 28 cs.

CITRIC ACID—
Amsterdam, 40 kgs.
Havre, 2 cs.

COAL TAR PRODUCTS—
Creosote
Havre, 1 cs.
Tar
Danzig, 46 brls.
Rotterdam, 1 ck.

CREAM OF TARTAR—
Bordeaux, 185 bgs., 110 brls., 12 cks., 10 kgs.; Marseilles, 321 bgs.

CRYOLITE—
Copenhagen, 400 bgs.

DYESTUFFS (NATURAL)—
Cochineal
Teneriffe, 30 bgs.
Cutch
Rangoon, 500 bgs.
Singapore, 800 bxs.
Logwood
New York, 191 cs.

FORMALDEHYDE—
Havre, 2 cs.

GELATINE—
Marseilles, 8 cks.

GLUCOSE—
Amsterdam, 10 cks.; Ghent, 200 bgs.; Norfolk, 360 brls.

GLUE—
Antwerp, 20 bls.; Grand Bassam, 7 brls.; Havre, 40 sks.; Marseilles, 110 brls.

IRON OXIDE—
Malaga, 38 brls., 560 bgs.
Marseilles, 11 cks.

KIESELGUHR—
Stavanger, 796 bgs.

LEAD ASHES—
Bilbao, 3 brls.

LEAD ORE—
Buenos Ayres, 600 bgs.

LITHOPONE—
Antwerp, 40 cks.
Rotterdam, 140 cks.

MAGNESIA (CALCINED)—
Amsterdam, 50 bgs.

MANGANESE ORE—
Bombay, 750 t.; Calcutta, 2,000 t.; Hong Kong, 1,130 pkgs.; Sekondi, 3,823 t.

NAPHTHA (WOOD)—
Hamburg, 58 brls.

OCHRE—
Marseilles, 33 cks.

PARAFFIN WAX—
Baltimore, 1,016 brls.
New Orleans, 227 brls.
Philadelphia, 100 brls.

POTASSIUM BROMIDE—
Hamburg, 10 cs.

POTASSIUM CHLORATE—
Havre, 1 cs.

POTASSIUM SULPHATE—
Bremen, 100 bgs.

ROSIN—
Pensacola, 850 brls.

SALAMMONIAC—
Hamburg, 14 brls.

SALT—
Hamburg, 150 bgs.
New York, 300 cs.

SALTPETRE—
Hamburg, 110 pkgs., 20 cks.

SOAP—
Bari, 30 cs.; Copenhagen, 24 cs.; Marseilles, 1,301 cs.; Montreal, 10 crts.; New Orleans, 250 brls.; Singapore, 1 ble.

SODIUM ACETATE—
Antwerp, 80 kgs.

STEARINE—
Hamburg, 167 cs.

SULPHURIC ACID—
Havre, 1 cs.

TALLOW—
Boston, 635 brls.; Hamburg, 117 pps., 153 trcs.; La Plata, 590 tcs.; Monte Video, 421 cks.; Punta Arenas, 2,597 brls.; San Sebastian, 2,000 brls.; Santa Cruz, 403 trcs.

TANNING MATERIALS—
Chestnut
Naples, 100 cks.; Trieste, 160 bgs
Gambier
Singapore, 477 cs.
Myrabolans
Bombay, 4,296 pkts.
Quebracho
Buenos Ayres, 5,069 brls.
Sumac
Palermo, 320 bgs.
Valencia, 867 bgs., 1,115 bgs.
Unspecified
Bastia, 1,000 brls.; Bordeaux, 575 sks.; Genoa, 140 cs.

TAR (WOOD)—
Stockholm, 50 brls.

TARTARIC ACID—
Genoa, 50 kgs.; Palermo, 1 cks.

TIN OXIDE—
Antwerp, 6 cks.

VEGETABLE WAX—
Kobe, 15 cs.; Osaka, 25 cs.

WAX (*otherwise undescribed*)—
Ceara, 111 sks.; Dakar, 46 pkgs.; New Orleans, 378 brls.; New York, 82 drms.; Philadelphia, 200 brls.

WHITE LEAD—
Bremen, 44 cks.
Rotterdam, 40 cks.

ZINC ASHES—
Bilbao, 12 brls., 2 drms.

ZINC OXIDE—
Antwerp, 40 brls.
New York, 257 brls.
Rotterdam, 50 cks.

ZINC WHITE—
Antwerp, 10 cks.

LONDON.

Week ending July 7.

ACETIC ACID—
Canada, 574 pkgs.

ALUM—
Germany, 102 pkgs. E. Friedlander

ALUMINA (FUSED)—
Sweden, 11 pkgs.

ALUMINIUM OXIDE—
Switzerland, £29.

AMMONIA—
Japan, 7 t. 9 c. Morris

ANTIMONY SALTS (*otherwise undescribed*)—
France, a qty. Mory

ARGOLS—
France, 421 pkgs.
Italy, 457
,, 17 Morison, Pollexfen
Spain, 410

ARSENIC—
Pt. E. Africa, 5 t. 5 c.

ARSENIOUS ACID—
France, 183 pkgs. W. Waugh
Portugal, 39 Coverley, Wall and Westray

ASBESTOS—
Cape, 4 t. 15 c.
Rhodesia, 53 9 W. Hamsher

BARIUM CHLORIDE—
Germany, £117. Burrell

BARYTES—
Belgium, 100 bgs. Felton & Crepin
Germany, 40 cks. W. Harrison
,, 74 Beck & Pollitzer
,, 67 Burrell
Spain, 20 brls. Leach

BEESWAX—
Anglo-Egypt. Sudan, 7 pkgs.
Denmark, 389 bls. Poth Hille
E. Turkey, 22 sks. N.de Mayo
Germany, 30 bgs.
,, 9 Scheuer
Morocco, 8 bgs. R. Lehmann
,, 111 Leach

BLEACHING POWDER—
Germany, 3 t. 2 c. Brown & Forth
,, 20 J. M. Steel

BORIC ACID—
Italy, 248 pkgs. Borax Consolid.

CALCIUM CARBIDE—
Norway, 1 t. 1 c. J. Spurling

CALCIUM CHLORIDE—
Germany, 10 t. 3 c. Vestey

CAMPHOR—
China, 100 cs. W. M. Smith
Japan, 50 Weber, Smith & Hoare
,, 200 R. Warner

CARBON BISULPHIDE—
Belgium, £164. H. Barrett

CARBON BLACK
France, 67 cks.
U.S.A., 95 cs.
,, £420.
,, 150 cs. Binney & Smith
,, 16 brls.

CARBONIC ACID GAS—
Holland, £25. W. H. Muller

CARNAUBA WAX—
Brazil, 111 bgs. Weber, Smith & Hoare
,, 22

CASEIN—
Argent. R., £400. Jones Moore
,, £372. H. Trengreust
,, £1,100. Duche
France, £800. G.,T. Symons
,, £87.
Irish F.S., £397.
Holland, £100. Jones Moore
U.S.A., £69. Gerhard & Hey

CAUSTIC POTASH—
Germany, 73 pkgs. Beck & Pollitzer

CERESINE WAX—
Czecho-Slov., 60 bgs.
Germany, 21 Holroyds Oil & Ceresine

CHEMICALS (*otherwise undescribed*)
France, £11. C. Atkins & Nisbet
Germany, £40. J. Schnurmann
,, £50. Ronsheim Moore
,, £10. J. Bailey
,, £10.
,, £62. Reitmeyer, Calburn & Kindersley
,, £24. W. Connell
,, £37. W. A. J. Tilleray
U.S.A., £40. W. Jones, Dooly
,, £5.

CHEMICALS (*otherwise undes.*)—
—— £314.

CITRIC ACID—
Holland, 10 pkgs.

COAL TAR PRODUCTS—
Pitch
Belgium, 6 cks. Pure Russ. Liquid Paraffin

COPPER ACETATE—
France, £200.

CREAM OF TARTAR—
Algeria, { 100 pkgs. / 100 kgs. } E. W. Taylor
,, 100 pkgs.
France, 60 T. Chapman
,, 20 Bessler, Waechter
Germany, 40 C. Zimmermann

DEXTRINE—
Germany, 5 t.
Holland, 5 B. E. Burgoyne
,, 10 c.
,, 3 t. 7 c. M. V. Thacker

DYESTUFFS (ARTIFICIAL)—
Unspecified
Canada, 45 pkgs. Knight & Morris
Germany, £137.
,, £204. Pronk, Davis & Rushby
Switzerland, 2 pkgs.
,, £127.

DYESTUFFS (NATURAL)—
Annatto
rit. India, 26 pkgs. R. G. Hill
,, 47 Litchfield & Saundy
,, 41 T. Smith
Holland, 1 Van Geelkerken
Cochineal
France, 1 pkg. J. L. Lyon
Indigo
Brit. India, 1 pkg.
Logwood
U.S.A., 45 pkgs. Pronk Davis & Rushby
492 R. Warner
Turmeric
Brit. India, 130 pkgs.
,, 171 bgs.

ERTILISER (DRIED BLOOD)—
Argentine, 10 t.

ERTILISERS (*otherwise undes.*)—
F.Ê gy pt. 150 t.

FULLER'S EARTH—
Holland, 2 t.

USEL OIL—
Holland, 6 cks. W. H. Muller

GELATINE
Belgium, £1,586. Duche
France, £13. Mory
,, £53. Soc. des Prod. Chim.
Germany, £417. Crowe
,, £50. Stancourt & Muir
,, £161. Williams & Geils
,, £10. Moxon, Salt
U.S.A., £13. Mory

GLUE—
Belgium, £125. Duche
,, £310. Van Oppen
,, £33. P. Ingenlath
France, £100. O. Murray
,, £360. T. & W. Farmiloe
,, £153. A. J. Malicet
,, £76. Stancourt & Muir
,, £563. E. J. Brash
,, £23. G. T. Symons
,, £197. Soc. des Prod. Chim.
,, £64.
Germany, £8. Neale & Wilkinson
Holland, £111. Stancourt & Muir
,, £8.

GLYCERINE—
Holland, £76.
Russia, £2,184. Thornett & Fehr

ISINGLASS—
Brit. Guiana, 1 ck.
,, 5 pkgs.
E. Turkey, 27 cs. W. M. Smith

KIESELGUHR—
Germany, 1 t. 3 c. R. Baker
Spain, 1 Macdermott & McLaren

LITHOPONE—
Germany, 100 cks. Dixon's White
Holland, 340 F. T. H. Nye

MAGNESITE—
Holland, £118. Scheuer

MAGNESIUM CARBONATE—
Germany, £90.

MAGNESIUM OXIDE—
Germany, £335.

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slovakia, 50 bgs. McNamara
Cyprus, 11 sks. W. Hall
Germany, 3 cks. Colthurst & Harding
Spain, 4 J. Spurling
,, 14 brls. S. Bramwell

MINERAL SALTS (*otherwise undes.*)
U.S.A., £104.

MINERAL WAX—
Austria, £32. Crowe
Germany, 10 sks. E. Friedlander

MONTAN WAX—
Germany, 300 bgs. Holroyds Oil & Ceresine

OCHRE—
France, 184 cks. Taylor & Cox
,, 81 brls. W. Harrison
U.S.A., 176 Fox, Ray

PARAFFIN WAX—
Poland, 15 t. L. Dembinstir

PLUMBAGO—
Ceylon, 31 brls. Litchfield & Saundy
France, 115 bgs. G. T. Symons
,, 1 ck. E. G. Boize
Japan, 894 cks.
,, 20 bgs.
Korea, 6 cks. Hoare Wilson
U.S.A., { 7 kgs. / 17 brls. } Pith & Scott
,, 34 Beck & Pollitzer

POTASSIUM CARBONATE—
Canada, 2 pkgs. Charles & Fox
Germany, 22 Stephens
,, 11 J. Bailey
U.S.A., 5

POTASSIUM CHLORATE—
Germany, 4 pkgs. Stephens

POTASSIUM NITRATE
Belgium, 18 cks. Hollingshurst
Germany, 421 pkgs. Nobel Indus.
,, 188 Burton, Baker

PRUSSIAN BLUE—
France, 10 cks. H. H. Poole
Germany, 7 Stancourt & Muir
Holland, 4 ,,
,, 8

RED LEAD—
Italy, 9 cks. Dexters
,, 34 brls.
,, 97 cks.
,, 31 C. Scull
,, 90 brls. A. W. Page
,, 33 cks. Taylor & Cox

ROSIN—
France, 5 cks. Jensen & Nicholson
,, 75 Lowden, Connell
,, 26 Langley Smith
Germany, 2 cs. C. W. Hartrodt
Spain, 25 cks. Rosin & Turp. Imp.
U.S.A., 25 drms. J. Johnson

SALAMMONIAC—
Germany, 9 t. 10 c. Van Oppen

SALT—
Germany, 23 t. Morris

SHELLAC—
Brit. India, 9 t. 4 c. Litchfield & Saundy
Burmah, 2 15
Straits Setts., 8 10 J.W.Cook

SIZE—
U.S.A., £62. Davies, Turner

SOAP—
Austria, £88.
Belgium, £35. S. Kalisky
,, £135.
Canada, £1,035. Gerhard & Hey
Denmark, £384. Beck & Pollitzer
,, £69.
France, £30. E. E. Mayer
,, £35. Pronk Davis
,, £50. E. J. Francois
,, £38. G. T. Symons
,, £70. F. Potter Priestley
,, £47.
Germany, £18. L. Duforest
,, £64. T. Meadows
,, £24.
Holland, £6. Nine Valley Tanning
,, £57.
Italy, £15. J. & E. Atkinson
U.S.A., £850. L. F. Smith
,, £48. H. A. Lane
,, £729. Knight & Morris
,, £30. Pronk Davis & Rushby
Victoria, £3,600. L. F. Smith

SODIUM PHOSPHATE—
Belgium, 5 t. 6 c.

STEARINE—
Belgium, 13 bgs. A. C. E. Garnham
Brazil, 149 brls. J. W. Cook
Holland, 7 bgs.

SULPHUR—
Italy, £482. Nisbett
,, 50 t. H. Gardner

SUPERPHOSPHATE—
Holland, 30 t.

TALLOW—
Argentine, 58 t.
Norway, 124 J. Knight
N.S.W., 17 13 Thornett & Fehr
,, 11 7
N.Z., 35 1 Phillips & Graves
,, 113
,, 9 10 Fairclough Dodd & Jones
S. Australia, 10 10 Weber, Smith & Hoare
U.S.A., 40 t.
Uruguay, 5

TANNING MATERIALS
Chestnut Extract
France, 50 pkgs.
Italy, 100 E. G. Boize
,, 80 H. G. Harper
,, 20 brls. T. Meadows
Myrabolans
Brit. India, 2,670 pkgs.
Sumac
Italy, 190 pks. C. S. Lovell
Spain, 127 bgs.
Valonia
A. Turkey, 39 t. J. & H. Whittall
Greece, 24
,, 20 H. Rubeck
Unspecified
Natal, 200 t. Leach
,, 4

TARTARIC ACID—
Italy, 100 pkgs. Duche
,, 100 Leach

TURPENTINE—
Poland, 18 drms.
,, 6 brls.

ULTRAMARINE—
Germany, 5 cks. H. Smart

WAX (*otherwise undescribed*)—
U.S.A., 254 pkgs. Gerhard & Hey
,, 3 G.W. Wheatley

WHITE LEAD—
France, 24 cks.
Italy, 76 C. Scull
U.S.A., 23 Greeff
Belgium, 54 E. & W. Farmiloe

ZINC OXIDE—
Belgium, 93 cks. M. Ashby
Czecho-Slovakia, 100 Greeff
Holland, 125 F. T. H. Nye
,, 60 M. Ashby

MANCHESTER.

OFFICIAL AMENDMENTS.

To Return for week ending June 16, Deduct—

ACETIC ACID—
Montreal, 8 brls.

To Return for week ending June 17, Deduct—

SODIUM CHLORATE—
—— 720 cs.

Week ending July 7.

ACETIC ACID—
Amsterdam, 22 cks.
Hamburg, 164 crbys., 37 cks.

ALBUMEN—
Ghent, 30 bgs.

ANTIMONY SALTS (*otherwise undes.*)
Hamburg, 8 cks.

BARYTES—
Bremen, 100 bgs.
Hamburg, 36 cks.

BLEACHING POWDER—
Hamburg, 113 cks.

CALCIUM CHLORIDE—
Hamburg, 32 drms.

CARBON (DECOLOURISING)—
Amsterdam, 107 bgs.

CARBON BLACK—
New York, 100 cs.

CASEIN—
Rouen, 167 bgs., 3 cs.

CAUSTIC POTASH—
Hamburg, 8 cks., 78 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 100 cks., 169 bgs., 27 drms.; Bremen, 8 cks.

CREAM OF TARTAR—
Hamburg, 5 cks.

DEXTRINE—
Baltimore, 1,816 bgs.
Norfolk, 1,320 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Hamburg, 1 ck.
Rotterdam, 97 cks.
Unspecified
Hamburg, 104 cks., 4 cs.
New York, 3 bxs.
Rotterdam, 678 pkgs.

DYESTUFFS (NATURAL)—
Logwood
Baltimore, 110 brls.
Quercitron
Baltimore, 55 brls.
Unspecified
Philadelphia, 190 bxs., 105 brls.

FORMALDEHYDE—
Bremen, 1 dmjhn.
New York, 56 brls.

FORMIC ACID—
Amsterdam, 39 dmjhns.
Hamburg, 261 crbys.

GLUCOSE—
Amsterdam, 10 cks.
Rotterdam, 115 cks.

GLUE
Antwerp, 100 bgs.
Auckland, 2 cs.
Rotterdam, 12 pkgs.

GLYCERINE—
Rotterdam, 1 drm.

LEAD ACETATE—
Hamburg, 10 cks.

LITHARGE—
Genoa, 28 pkgs.

LITHOPONE—
Rotterdam, 220 cks.

MAGNESITE—
Rotterdam, 50 bgs.

MAGNESIUM CHLORIDE
Bremen, 743 drms.
Hamburg, 37 cks.

MAGNESIUM SULPHATE—
Rotterdam, 100 bgs.

MINERAL COLOURS (*otherwise undescribed*)—
Hamburg, 46 cks., 100 bgs.

OXALIC ACID—
Amsterdam, 6 cks.

PARAFFIN WAX—
Baltimore, 320 brls.
New York, 505 brls.
Philadelphia, 840 brls.

PHOSPHORUS—
Montreal, 188 drms.

POTASH—
Montreal, 2 brls.

POTASH ALUM—
Hamburg, 15 cks.

POTASSIUM CARBONATE—
Hamburg, 6 brls.

POTASSIUM PRUSSIATE—
Rotterdam, 16 cks.

RED LEAD—
Genoa, 34 pkgs.

SALT—
Hamburg, 500 bgs.

SALTPETRE—
Hamburg, 30 bgs.

SOAP—
Rouen, 11 cs.

SODIUM BICHROMATE—
Baltimore, 43 cks.

SODIUM HYPOSULPHITE—
Bremen, 24 cks.

SODIUM NITRATE—
Hamburg, 25 cks.

SODIUM PHOSPHATE—
Hamburg, 1 ck.

SODIUM SILICATE—
Philadelphia, 1 brl., 2 drms.

STEARINE—
Antwerp, 90 bgs., 14 cks.

SULPHUR—
Catania, 450 bgs.

TALLOW—
Boston, 600 brls.

TANNIC ACID—
Hamburg, 30 cks.

TANNING MATERIALS—
Sumac
Palermo, 180 bgs.
Unspecified
Antwerp, 27 brls.; Bastia, 200 brls.; Hamburg, 10 brls.; New York, 5 brls.; Philadelphia, 5 brls.

TARTARIC ACID—
Genoa, 20 cks., 80 pkgs.

ULTRAMARINE—
Hamburg, 14 cks.

WAX (*otherwise undescribed*)—
Boston, 10 brls.
New York, 45 drms.

ZINC DUST—
Antwerp, 13 kgs., 66 cs.

ZINC OXIDE—
Antwerp, 20 cks.

NEWCASTLE-ON-TYNE

Week ending July 7.

ACETIC ACID—
Hamburg, 67 crbys.

ACIDS (*otherwise undescribed*)—
Rotterdam, 13 crbys., 40 cks.

ANTIMONY—
Hamburg, 60 cks.

BARYTES—
Bremen, 30 bgs.
Hamburg, 36 cks., 150 bgs.

CALCIUM CARBIDE—
Christiania, 140 drms.

CHEMICALS (*otherwise undescribed*)
Gothenburg, 2 cs.
Hamburg, 20 cks.

COAL TAR PRODUCTS—
Tar Oil
Hamburg, 25 cks.

GLUCOSE—
New York, 1,100 brls.

LITHARGE—
Christiania, 8 brls.

LITHOPONE—
Antwerp, 8 cks.

MINERAL COLOURS (*otherwise undescribed*)—
Hamburg, 2 bgs.

OXIDE (*otherwise undescribed*)—
Rotterdam, 25 cks.

POTASSIUM BROMIDE—
Hamburg, 10 cs.

SALAMMONIAC—
Hamburg, 11 cs.

SALT—
Hamburg, 1,280 bgs.

SOAP—
Copenhagen, 4 cs.
Hamburg, 3 cs.

TANNING MATERIALS—
Valonia
Hamburg, 340 bgs.

ZINC OXIDE—
Antwerp, 40 brls.

N. & S. SHIELDS.

Week ending July 7.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending July 7.

ALBUMEN—
Cape Town, 1 cs.

CHEMICALS (*otherwise undescribed*)
Bombay, 217 pkgs.; Buenos Ayres, 115 pkgs.; Coquimbo, 7 pkgs.; Montreal, 404 pkgs.; Oporto, 10 pkgs.

COAL TAR PRODUCTS—
Pitch
Calcutta, 25 brls.
Tar
Hamburg, 11 t. 5 c.; Karachi, 22 t.; Talala, 4 t.
Unspecified
Hamburg, 2 t. 19 c.
Oporto, 65 t. 17 c.

PARAFFIN WAX—
Antofagasta, a qty.; Genoa, 101 t.; Oporto, 8 t.

POTASSIUM BICHROMATE—
Hamburg, 1 t. 2 c.
Karachi, 5 c.

ROSIN—
Rangoon, 10 cks.

SOAP—
Buenos Ayres, 2 t. 13 c.
Talala, 5 c.

SODIUM BICHROMATE—
Hamburg, 1 t.

TAR (ARCHANGEL)—
Calcutta, 11 c.

TURPENTINE—
Rangoon, 40 drms.

GRANGEMOUTH.

Week ending July 7.

COAL TAR PRODUCTS—
Creosote
Antwerp, 5 t. 5 c.
Creosote Oil
Christiania, 3 t.
Tar
Christiania, 10 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rouen, 25 lb.

IODINE—
Rouen, 16 c.

PARAFFIN WAX—
Christiania, 10 t.; Rouen, 2 t.; Stockholm, 2 t.

POTASSIUM BICHROMATE—
Stockholm, 14 c.

ROSIN OIL—
Stockholm, 5 brls.

SODIUM BICHROMATE—
Rouen, 5 t. 7 c.

HULL.

Week ending July 3.

ACIDS (*otherwise undescribed*)—
New York, 20 drms.

ASBESTOS—
Christiania, 2 trcs., 4 cs.
Harlingen, 1 trc.
Stockholm, 4 trcs.
Yxpila, 5 pkgs.

CHEMICALS (*otherwise undescribed*)
Abo, 50 pkgs.; Mantyluoto, 5 drms.; Rotterdam, 930 cs.; Stockholm, 170 drms.

COAL TAR PRODUCTS—
Naphthalene
Rotterdam, 490 bgs.
Pitch
Baltimore, 211 brls.
Unspecified
Christiania, 181 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiania, 2 cks.

GELATINE—
Christiansand, 2 bgs.

GLUE—
Abo and Wasa, 1 bg.

GLYCERINE—
Amsterdam, 76 drms.

SOAP—
Amste dam, 500 cs.
Christiania, 2,038 cs.

STEARINE—
Abo, 25 brls.
Hamburg, 71 brls.

LEITH.

Week ending July 7.

BORON MINERAL—
Dunkirk, 2,260 bgs.

DYESTUFFS (NATURAL)—
Cutch
Rotterdam, 15 bxs.

LEAD ORE—
Hamburg, 51 t.

PARAFFIN WAX—
Amsterdam, 160 bgs.; Dunkirk, 16 bgs.; Gothenburg, 800 bgs.

PITCH (*otherwise undescribed*)—
Amsterdam, 25 cks.
Antwerp, 35 pkgs., 50 cks.

SALT—
Sorvang, 200 bgs.

SOAP—
Sorvang, 5 cs., 7 kgs.

TALLOW—
Rotterdam, 260 cks.

TALLOW OIL—
Copenhagen, 20 trcs.

TAR (*otherwise undescribed*)—
Antwerp, 15 cks.

WOOD PRESERVATIVE—
Copenhagen, 20 drms.

ZINC ASHES—
Antwerp, 287 bgs.

LIVERPOOL.

Week ending July 5.

ACETIC ACID—
Callao, 3 c., £17.

ACIDS (*otherwise undescribed*)—
Barcelona, 1 t., £170.

ALUM—
Brisbane, 1 t. 7 c., £14.
Guayaquil, 1 t., £11.

AMMONIA (ANHYDROUS)—
Lisbon, 8 c., £82.
Lagos, 4 c., £27.

AMMONIUM CARBONATE—
Cape Town, 2 t., £67.
Copenhagen, 10 c., £16.

AMMONIUM CARBONATE—
Constantinople, 12 t. 1 c., £38.; Kobe, 25 t., £734.; Melbourne, 5 t., £131.; Nantes, 10 c., £18.; Pasages, 1 t. 19 c., £68.; Rio de Janeiro, 2 t. 9 c., £129.; Seville, 1 t., £39.; Talcahuano, 1 t. 9 c., £50.; Yokohama, 10 t., £303.; New York, 2 t. 10 c., £83.

AMMONIUM CHLORIDE—
Adelaide, 5 c., £13.; Alexandria, 5 t. 8 c., £223.; Calcutta, 7 t., £284.; Constantinople, 4 t. 8 c., £184.; Karachi, 6 t. 5 c., £254.

AMMONIUM SALTS (*otherwise undescribed*)—
Buenos Ayres, 4 t. 18 c., £184.
Bilbao, 10 c., £14.; Cape Town, 6 c., £11.; Tokio, 1 t., £32.

AMMONIUM SULPHATE—
Cheribon, 340 t. 2 c., £5,541.; Demerara, 144 t. 12 c., £10,573.; Hong Kong, 160 t., £2,729.; Kobe, 355 t., £5,859.; Las Palmas, 114 t., £1,949.; Mauritius, 100 t., £1,551.; Malaga, 98 t. 17 c., £1,531.; Palermo, 19 t. 19 c., £329.; Sourabaya, 249 t. 19 c., £4,123.; Teneriffe, 30 t., £495.; Yokohama, 1,043 t. 4 c., £17,237.

AMYL ACETATE—
Melbourne, 8 c., £78.

ANTIFOULING PAINT—
Bilbao, 3 t. 2 c., £342.; Ferrol, 10 c., £36.; Rio de Janeiro, 24 t. 12 c., £2,584.; Singapore, 9 t. 10 c., £750.; Summerside, 3 c., £14; Trinidad, 1 t., £104.; Valparaiso, 3 t. 18 c., £382.

BLEACHING POWDER—
Cape Town, 10 c., £12.; Corunna, 7 t. 18 c., £90.; Constantinople, 1 t. 17 c., £26.; Durban, 1 t., £12.; Havana, 1 t. 9 c., £15.; Montreal, 18 t. 8 c., £170.; New York, 6 t. 13 c., £190.; Puerto Alegre, 1 t., £11.; Pasages, 5 t. 1 c., £50.; San Antonio (Chili), 10 t., £120.; Shanghai, 12 t. 1 c., £158.; Santos, 15 t. 2 c., £180.; Salonica, 1 t., £12.; Vera Cruz, 7 t. 18 c., £98.

BITUMEN—
Bombay, 4 t., £61.; Hong Kong, 17 t. 11 c., £250.; Sekondi, 8 c., £21.

BOILER COMPOSITION—
Auckland, 2 t., £90.
Calcutta, 2 t. 8 c., £120.

BORAX—
Auckland, 1 t., £75.; Barcelona, 1 t. 3 c., £32.; Cienfuegos, 16 c., £20.; Constantinople, 10 c., £15.; Calcutta, 1 t. 10 c., £40.; Christchurch, 1 t., £29.; Hobart, 10 c., £15.; Hong Kong, 1 c., £2.; New Plymouth, 1 t., £30.; Oporto, 2 t. 10 c., £67.; Shanghai, 4 t. 3 c., £131.

BORIC ACID—
Barcelona, 4 c., £10.; Bombay, 1 c., £5.; Constantinople, 4 c., £17.; Hobart, 1 t., £55.; Hong Kong, 3 c., £9.

CALCIUM CARBIDE—
Buenos Ayres, 3 t. 3 c., £117.

CALCIUM CHLORIDE—
Algoa Bay, 2 t. 11 c., £15.; Auckland, 5 t. 2 c., £30.; Buenos Ayres, 20 t. 1 c., £83.; Madras, 5 t. 4 c., £32.; Sydney, 25 t. 1 c., £150.; Wellington, 5 t. 3 c., £30.

CARBONATE OF LIME—
Genoa, 1 t. 10 c., £24.

CARBONIC ACID GAS—
Iddo, 4 c., £17.; Lisbon, 9 c., £20.

CHEMICALS (*otherwise undescribed*)
Adelaide, 2 t., £57.; Alexandria, 1 t., £28.; Amsterdam, 2 qr., £62.; Bombay, 18 c., £105.; Brisbane, 3 t., £84.; Coquimbo, 10 c., £14.; Genoa, 1 c., £152.; Melbourne, 22 t. 16 c., £2,913.; New York, 17 t. 1 c., £384.; Pasages, 10 t., £111.; Rangoon, 5 t., £135.; Sydney, 9 t. 5 c., £289.; Seville, 5 t., £135.; Sao Paulo, 9 t. 17 c., £278.; Tampico, 1 t., £54.; Valencia, 1 t., £27; Wellington, 3 t, £63.

CITRIC ACID—
Shanghai, 1 c., £10.
Wellington, 10 c., £91.

COAL TAR PRODUCTS—
Betaoxynaphthoic Acid
Havre, £11.
Carbolic Acid
Christchurch, 1 c., £14.; Calcutta, 5 c., £25.; Durban, 9 c., £15.; Genoa, 4 t. 18 c., £753.; Hamburg, 15 t. 5 c., £1,995.; Kobe, 20 t. 4 c., £3,591.; Rouen, 11 t. 17 c., £412.; Shanghai, 18 c., £143.
Creosote
Antwerp, 5 t. 2 c., £273.; Montreal, 16 c., £26.; New York, 32 t. 7 c., £1,784.; Perth Amboy, 22 t. 14 c., £1,046.; Sydney, 8 c., £18.
Mirbane Oil
Sydney, 11 c., £38.
Monochlor Benzol
Antwerp, 26 t., £1,734.
Naphthalene
Iddo, 2 t., £46.
Tar
Accra, 26 t. 12 c., £296.; Grand Bassam, 3 t. 15 c., £10.; Lome, 3 t. 11 c., £51.; La Guaira, 3 t. 1 c., £38.; Lagos, 1 t. 9 c., £28.; Puerto Colombia, 1 t., £14.; San Pedro, 1 qr., £24.; Santa Cruz, 2 t. 6 c., £175.; Sydney, 9 t. 10 c., £388.; Sekondi, 6 t. 16 c., £58.
Unspecified
Hamburg, 15 t., £1,876.
Melbourne, 5 c., £75.
New York, 11 t. 6 c., £1,574.

COBALT OXIDE—
Gijon, 6 c., £300.
Hankow, 1 t. 7 c., £1,387.

COBALT SULPHATE—
Paranagua, 1 c., £22.

COPPER SULPHATE—
Alexandria, 2 t. 1 c., £51.; Accra, 10 c., £13.; Bergen, 1 t., £24.; Calcutta, 3 c., £4.; Monte Video, 5 t. 18 c., £151.; Pt. Elizabeth, 1 c., £1.; Trinidad, 2 c., £3.

CREAM OF TARTAR—
Lyttleton, 1 t., £100.
Melbourne, 3 t., £285.
New Plymouth, 1 t., £102.
Wellington, 1 t., £100.

DISINFECTANTS (*otherwise undes.*)
Alexandria, 1 t. 3 c., £59.; Amsterdam, 4 c., £90.; Accra, 1 qr., £17.; Bombay, 4 t. 13 c., £142.; Colombo, 18 c., £45.; Demerara, 8 c., £15.; Durban, 12 c., £32.; Hong Kong, 1 t. 8 c., £85.; Montreal, 8 c., £21.; Montserrat, 1 t. 3 c., £96.; New York, 14 t. 18 c., £730.; Penang, 1 t. 3 c., £55.; Shanghai, 14 c., £23.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Batavia, 12 t. 2 c., £2,079.
Samarang, 13 t. 11 c., £2,274.
Sourabaya, 2 t. 19 c., £495.
Indigo
Hankow, 19 t. 14 c., £2,482.
Shanghai, 14 t. 18 c., £1,875.
Unspecified
Adelaide, 2 c., £168.; Algoa Bay, 3 c., £54.; Barcelona, 7 c., £77.; Bangkok, 1 c., £10.; Calcutta, 2 c., £28.; Havre, 1 c., £15.; Lyttleton, 5 c., £105.; Launceston, 6 c., £113.; Montreal, 5 t. 6 c., £548.; Rio de Janeiro, 8 c., £674.; Shanghai, 1 c., £28.; Yokohama, 12 c., £125.

DYESTUFFS (NATURAL)—
Hematine Crystals
Auckland, 2 c., £10.

ESSENTIAL OILS—
Synthetic
Antwerp, 3 c., £207.
Durban, 1 t. 16 c., £609.
Sydney, 1 qr., £47.

FERTILISERS (*otherwise undes.*)—
Mauritius, 10 t., £169.

FORMALDEHYDE—
Sydney, 7 c., £24.

GLYCERINE—
Antwerp, 2 t. 18 c., £227.; Aalborg, 1 t., £66.; Batavia, 4 c., £17.; Bombay, 6 t., £542.; Cape Town, 25 t. 19 c., £1,296.; Copenhagen, 2 t. 10 c., £175.; Hong Kong, 4 t. 17 c., £428.; Helsingfors, 10 c., £39.; Monte Video, 1 t., £87.; Melilla, 6 c., £26.; Rangoon, 1 t., £90.; Samarang, 5 c., £21.; Santander, 9 t. 17 c., £743.; Shanghai, 6 t. 17 c., £550.; Stockholm, 1 t., £68.; Wellington, 9 t. 18 c., £869.; Wiborg, 5 c., £18.

HYDROCHLORIC ACID—
Buenos Ayres, 6 c., £33.

IODINE—
Pt. Harcourt, 1 qr., £4.

IODOFORM—
Calabar, 2 qr., £61.

LACTIC ACID—
Melbourne, 2 t. 6 c., £88.
Sydney, 2 t. 1 c., £97.

MAGNESIA—
San Juan de Porto Rico, 6 c., £43.

MAGNESIA (CALCINED)—
Kobe, 2 t. 10 c., £244.
Maracaibo, 2 qr., £14.
Vera Cruz, 4 c., £39.

MAGNESIUM CARBONATE—
Bombay, 2 t. 10 c., £82.
Vera Cruz, 1 t. 4 c., £102.

MAGNESIUM CHLORIDE—
New Orleans, 1 t., £18.

MAGNESIUM SULPHATE—
Curacao, 2 c., £1.
Invercargill, 1 c., £1.
Nassau, 1 c., £2.
Sekondi, 1 c., £1.
Pt. Harcourt, 4 c., £7.

MANGANESE SULPHATE—
Bilbao, 1 c., £50.

NITRIC ACID—
Buenos Ayres, 3 c., £14.

PHOSPHORUS (AMORPHOUS)—
Durban, 1 t. 7 c., £318.

PHOSPHORUS SESQUISULPHIDE
Wellington, 1 t. 9 c., £323.

PLATING SALTS (*otherwise undes.*)
Wellington, 1 c., £21.

POTASSIUM BICHROMATE—
Constantinople, 4 c., £10.

POTASSIUM IODIDE—
Accra, 1 qr., £30.; Half Assinie, £10.; Sapele, 1 c., £70.

POTASSIUM PRUSSIATE—
Barcelona, 10 c., £73.; Bilbao, 5 c., £36.; New York, 18 c., £260.

POTASSIUM SULPHATE—
Las Palmas, 7 t. 10 c., £93.

QUININE CHLORIDE—
San Pedro, 1 qr., £30.

QUININE SULPHATE—
Maracaibo, £20.

SALAMMONIAC—
Constantinople, 3 t., £139.; Madras, 2 t. 2 c., £113.; Rhodes, 6 c., £16.; Salonica, 2 t. 12 c., £145.

SALTCAKE—
Antwerp, 325 t., £1,950.

SHEEP DIP—
Adelaide, 4 t. 6 c., £339.; Auckland, 1 t., £22.; Albany, 1 t. 8 c., £55.; Bombay, 3 c., £35.; Buenos Ayres, 40 t. 6 c., £2,191.; Cartagena, 3 c., £32.; Delagoa Bay, 5 t. 7 c., £108.; Deseado, 10 t. 7 c., £787.; Mossel Bay, 1 t. 7 c., £102.; Maracaibo, 6 c., £23.; Melbourne, 27 t. 10 c., £1,053.; New Plymouth, 1 t. 3 c., £71.; Pt. Madryn, 3 t. 9 c., £263.; Rio de Janeiro, 1 t. 4 c., £40.; Wellington, 22 t. 5 c., £878.

SODIUM CYANIDE—
Sekondi, 2 t. 10 c., £211.

SODIUM SULPHIDE—
Santos, 5 t. 1 c., £80.

SULPHURIC ACID—
Barbados, 8 c., £17.
Shanghai, 1 c., £14.

SUPERPHOSPHATE—
Las Palmas, 20 t. 10 c., £89.

TANNING MATERIALS—
Unspecified
Amsterdam, 5 t. 13 c., £93.; Algoa Bay, 4 t. 11 c., £84.; Auckland, 1 t. 9 c., £29.; Antwerp, 4 c., £6.; Bergen, 23 t. 8 c., £350.; Hamburg, 4 t. 3 c., £285.; Melbourne, 6 t. 13 c., £224.; Montreal, 2 c., £54.; Pt. Elizabeth, 1 t. 3 c., £22.; Rotterdam, 2 t., £49.; Simrishamn, 3 t. 6 c., £90.; Sydney, 2 t. 8 c., £51.; Uleaborg, 5 t., £116.

TARTARIC ACID—
Auckland, 10 c., £68.; Lyttleton, 10 c., £70.; Pimentel, 4 c., £30.; Sydney, 1 t., £131.; Wellington, 1 t. 10 c., £205.

TETRALINE—
Barcelona, 1 c., £13.

TIN CRYSTALS—
Montreal, 1 t., £126.

TIN OXIDE—
Montreal, 1 t., £218.

ZINC AMMONIUM SULPHATE—
New York, 3 c., £40.

ZINC CHLORIDE—
Bombay, 5 t. 15 c., £129.
Karachi, 19 c., £23.
Melbourne, 3 t., £82.
Pernambuco, 9 c., £14.

ZINC DUST—
Hobart, 59 t. 10 c., £2,323.

ZINC SULPHATE—
Auckland, 1 c., £2.
Melbourne, 2 t. 3 c., £28.

Week ending July 6.

CAUSTIC POTASH—
Reval, 100 drms.

CAUSTIC SODA—
Auckland, 76 drms.; Bahia, 500 drms.; Bangkok, 5 cs.; Bombay, 390 drms.; Buenos Ayres, qty.; Calcutta, 40 drms.; Carupano, 18 pkgs.; Christiania, 55 drms.; Cuidad Bolivar, 10 pkgs.; Copenhagen, 44 drms.; Drammen, 20 pkgs.; Dunedin, 55 drms.; Durban, 32 pkgs., 384 drms.; East London, 30 drms.; Elsinore, 20 drms.; Fredericia, 10 pkgs.

CAUSTIC SODA—
Geelong, 20 pkgs.; Gisborne, 12 pkgs.; Melbourne, 30 drms.; Gothenburg, 59 drms.; Monte Video, 50 drms.; Oporto, 51 drms.; Para, 20 drms.; Perth, 20 drms.; Pisco, 6 drms.; Para, 20 drms.; Rangoon, 60 drms.; Rosario, 20 drms.; Rockhampton, 15 drms.; Sherbro, 6 cs.; Sierra Leone, 3 cs.; Stockholm, 60 drms.; Singapore, 50 drms.; Sydney, 167 cs., 354 drms.; Trinidad, 18 drms.; Valparaiso, 100 drms.

CHINA CLAY—
Buenos Ayres, 3 t.; Santos, 2 t.

FERRO MANGANESE—
Baltimore, 850 t.; Copenhagen, 100 t.; Danzig, 50 t.; Hamburg, 50 t.; San Francisco, 175 t.

GLUE, SIZE, AND GELATINE—
Amsterdam, 25 pkgs.; Boston, 200 bgs.; Kingston (Ja.), 1 pkg.; Melbourne, 10 cks.; New York, 120 bgs.

PARAFFIN WAX—
Cuidad Bolivar, 50 sks.

SALT—
Aarhus, 50 t.; Accra, 26 t.; Antwerp, 459 t.; Auckland, 5 t.; Baltimore, 25 t.; Barbados, 26 t.; Black River, 10 t.; Bombay, 10 t.; Bonny, 10 t.; Brisbane, 3 t.; Calcutta, 5,004 t.; Cape Palmas, 1 t.; Cape Town, 5 t.; Christiania, 200 t.; Conakry, 30 t.; Copenhagen, 20 t.; Durban, 34 t.; Degama, 8 t.; Duala, 65 t.; East London, 17 c.; Fremantle, 2 t.; Ghent, 100 t.; Gibraltar, 2 t.; Gothenburg, 208 t.; Iddo, 220 t., 156 pkgs.; Montreal, 389 t.; New Orleans, 100 t.; New Plymouth, 25 t.; New York, 75 t.; Norrkoping, 100 t.; Pt. Elizabeth, 3 t.; Reval, 10 t.; Sekondi, 32 t.; Sierra Leone, 10 t.; Sherbro, 75 t.; Sundsvall, 50 t.; Victoria (W.A.), 7 t.

SOAP—
Accra, 650 bxs.; Addah, 100 pkgs.; Alexandria, 616 cs.; Amsterdam, 12 bxs.; Antwerp, 75 pkgs., 120 bxs.; Annotto Bay, 51 bxs.; Bandjermassin, 255 bxs.; Banjoewangie, 75 bxs.; Bangkok, 74 pkgs.; Barranquilla, 52 cs; Batavia, 1,870 pkgs; Belawan, 558 pkgs.; Bermuda, 25 bxs.; Bombay, 2,810 pkgs.; Blindjoe, 90 bxs.; Bolivia, 1 cs.; Boma, 3 bxs.; Bourgas, 100 cs.; Calcutta, 1,297 pkgs.; Colombo, 150 pkgs.; Calabar, 272 pkgs.; Cartagena (Col.), 50 pkgs.; Cape Town, 34 pkgs.; Caracas, 21 pkgs.; Cheribon, 150 pkgs.; Christiania, 71 pkgs.; Copenhagen, 22 pkgs.; Curacao, 50 pkgs.; Djeboes, 30 pkgs.; Dongala, 300 pkgs.; Djambi, 100 pkgs.; Duala, 1,165 pkgs.; Durban, 140 pkgs.; East London, 9 pkgs.; Falmouth (Ja.), 90 pkgs.; Fiume, 15 pkgs.; Gibraltar, 161 pkgs.; Gorontalo, 100 pkgs.; Gothenburg, 2 pkgs.; Grenada, 335 pkgs.; Greymouth, 14 pkgs.; Grand Bassam, 25 pkgs.; Hong Kong, 117 pkgs.; Iddo, 40 pkgs.; Karachi, 996 pkgs.; Kingston (Ja.), 1,506 pkgs.; Kuala Lumpur, 1,725 pkgs.; Lagos, 3 pkgs.; Langsa, 205 pkgs.; Las Palmas, 512 pkgs.; Leghorn, 454 pkgs.; Limon, 16 pkgs.; Lome, 110 pkgs.; Macassar, 900 pkgs.; Maceio, 40 bxs.; Madras, 397 pkgs.; Malta, 25 bgs.; Manzanillo, 1 cs.; Malmo, 1 bx.; Marmagoa, 312 pkgs.; Mauritius, 3,900 bxs.; Melbourne, 4 pkgs.; Menado, 467 bxs.; Monte Video, 61 bxs.; Montserrat, 140 cs.; Muntok, 100 bxs.; Naples, 100 cs.; Okopedi, 253 bxs.; Olehleh, 150 bxs.; Padang, 100 bxs.; Palembang, 200 bxs.; Paramaribo, 100 cs.; Penang, 1,594 bxs.; Panama, 2 cs.; Puerto Barrios, 1 cs.; Port Velho, 1 cs.; Pontianak, 390 bxs.; Pt. Harcourt, 424 pkgs.; Pt. Said, 202 pkgs.; Punta Arenas, 55 cs.

SOAP –
Quittah, 100 bxs.; Rangoon, 2,231 pkgs.; Rotterdam, 263 pkgs.; Saltpond, 425 cs.; Samarang, 150 bxs.; Samarinda, 100 bxs.; Sav-la-Mar, 123 bxs.; Sekondi, 186 pkgs.; Sinoe, 5 cs.; Smyrna, 7 bxs.; St. Lucia, 5 pkgs.; Shanghai, 422 pkgs.; Sherbro, 38 pkgs.; Sierra Leone, 26 pkgs.; Singapore, 1,546 pkgs.; Sourabaya, 515 pkgs.; Suez, 102 cs.; Sydney, 8 bxs.; Tandjong Balei, 406 bxs.; Teneriffe, 334 bxs.; Trinidad, 453 pkgs.; Varna, 100 cs.; Victoria (W.Af.), 20 bxs.; Wellington, 63 bxs.

SODA ASH—
Adelaide, 142 pkgs.; Bombay, 1,250 bgs.; Brisbane, 11 cks., 118 bgs.; Constantinople, 200 pkgs.; Copenhagen, 35 pkgs.; Drammen, 50 bgs.; East London, 200 bgs.; Geelong, 36 cks.; Gothenburg, 40 pkgs.; Hamburg, 2,600 pkgs.; Kobe, 6,308 bgs.; Madras, 100 pkgs.; Melbourne, 543 pkgs.; Monte Video, 250 cks.; Norrkoping, 50 bgs.; Rangoon, 900 pkgs.; Rio de Janeiro, 303 cks., 142 kgs.; Rosario, 195 pkgs.; Rockhampton, 35 cks.; Shanghai, 64 bgs.; Singapore, 125 cks.; San Francisco, 1,300 bgs.; Stockholm, 550 bgs.; Sydney, 1,226 pkgs., 39 cks.; Valparaiso, 330 cks.

SODA CRYSTALS—
Durban, 20 pkgs.; Gibraltar, 10 pkgs.; Kingston, 70 pkgs.; Madras, 100 kgs.; Malta, 50 bgs.

SODIUM BICARBONATE—
Adelaide, 329 pkgs.; Algoa Bay, 5 pkgs.; Alexandria, 200 kgs.; Ancona, 180 kgs.; Bombay, 300 bgs.; Bourgas, 20 kgs.; Brisbane, 40 kgs., 522 pkgs.; Calcutta, 400 pkgs.; Cape Town, 20 pkgs.; Catania, 30 pkgs.; Copenhagen, 109 pkgs.; Danzig, 1,142 pkgs.; Fremantle, 44 pkgs.; Galatz, 100 pkgs.; Genoa, 304 pkgs.; Helsingfors, 16 pkgs.; Leghorn, 284 pkgs.; Madras, 1,000 kgs.; Malta, 25 bgs.; Melbourne, 1,009 pkgs.; Montreal, 50 pkgs.; Palermo, 20 kgs.; Pt. Swettenham, 20 cks.; Rangoon, 150 pkgs.; Rosario, 25 pkgs.; Rockhampton, 20 kgs.; Salonica, 100 kgs.; Singapore, 80 kgs.; Stockholm, 70 kgs.; Sydney, 241 kgs., 438 pkgs.; Talcahuano, 200 kgs.; Yokohama, 1,400 kgs.

SODIUM CYANIDE—
Cuidad Bolivar, 10 cs.

SODIUM SILICATE—
Alexandria, 400 bgs.; La Guaira, 4 pkgs.; La Plata, 99 cks.; Madras, 13 drms.; Messina, 48 cks.; Montreal, 16 pkgs.; Rio de Janeiro, 33 cks.; Singapore, 3 pkgs.; Sydney, 28 pkgs.

TALLOW—
Alexandria, 3 brls.
Hamburg, 55 brls.

LONDON.

Week ending July 4.

ACETIC ACID—
Auckland, 3 c., £32.; Antwerp, 2 brls. (F.), £30.; Bombay, 1 c., £5.; Adelaide, 5 cs., £14.; Hong Kong, 1 c., £7.; Fremantle, 2 cs., £6.; Dunedin, 5 cs., £17.; Karachi, 2 cs., £5.; Napier, 3 c., £9.; Sydney, 6 cs., £21.; Wellington, 3 cs., £11.

ACETONE—
Pt. Elizabeth (F.), 4 drms., £46.

ACETYL SALICYLIC ACID—
Auckland, 1cs., (pt.), £5.; Cape Town, 2 cs. (pt.), £19.; Calcutta, 1 cs. (pt.), £7.; Shanghai, 2 cs. (pt.), £8.; Sydney (F.), 2 cs., £17.

AMMONIA—
Buenos Ayres, 4 cs., £7.; Cape Town, 10 cs., £17.; Constantinople, 5 cs., £8.; Durban, 15 cs., £26.; Karachi, 3 cs., £7.; Killa, 5 cs., £8.; Pt. Elizabeth, 4 cs., £7.; Shanghai, 2 cs., £7.; Trinidad, 5 cs., £9.

AMMONIA (ANHYDROUS)—
Basrah, 13 cylds., £77.
Suez, 1 cs., £14.

AMMONIUM ACETATE—
Colombo, 19 cs., £47.

AMMONIUM BROMIDE—
Melbourne, 1 cs., £5.

AMMONIUM CARBONATE –
Arequipa, 5 c., £18.; Calcutta, 1 c., £6.; Cape Town, 6 c., £20.; Demerara, 10 c., £32.; Hong Kong, 10 c., £31.; Paita, 3 c., £10.; Seychelles, 2 c., £10.; Singapore, 3 c., £9.

AMMONIUM CHLORIDE—
Zanzibar, 1 ck., £26.

AMMONIUM PHOSPHATE—
Pasages, 6 cks., £70.

AMMONIUM SULPHATE—
Antigua, 15 t., £233.; Canary Islands, 14 t., £230.; Grenada, 8 t., £123.; Hong Kong, 60 t., £974.; Trinidad, 50 t., £757.

AMYL ACETATE—
Bangkok, 2 cs., £14.

ANTIMONY SULPHIDE—
Buenos Ayres, 10 cks., £188.; Genoa, 1 ck., £20.; Gothenburg, 2 cks., £30.; Hamburg, 2 t. 12 c.; £234.; New York, 15 cs., £168.; Malmo, 1 ck., £16.; Sydney, 7 cks., £176.

ARSENIC—
Auckland, 11 c., 5 drms., £63.; Durban, 100 drms., £290.; Monte Video, 2 t. 10 c., £188.; Wellington, 1 t. 2 c., £83.

ARSENIC BROMINE—
Pt. Said, 1 cs., £5.

BARIUM SULPHATE (BLANC FIXE)—
Paris, 50 bgs., £78.

BISMUTH AMMONIUM CITRATE
Wellington, 3 cs. (pt.), £9.

BISMUTH SALTS (*otherwise undes.*)
Calcutta, 1 cs., 2 pkgs. (pt.), £145.

BISMUTH SUBNITRATE—
Jamaica, 1 cs. (pt.), £16.
Madras, 22 cs. (pt.), £7.

BISULPHITE OF LIME—
Adelaide, 5 cks., £5.
Antwerp, 10 cks., £27.
Dunedin, 12 pkgs., £16.

BONE FERTILISER—
Antwerp (transit) (F.), 78 t., £936.
Sydney, 1 t., £9.

BORAX—
Durban, 3 c., £6.
East London, 2 c., £5.

BORIC ACID—
Bangkok, 10 c., £34.
Beira, 1 c., £4.
Calcutta, 6 c., £25.
Durban, 10 c., £46.
East London, 2 t., £182.

CALCIUM CARBIDE –
Famagusta (F.), 2 t., £31.
Sekondi, 4 c., 3 cs., £15.

CALCIUM CHLORIDE (ANHYDROUS)—
Demerara, 1 cs., £8.

CALCIUM GLYCEROPHOSPHATE
Melbourne, 1 cs., £7.

CALCIUM LACTATE—
Sydney, 1 cs. (pt.), £5.

CARBON BISULPHIDE—
Cape Town, 2 cs., £6.
East London, 5 cs., £14.
Lyttleton, 3 cs., £8.

CAUSTIC POTASH—
Beira, 7 drms., £72.

CAUSTIC SODA—
Shanghai, 3 c., £11.

CHEMICALS (*otherwise undescribed*)
Adelaide, 17 pkgs., £221.; Alexandria, 5 cs. (pt.), £63.; Antwerp, 27 pkgs., £75.; Auckland, 6 cs., £120.; Barbados, 2 kgs., £5.; Brisbane, 5 pkgs., £34.; Cape Town, 2 cs. (pt.), £24.; Christiania, 15 cks., £41.; Canterbury, 1 cs., £11.; Colombo, 29 pkgs., £83.; Constantinople, 10 cs. (pt.), £47.; Dominica, 1 cs., £10.

CHEMICALS (*otherwise undescribed*)
Danzig, 200 bgs., £540.; Durban, 6 cs., £29.; East London, 2 cs., £18.; Fremantle, 50 pkgs. (pt.), £408.; Hong Kong, 3 cs., £79.; Italy (*via* Ghent), 2 cs. (pt.), £16.; Gothenburg, 50 bgs., £140.; Karachi, 16 cs., £160.; Lyttleton, 3 cs., £105.; Madras, 23 cs. (pt.), £96.; Malta, 1 cs., £13.; Melbourne, 21 pkgs., £287.; Montreal, 1 cs. (pt.), £10.; New York, 3 cs. (pt.), £23.; Otago, 3 cs., £30.; Padang, 10 cks., £27.; Pt. Elizabeth, 9 pkgs., £21.; Rotterdam, 260 pkgs., £1,088.; Singapore, 1 cs., £50.; Sydney, 2 cs. (pt.), £14.; Timaru, 12 pkgs., £20.; Valencia, 20 pkgs., £54.

CHROME OXIDE—
Auckland, 1 kg., £7.

CITRIC ACID—
Adelaide, 1 t. 13 c., £277.; Auckland, 11 c., £93.; Barcelona, 5 t. 8 c., £911.; Bluff, 4 c., £47.; Brisbane, 1 t., £168.; Calcutta, 3 c., £36.; Cape Town (F.), 15 c., £144.; Christiania, 5 c., £42.; Fremantle, 5 c., £42.; Gothenburg, 18 c., £153.; Irish Free State, 1 c., £11.; Limon, 1 c., £10.; Lisbon, 10 c., £84.; Lyttleton, 7 c., £60.; Medan, 4 c., £34.; Melbourne, 5 c., £42.; Montreal, 7 t. 12 c., £1,261.; Napier, 2 c., £27.; Petrograd, 5 t., £1,167.; Rio de Janeiro, 5 c., £58.; Rotterdam, 1 t. 10 c., £262.; Samarang, 3 c., £35.; Seychelles (F.), 1 c., £10.; Sydney, 10 c., £84.; Sourabaya, 5 c., £42.

COAL TAR PRODUCTS—
Aniline Oil
Sydney (F.), 14 kgs., £237.
Anthracene Oil
Rotterdam, 49 drms., £120.
Benzol
Calcutta, 8 drms., £5.
Carbolic Acid
Karachi, 5 drms., £6.
Trinidad, 1 cs., £11.
Creosote
Demerara, 5 brls., £30.
Creosote and Tar
Haifa, 5 cks., £10.
Naphthalene
Burutu, 10 cs., £14.; Colombo, 5 cs., £14.; East London, 2 cs., £14.; Lagos, 18 cks., £33.; New York, 1,100 bgs., £1,595.; Philadelphia, 658 bgs., £630.; Rotterdam, 1,170 bgs., £1,352.
Pitch
Antofagasta, 15 cks., £41.; Colombo, 80 brls., £115.; Pt. Elizabeth, 10 kgs., £5.; Pt. Swettenham, 190 brls., £473.; Singapore, 30 cks., £124.; Suva, 25 brls., £26.; Switzerland, 15 cks., £36.
Pyridine
Genoa, 6 drms., £300.
Rotterdam, 14 drms., £140.
Tar
Alexandria, 50 brls., £79.; Beira, 80 drms., £15.; Durban, 130 drms., £26.; East London, 60 drms., £9.; Madras, 63 drms., £77.; Nain (Labrador), 2 pkgs., £6.; Pt. Elizabeth, 150 pkgs., £17.; Singapore, 30 cks., £124.
Tar Acids
New York, 55 cks., £1,595.
Tar Oil
Barcelona, 24 brls., £45.

COBALT ACETATE–
Amsterdam, 1 cs., £24.

COBALT OXIDE—
Brussels, 6 cs., £264.
Italy, 2 cs., £96.

COPPER SULPHATE—
New York, 25 t., £600.
Pt. Elizabeth, 11 c., £19.

CREAM OF TARTAR—
Adelaide, 5 t. 10 c., £526.; Barbados, 1 c., £5.; Bluff, 1 t. 10 c., £139.; Calcutta (F.), 1 c., £6.; Cape Town (F.), 2 c., £9.; Delagoa Bay (F.), 1 c., £7.; Demerara, 1 c., £6.; Demerara, 1 c. (F.), £5.; Dunedin, 1 t., £93.

CREAM OF TARTAR –
Durban (F.), 3 c., £21.; East London, 1 c., £6.; Hobart, 10 c., £48.; Malta, 2 c., £9.; Melbourne, 16 t., £1,526.; Sydney, 17 t. 10 c., £1,672.

DISINFECTANTS (*otherwise undes.*)
Aden, 11 c., £36.; Ahwaz, 10 c., £25.; Auckland, 7 c., £83.; Bangkok, 4 t. 12 c., £200.; Beira, 6 t. 18 c., £414.; Bombay, 5 c., £13.; Brisbane, 1 t. 12 c., £60.; Calcutta, 4 c., £9.; Cape Town, 2 c., £9.; Christchurch, 1 t. 9 c., £306.; Demerara, 15 c., £27.; Greymouth, 1 c., £6.; Hong Kong, 13 c., £26.; Irish Free State, 19 c., £62.; Karachi, 5 t. 19 c., £193.; Lyttleton, 3 c., £26.; Melbourne, 6 c., £44.; Paris, 3 t., £25.; Pt. Elizabeth, 16 c., £26.; Shanghai, 2 t. 5 c., £124.; Singapore, 5 c., £18.; Sydney, 1 c., £15.; Tellicherry, 5 c., £14.; Trinidad, 2 cs., £13.; Vancouver, 11 c., £21.; Wellington, 6 c., £22.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Adelaide, 28 pkgs. (pt.) £23.; Barbados ,2 cs., £13.; Bluff, 1 cs. (pt.), £22.; Boulogne, 18 pkgs., £554.; Dunediu, 1 kg., £10.; Durban, 1 cs., 1 pkg., £42.; Durban (F.), 1 cs. (pt.), £5.; Irish Free State, 1 cs., £27.; Levuke, 1 cs., £25.; Madras, 1 cs. (pt.), £14.; Melbourne (F.), 1 kg., £27.; Melbourne, 1 kg., £27.; New York, 1 cs. (pt.), £8.; Singapore, 3 cs., £23.; Sydney, 9 pkgs., £458.; Sydney (F.), 14 kgs., £237.; Valencia, 1 cs., £74.

ETHER—
Cape Town, 1 cs., £18.; East London, 4 cs. (pt.), £18.; Madras, 4 cs., £22.; Malta, 6 cs., £27.; Singapore, 3 cs., £8.

ETHYL CHLORIDE—
Durban, 1 cs., £18.
Wellington, 1 cs., £8.

FERTILISERS (*otherwise undes.*)—
Baltimore, 50 t., £325.
Durban, 3 c., £5.

GALLIC ACID—
Brisbane, 1 c., £8.

GLYCERINE—
Barcelona, 1 t. 1 c., £96.; Beira, 3 c., £13.; Cape Town (crude), 5 t. 1 c., £258.; Demerara, 1 c., £5.; Fremantle, 5 c., £22.; Jamaica, 3 c., £13.; Lisbon, 1 t., £80.; New York (crude), 35 t. 9 c., £1,636.; Rio de Janeiro, 1 c., £5.

HYDROCHLORIC ACID—
Alexandria, 1 c., £7.; Karachi, 6 c., £25.; Melbourne, 1 cs., £6.; Rangoon, 5 c., £16.; Wellington, 4 c., £15.

HYDROFLUORIC ACID—
Adelaide, 1 cs., £8.
Hong Kong, 2 cs., £16.

HYDROGEN PEROXIDE—
Alexandria, 2 cs., £19.; Beira, 5 cs., £44.; East London, 8 cs., £16.; Jamaica, 3 cs., £21.; Kilindini, 3 cs., £9.

HYPOPHOSPHITE SALTS (*otherwise undescribed*)—
Genoa, 13 cs., £229.

IODINE—
Buenos Ayres, 2 cs., £207.
Calcutta, 1 cs., £53.

IRON AMMONIUM CITRATE
Auckland, 1 cs., £16.
Sydney, 1 cs., £13.

IRON SALTS (*otherwise undescribed*)
Calcutta, 1 cs. (pt.), £14.

LEAD ARSENATE—
Helsingborg, 2 drms., £13.
Sydney, 26 kgs., £77.

LEAD NITRATE—
Beira, 2 cs., £21.

LEAD OXIDE—
Genoa, 1 drm., £66.

MAGNESIA—
Auckland, 10 cs., £24.; Alexandria, 5 cs., £150.; Irish Free State, 55 pkgs., 3 cs., £530.

MAGNESIA—
Lyttleton, 10 cs., £24.; Pt. Said, 5 cs., £150.; Pt. Swettenham, 2 cs., £5.; Rio de Janeiro, 4 cs., £31.; Switzerland, 2 cs., £5.; Wellington, 20 cs., £48.

MAGNESIA (CALCINED)—
Buenos Ayres, 1 cs., £12.

MAGNESIUM CARBONATE—
Buenos Ayres, 10 cs., £35.; Calcutta, 1 cs., £6.; Rio de Janeiro, 6 cs., £24.; Trinidad, 3 cs., £11.; Wellington, 6 cs., £8.

MAGNESIUM CITRATE—
Calcutta, 1 cs., £12.
Gibraltar, 5 cs., £75.

MAGNESIUM SULPHATE—
Auckland, 1 t. 14 c., £43.; Barbados, 3 c., £6.; Cape Town,, 5 c., £7.; Delagoa Bay, 4 c., £5.; Demerara, 10 c., £8.; Dunedin, 1 t. 3 c., £28.; Durban, 14 c., £18.; East London, 11 c., £16.; Lyttleton, 3 t. 5 c., £81.; Melbourne, 1 t. 2 c., £29.; Pt. Elizabeth, 14 c., £18.; Wanganui, 5 c., £7.; Wellington, 1 t. 19 c., £54.

MANGANESE BORATE—
Antwerp, 6 cs., £29.
Christchurch, 1 ck., £8.

MERCURIALS (*otherwise undes.*)—
Calcutta, 1 cs., £28.

MERCURY SUBCHLORIDE—
Coconada, 1 cs., £24.

METHYL SALICYLATE—
Auckland, 1 cs., £7.

NICKEL OXIDE—
Amsterdam, 1 cs., £6.

NITRIC ACID—
Alexandria, 1 c., £9.; Auckland, 2 c., £5.; Karachi, 2 c., £8.; Rangoon, 5 c., £22.; Sydney, 1 c., £5.; Wellington, 15 c., £43.

PARALDEHYDE—
Sydney, 2 cs., £11.

PHOSPHORIC ACID—
Adelaide, 4 cs., £8.; Fremantle, 2 cs., £5.; Melbourne, 10 cs., £35.; Sydney, 50 cs., £146.; Wellington, 2 cs., £6.

PHOSPHORUS SESQUISULPHIDE
Buenos Ayres, 200 cs., £2,156.
Monte Video, 40 cs. (pt.), £431.

POTASSIUM BROMIDE—
Cape Town, 2 cs., £8.
Calcutta, 2 kgs., £10.

POTASSIUM CARBONATE—
Ahwaz, 2 kgs., £6.

POTASSIUM CHLORATE—
Bushire, 2 c., £8.

POTASSIUM CITRATE—
Auckland, 1 cs., £15.

POTASSIUM CYANIDE—
Shanghai, 2 cs., £22.
Singapore, 3 cs., £34.

POTASSIUM IODIDE—
Beira, 1 cs., £83.; Calcutta, 1 cs., £88.; Madras, 22 cs. (pt.), 1 cs., £94.; Melbourne, 1 cs., £87.; Opobo, 10 cs., £83.; Rio de Janeiro, 3 cks. (pt.), £66.; Sekondi, 1 cs., £11.

POTASSIUM METABISULPHITE—
Antwerp, 10 cs., £75.; Dunedin, 4 kgs., £22.; Melbourne, 12 cs., £39.; Sydney, 2 cs., £23.

POTASSIUM PERMANGANATE—
Auckland, 1 drm., £5.
Calcutta, 1 drm., £7.
Lyttleton (F.), 2 drms., £9.

POTASSIUM PRUSSIATE—
Barcelona, 1 ck., £18.

POTASSIUM BINOXALATE—
Sydney (F.), 2 kgs., £14.
Sydney, 2 kgs., £15.

PYROGALLIC ACID—
Danzig, 1 pkg., £11.
Montreal, 2 cs., £46.

ROCHELLE SALTS—
Melbourne, 1 cs., £5.

SALAMMONIAC—
Auckland, 7 c., £24.; Fremantle, 2 c., £6.; Napier, 2 c., £6.; Sydney, 2 c., £6.

SALICYLIC ACID—
Hong Kong, 1 cs., £10.
Wellington, 1 kg., £12.

SALTCAKE—
Bilbao, 150 t., £731.

SALTPETRE—
Calcutta, 5 c., £16.; Rio de Janeiro, 1 t., £43.; Seychelles, 5 c., £11.; Sydney, 1 t., £125.

SHEEP DIP—
Bluff, 4 t., £177.
Lyttleton, 9 t. 10 c., £442.
Pt. Madryn, 47 t. 2 c., £2,500.

SILVER NITRATE—
Bombay, 1 cs., £100.
Hong Kong, 1 cs., £175.

SODA CRYSTALS—
Calcutta, 15 c., £5.
Perth, 5 crts., £19.

SODIUM ARSENITE—
Durban, 1 t. 3 c., £82.

SODIUM BENZOATE—
Calcutta, 10 cs., £117.
Shanghai, 2 cs., £23.

SODIUM BICARBONATE—
Arequipa, 10 c., £9.; Auckland, 4 c., £8.; Buenos Ayres, 6 c., £14.; Calcutta, 18 c., £54.; Colombo, 1 t., £43.; Durban, 10 c., £13.; East London, 4 c., £6.; Hong Kong, 1 c., £5.; Lima, 9 c., £12.; Pt. Elizabeth, 1 t. 4 c., £37.; Suva, 10 c., £6.; Vancouver, 2 c., £5.

SODIUM BISULPHITE—
Auckland, 1 t., £20.; Belawan, 2 t. 10 c., £48.; Pt. Swettenham, 2 t. 10 c., £50.; Sourabaya, 2 t., £38.

SODIUM HYPOSULPHITE—
Durban, 1 t., £17.
Malta, 6 c., £5.

SODIUM NITRATE—
Calicut, 10 t., £145.

SODIUM PEROXIDE—
Adelaide, 1 cs., £7.

SODIUM PYROPHOSPHATE—
Sydney, 10 c., £23.

SODIUM SALICYLATE—
Auckland, 1 cs., £7.
Calcutta, 2 cs., £14.

SODIUM SULPHATE—
Barbados, 1 t., £7.; Demerara, 1 t. £7.; Irish Free State, 8 c., £8.

SODIUM SULPHITE—
Malta, 6 c. £7.; Singapore, 3 cks., £14.; Tokio, 2 t., £51.

SODIUM TARTRATE—
Calcutta, 6 c., £31.

SULPHUR CHLORIDE—
Brussels, 16 crbys., £29.

SULPHURIC ACID—
Alexandria, 1 c., £7.; Amsterdam, 6 c., £7.; Karachi, 2 c., £8.; Pt. Sudan, 2 t., £33.; Rangoon, 5 c., £16.; Sekondi, 1 t. 18 c., £38.; Wellington, 1 t. 5 c., £55.

SUPERPHOSPHATE—
Channel Islands, 5 t., £25.
Durban, 187 t. 11 c., £1,449.
Grenada, 6 t., £27.

TARTARIC ACID—
Adelaide, 1 t., £131.; Auckland, 6 c., £39.; Barbados, 1 c., £11.; Calcutta, 1 c., £13.; Cape Town, 4 c. (F.), £29.; Callao, 6 c., £47.; Delagoa Bay, 2 c., £20.; Durban, 1 c. (F.), £10.; East London, 1 c., £9.; Gothenburg, 2 c., £13.; Hamburg, 6 c., £39.; Lima, 2 c., £19.; Lyttleton, 12 c., £78.; Melbourne, 2 t., £261.; Montreal, 2 t. 10 c., £327.; Napier, 1 c., £11.; Pt. Elizabeth, 10 c., £62.; Pt. Elizabeth (F.), 2 c., £20.; Riga (F.), 1 t. 10 c., £200.; Samarang, 3 c., £20.; Sourabaya, 3 c., £20.; Sydney, 10 c., £75.; Vera Cruz, 1 t., £131.

TIN OXIDE—
Brussels, 5 cks., £235.

TURPENTINE—
Auckland, 8 cs. (pt.), £6.

URANIUM ACETATE—
Sydney, 1 cs., £5.

ZINC OXIDE—
Calcutta, 10 kgs., £39.; New York, 2 cks., £10.; Otago, 1 c., £6.; Wellington, 2 cs., £9.

Week ending July 7.

ANTIMONY—
Rio de Janeiro, 2 t.

BEESWAX—
Irish Free State, 1 t.

BONE ASH—
Sydney, 10 c.

CARNAUBA WAX—
Irish Free State, 1 t.

CASEIN—
Italy, 1 t.: Vera Cruz, 9 t. 14 c.

CERESINE WAX—
Sydney, 6 c.

FULLER'S EARTH—
Montreal, 40 t.

GLUE, SIZE AND GELATINE—
Adelaide, 17 c.; Alexandria, 4 t. 1 c.; Antwerp, 1 t. 1 c.; Auckland, 11 c.; Barbados, 4 c.; Bombay, 1 t.; Bordeaux, 5 t.; Calcutta, 2 t. 1 c.; Christchurch, 1 c.; Iddo, 1 c.; Dunedin, 1 c.; Durban, 12 c.; East London, 1 c.; Hong Kong, 1 c.; Irish Free State, 4 c.; Kobe, 53 t. 1 c.; Kilindini, 5 c.; Larache, 15 c.; Madras, 1 t.; Manilla, 1 t.; Melbourne, 2 c.; Montreal, 3 t.; Perth, 5 c.; Pt. Elizabeth, 8 c.; Rangoon, 6 c.; Rotterdam, 3 c.; St. Helena, 1 c.; Shanghai, 2 c.; Shanghai, 1 t. 1 c.; Tampico, 1 t.; Toronto, 4 t. 5 c.; Vancouver, 1 t. Vera Cruz, 15 t. 2 c.; Yokohama, 17 t. 10 c.; Sydney, 2 t. 5 c.

IRON OXIDE—
Antwerp, 30 t.

LEAD ASHES—
Antwerp, 7 t.

MINERAL WAX—
Havre, 17 c.

PARAFFIN SCALE—
Cape Town, 1 t.

PLUMBAGO—
Dunedin, 10 c.; Rio de Janeiro, 1 t. 10 c.; Valencia, 1 t.

QUININE—
Beira, 170 oz.; Calcutta, 1,000 oz.; Dar-es-Salaam, 2,048 oz.; Demerara, 5,208 oz.; Irish Free State, 38 oz.; Lyttleton, 25 oz.; Madras, 27 oz.; Rio de Janeiro, 966 oz.; Sydney, 232 oz.; Tanga, 12 oz.

SALT—
East London, 6 c.; Hong Kong, 8 c.; Iquique, 6 c.; Irish Free State, 1 c.; Kilindini, 1 c.; Malta, 11 c.; Madras, 9 c.; Penang, 2 c.; Pt. Swettenham, 2 c.; Pt. Said, 3 c.; Pt. Swettenham, 2 c.; Rabat, 1 t. 12 c.; Rangoon, 8 c.; Salonica, 2 c.; Singapore, 1 t. 1 c.; Sekondi, 1 c.; Sydney, 9 t. 13 c.

SHELLAC—
Italy, 1 t. 1 c.

SOAP—
Accra, 19 t. 2 c.; Adelaide, 8 c.; Ahwaz, 4 c.; Alexandria, 14 c.; Amsterdam, 1 t. 2 c.; Antwerp, 1 t. 11 c.; Auckland, 10 c.; Bagdad, 3 c.; Beira, 4 c.; Bilbao, 9 c.; Bombay, 6 t. 16 c.; Buenos Ayres, 3 c.; Boulogne, 8 c.; Brussels, 1 c.; Calcutta, 10 c.; Calabar, 5 t. 7 c.; Cape Town, 2 c.; Cologne, 12 c.; Colombo, 7 t. 14 c.; Christchurch, 5 c.; Copenhagen, 1 c.; Dominica, 1 t.; Durban, 4 c.; Hong Kong, 4 c.; Irish Free State, 2 t. 5 c.; Jamaica, 8 t.; Karachi, 5 t.; Kilindini, 2 t. 11 c.; Larache, 1 t.; Lyttleton, 1 c.; Madras, 18 c.; Malta, 2 c.; Melbourne, 5 c.; Monte Video, 1 c.; Newcastle, 4 c.; Penang, 6 c.; Pt. Elizabeth, 1 t. 8 c.; Pt. Said, 11 c.; Quilimane, 1 c.; Rabat, 9 t. 18 c.; Rangoon, 8 c.; Rotterdam, 1 t. 12 c.; Santander, 7 c.; St. Kitts, 2 t. 10 c.; Santos, 1 c.; Sekondi, 112 t. 15 c.; Seville, 3 c.; Shanghai, 5 c.; Singapore, 14 c.; Stockholm, 4 c.; Sydney, 10 c.; Timaru, 1 c.; Trinidad, 11 t. 10 c.; Trondhjem, 9 c.; Vancouver, 1 c.; Vera Cruz, 8 c.; Yokohama, 1 t. 12 c.

TALLOW—
Shanghai, 5 c.

WHITE LEAD—
Adelaide, £141.; Antwerp, £19.; Auckland, £91.; Bangkok, £331.; Bombay, £40.; Brisbane, £240.; Cape Town, £47.; Channel Is., £32.; Fiji Islands, £22.; Gisborne, £70.; Hobart, £49.; Irish Free State, £297.; Invercargill, £75.; Launceston, £13.; Madras, £2,009.; Malta, £32.; Melbourne, £238.; Pt. Elizabeth, £8.; Rio de Janeiro, £5.; Rotterdam, £21.; Shanghai, £8.; St. Thomas, £30.; Singapore, £13.; Sydney, £663.; Tocopilla, £34.; Townsville, £24.

MANCHESTER.

Week ending July 5.

BITUMEN—
Bombay, 11 cs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
India, 1 cs.

GLUE—
Alexandria, 10 t.

MINERAL WHITE—
Spain, 5 bgs.

SALT—
Ghent, 2,000 sks.

NEWCASTLE-ON-TYNE

Week ending July 7.

ANTIMONY—
————1 t. 12 c.

ANTIMONY OXIDE—
Antwerp, 1 t.; Hamburg, 9 t.

ANTIMONY SULPHIDE—
Hamburg, 1 c.

ASBESTOS—
Bergen, 1 trns.

BLEACHING POWDER—
————37 t. 4 c.

CAUSTIC SODA—
Genoa, 20 t.; Hamburg, 30 t.; ————, 14 t. 14 c.

COAL TAR PRODUCTS—
Pitch
Bergen, 1 t.; ——, 4 t.; Rotterdam, 4 t. 6 c.
Unspecified
Leghorn, 60 t.

COPPER PRECIPITATE—
Bergen, 1 t.

COPPER SUBOXIDE—
Bergen, 1 t.

GLUE—
————, 1 t. 5 c.

GLUE (MARINE)—
Rotterdam, 1 t. 7 c.

LITHARGE—
Antwerp, 3 t.
Hamburg, 22 t., 64 cks.
Rotterdam, 3 t.

MAGNESIA—
Antwerp, 4 t. 5 c.

MAGNESIUM CARBONATE—
Antwerp, 10 t. 13 c.

MERCURY OXIDE—
Bergen, 4 c.

RED LEAD—
Antwerp, 5 t.; Bergen, 1 t. 4 c.; Hamburg, 32 t., —38 cks.

SODIUM BISULPHATE—
Hamburg, 10 t.

SODIUM SULPHATE—
Bergen, 5 t.; Waija, 180 t.

SUPERPHOSPHATE—
Riga, 500 t.

WHITE LEAD—
Antwerp, 30 t.; Hamburg, 19 t.; ——, 6 t. 17 c.

ZINC ASHES—
Antwerp, 10 t.

N. & S. SHIELDS.

Week ending July 7.

NIL.

PRICES CURRENT.

WEDNESDAY, JULY 11, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & Co., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	..*cwt.	24/-	&	48/-
Acetic, (Glacial, B.P.) in carboys	..*ton	70	0	0
Arsenic, S.G. 2.000	.. ton	85	0	0
Boric (crystals)	..†ton	50	0	0
Citric	.. lb.	0	1	8¼
Formic, 80/85%	..*ton	52	0	0
Hydrofluoric, 59/60%	..*lb.	0	0	7½
Lactic, 80%	.. ton	60	0	0
Muriatic (Tower Salts), 30/32 Tw.	..*carboy	0	4	0
Nitric, 80° Tw.	..*ton	21	10	0
Oxalic	.. lb.	0	0	6¼
Phosphoric, 1,500° tech.	..*ton	33	0	0
Sulphuric (168°)	..*ton	7	10	0
Sulphuric (140°)	..*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	..*ton	4	10	0
Tannic (commercial)	.. lb.	0	2	3
Tarteric (crystals)	.. lb.	0	1	3
COAL TAR PRODUCTS.				
Aniline Oil and Salt	..*lb.	0	0	9½
Anthracene, 40/45%, "A"	.. unit	0	0	4
Benzol, 90%	..*gallon	0	1	7
Carbolic Acid (crude 60%)	.. gallon	0	3	4
Carbolic Acid (crystals 40°)	.. lb.	0	1	3
Creosote	..*gallon	0	0	9½
Cresylic Acid, 95%	..*gallon	0	2	6
Naphtha, crude, 30%	..*gallon	0	0	9
Naphtha, solvent (90/160)	.. gallon	0	1	4
Naphthalene, refined	.. ton	18	10	0
Pitch (f.a.s. Liverpool)	.. ton	6	12	6
Pyridin	..*lb.	0	18	0
Tar, crude	.. ton	4	5	0
Tar, refined	.. barrel	2	2	6
Toluol	..*gallon	0	2	0
Xylol, (pure)	..*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	..*ton	118	0	0
Alum, loose lump (delivered)	..*ton	12	0	0
Aluminium Sulphate, 17/18%	.. ton	10	10	0
Aluminium Sulphocyanide	.. lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	.. ton	7	0	0
Ammonia, anhydrous	..*lb.	0	1	4
Ammonia, .880	..*ton	22	10	0
Ammonia, .920	..*ton	14	10	0
Ammonium Carbonate (lump)	.. lb.	0	0	4
Ammonium Muriate (grey)	..†ton	30	0	0
Ammonium Nitrate	.. ton	35	0	0
Ammonium Phosphate	.. ton	60	0	0
Ammonium Sulphate, 25¾% delivered	..†ton	14	15	0
Ammonium Sulphocyanide, 95%	.. lb.	0	1	3
Antimony (Golden Sulphide)	.. lb.	0	0	9
Arsenic (Cornish White)	.. ton	70	0	0
Barium Carbonate (native), 92/94%	.. ton	5	15	0
Barium Chlorate	.. lb.	0	0	8
Barium Chloride (in casks)	.. ton	15	0	0
Barium Sulphate	.. ton	£5	to	£7
Barium Sulphocyanide, 95%	.. lb.	0	0	10½
Bleaching Powder, 35%	..*†ton	11	7	6
Bleaching Liquor, 7%	..*ton	4	5	0
Calcium Chloride	..†ton	5	10	0
Carbon Bisulphide	..*ton	28	0	0
Casein (commercial)	.. ton	80	0	0
China Clay (at Runcorn), in bulk	.. ton	50/-	to	90
Chromium Acetate (crystals)	.. lb.	0	0	8
Copper Sulphate	.. ton	26	0	0
Formaldehyde, 40%	.. ton	94	0	0
Glycerine (chemically pure, S.G. 1,260)	..*ton	85	0	0
Glycerine (crude), 80%	..*ton	60	0	0
Iodine	..*oz.	0	1	0
Iron Nitrate, 80° Tw.	..*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	.. ton	6	0	0
Lead Acetate (white)	.. ton	40	0	0
Lead Acetate (brown)	.. ton	42	0	0
Lead Carbonate (White Lead)	.. ton	45	0	0
Lead Nitrate	.. ton	42	0	0
Lime Acetate (brown)	..*ton	10	10	0
Lime Acetate (grey), 80%	..*ton	21	0	0
Lime Bisulphite (S.G. 1,070)	..*ton	8	0	0
Lime Superphosphate, 30%	.. ton	3	15	0
Litharge	.. ton	37	0	0
Magnesite, Calcined (delivered)	.. ton	11	0	0
Magnesite, Raw	.. ton	3	0	0
Magnesium Carbonate (light)	.. cwt.	2	0	0
Magnesium Chloride (solid)	.. ton	4	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	.. ton	6	0	0
Manganese Borate, 85%	.. ton	112	0	0
Manganese Sulphate, 90%	.. ton	50	0	0
Methylated Alcohol, 64° (industrial)	.. gallon	0	2	1
Naphtha (Wood), Solvent	..*gallon	0	6	9
Naphtha (Wood), Miscible, 60° p.	.. gallon	0	6	9
Potassium Bichromate	.. lb.	0	0	5¾
Potassium Carbonate, 90%	.. ton	28	0	0
Potassium Chlorate	.. lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	30	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	28	0	0
Potassium Hydrate (liquid), 50° Bé.	.. ton	17	10	0
Potassium Chloride 80%	.. ton	8	10	0
Potassium Nitrate (refined)	.. ton	32	0	0
Potassium Permanganate (commercial)	.. lb.	0	0	9¾
Potassium Prussiate (yellow)	.. lb.	0	1	3
Potassium Prussiate (red)	.. lb.	0	4	0
Potassium Sulphate, 90% (ex ship)	.. ton	11	10	0
Potassium Sulphocyanide	.. lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	60/-	&	57/-
Sodium Acetate	.. ton	24	10	0
Sodium Arsenate, 45%	.. ton	50	0	0
Sodium Borate (Borax), Crystals	..*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	..†ton	10	10	0
Sodium Bichromate	.. lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	.. ton	15	0	0
Sodium Carb. (Alkali), 58% bags	..†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	.. lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d.	to	9d
Sodium Hydrate (76% C. Soda), f.o.r.	..†ton	21	10	0
Sodium Hydrate (70% C. Soda)	..†ton	20	0	0
Sodium Hydrate (60% C. Soda)	..†ton	19	0	0
Sodium Hydrate (Liquid, 90° Tw.)	..†ton	8	10	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	26	0	0
Sodium Hyposulphite (commercial)	..†ton	10	0	0
Sodium Hyposulphite (photographic)	.. ton	14	0	0
Sodium Manganate (basis 25%)	.. ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	.. ton	13	7	6
Sodium Nitrite, 100% basis	.. ton	26	10	0
Sodium Perborate	.. lb.	0	0	11½
Sodium Phosphate	.. ton	15	0	0
Sodium Prussiate	.. lb.	0	0	6¾
Sodium Silicate (glass), Alkaline	..†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	..†ton	9	0	0
Sodium Sulphate (Saltcake)	..†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	.. ton	4	0	0
Sodium Sulphide (conc.), 60/65%	.. ton	15	0	0
Sodium Sulphide Crystals (casks)	..†ton	8	10	0
Sodium Sulphocyanide (liquid)	.. lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	.. ton	8	5	0
Sulphur (Roll Brimstone)	.. ton	8	5	0
Sulphur (Texas Gulf)	.. ton	5	5	0
Tartar Emetic, 43/44%	.. lb.	0	1	1
Tin Crystals	.. lb.	0	1	4
Tin Perchloride fused	.. lb.	0	1	10
Titanous Chloride	.. lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	..*ton	20	0	0
Zinc Sulphate, Crystals	.. ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	.. ton	115	0	0
Antimony	.. ton	30	0	0
Copper	.. ton	65	5	0
Lead (Chemical Sheet), delivered	.. cwt.	1	13	0
Lead (Foreign Pig)	.. ton	25	15	0
Nickel	.. ton	130	0	0
Silver	.. oz.	0	2	7¼
Tin, English Ingots	.. ton	180	10	0
Zinc (Spelter)	.. ton	28	12	6
Zinc Dust, 90/92%	.. ton	50	0	0
OILS.				
Cottonseed	..*ton	44	10	0
Linseed, Raw	..*ton	45	0	0
Stearine, 115-120° M.P.	.. ton	48	0	0
Tallow	.. ton	40	0	0
Turpentine	.. cwt	4	0	0

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only

THE

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CONTENTS.

	PAGE
Current Topics:—	
The Work of the A.B.C.M.	61
Caustic Soda from Sodium Sulphate	62
The Caracristi Low-temperature Process	62
British Progress in Nitrogen Fixation	62
Association of British Chemical Manufacturers	63
Gravimetric Estimation of Iron	64
Sodium Perborate	65
Chemists and the Law of Contract	66
The Markets for Oils and Fats	68
Pyrites Trade Prospects	70
Platinum Industry of Colombia	70
Correspondence	70
Items of Interest	71
Our Bookshelf	72
British Overseas Chemical Trade	73
Parliamentary News	74
South Wales Notes	74
Cumberland Coking and By-product Industries	74
Legal Intelligence	74
Fertiliser News	75
Imports of Chemicals and Allied Products in June	76
Exports of Chemicals and Allied Products in June	77
Reports of Companies	78
Trade Inquiries	78
New Companies	78
The Patent List:—	
Applications for British Letters Patent	79
Complete Specifications Accepted	79
Complete Specifications Open to Public Inspection before Acceptance	79
Abstracts of Latest Complete Specifications	79
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	80
Thirty-five Years Ago	81
Gazette News	81
Market Reports:	
London "Open Market" Report	81
London Metal Market	83
Manchester Chemical Market	83
Swansea Market Report	83
Liverpool Chemical Market	83
West of Scotland Chemicals	84
Imports of Chemical Products	84
Exports of Chemical Products	86
Prices Current	90

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CURRENT TOPICS.

THE WORK OF THE A.B.C.M.

THAT the Association of British Chemical Manufacturers has amply justified its existence, and is doing work of inestimable value for the chemical industry of the country as a whole, was clearly illustrated in the proceedings at the seventh annual general meeting, held in London last Thursday The solidarity now existing in the ranks of the larger, and to a considerable extent of the smaller, manufacturers seems destined to find its most spectacular expression in the comprehensive exhibit being arranged for the Chemical Section at the British Empire Exhibition next year. As Dr. Levinstein pointed out, such an exhibit cannot fail to impress the foreign visitor—and in a way that a multiplicity of exhibits by private firms could hardly do—with the fact that the whole of the resources and determination of the country are behind the attempt to establish all branches of the chemical industry in a flourishing condition in Great Britain. It is a matter for congratulation that through the activities of the Association, the restrictions in the use of alcohol for chemical manufacturing purposes have been considerably relaxed, and it is to be hoped and expected that full advantage will be taken of the new concessions. The grave note sounded by Sir Max Muspratt in discussing the Continental situation will undoubtedly be echoed by all serious business men. The immediate stimulus to our chemical trade accruing from the restriction of German activities in the Ruhr district, has by no means compensated for the injury to our slowly recovering overseas trade that has been inflicted by the dislocation and uncertainties of the moment. The solution of the Ruhr and reparations problem is now occupying the attention of the statesmen of all European countries, and until a satisfactory solution is arrived at, stability in international trade cannot be attained. A further important matter discussed at the general meeting was the wisest attitude to be adopted by manufacturers and traders in their attempt to secure lower railway rates. The fundamental question is whether resort should be had to direct frontal attack against the railway companies before all the possibilities of arriving at agreement by negotiation are exhausted. The consensus of opinion furnished a negative reply to the above question, and we ourselves are inclined to agree with the general opinion, though not entirely on the grounds advanced by the Right Hon. J. W. Wilson.

CAUSTIC SODA FROM SODIUM SULPHATE.

An interesting investigation has recently been carried out at the Massachusetts Institute of Technology to determine the practicability, from a commercial standpoint, of recovering caustic soda and sulphuric acid of satisfactory concentrations and purity by the electrolysis of sodium-sulphate solutions. The work was undertaken at the request of the Viscose Company, of America, who produce large amounts of sodium sulphate as a by-product, and has produced results which indicate that, operating under suitable conditions, the total cost of production per pound of caustic soda compares very favourably with that from sodium chloride. The actual experiments were carried out by H. V. Atwell and T. Fuwa, and the detailed results are given in the *Industrial and Engineering Chemistry*, June, 1923. Owing to the rather surprising lack of data in the literature on the behaviour of sodium sulphate as an electrolyte, the workers had at the outset to determine the specific gravity and electrical conductivity of fairly concentrated sodium-sulphate solutions at elevated temperatures, but the investigations were continued until a suitable type of cell was elaborated and all the fundamental factors governing the electrolysis were established. Stated briefly, the process recommended is as follows: The cell follows in principle the design of the Allen-Moore caustic soda-chlorine cell. The electrodes, consisting of two highly perforated metal plates each covered on the inner surface with a sheet of asbestos paper, are clamped against the opposite sides of a thin rectangular frame of non-conducting material, thus forming the electrolysing chamber. Sodium-sulphate solution is fed into the interior of this chamber, and under its own gravity head of a few inches flows out continuously through the diaphragms and electrodes carrying the products of electrolysis along with it. The anode is made of perforated sheet iron, and the cathode of perforated chemical sheet lead. Operating with a liquid head of 4 to 6 inches, with a current density of 100 amperes per square foot, and with an electrolyte containing 22 per cent. of sodium sulphate at 80° to 90° C it is possible to obtain a current efficieny of 85 per cent., an operating voltage of 4.3 volts, and a yield of 0.65 pound of caustic soda and 0.79 pound of sulphuric acid per kilowatt hour. The caustic soda is in the form of a 6.5 per cent. solution containing 15 per cent. of sodium sulphate, which can apparently be concentrated to practically pure sodium hydroxide in an ordinary caustic evaporator equipped with salt catchers. The sulphuric acid is in the form of an 11 per cent. solution containing about 13 per cent. of sodium sulphate which cannot readily be removed. Of course, the value of the two anode products—sulphuric acid and oxygen—is considerably less than that of the chlorine from the sodium chloride process, but where plentiful supplies of waste sodium sulphate are available, and where the oxygen can be used or sold locally without compressing into cylinders, the process would appear to be decidedly attractive.

THE CARACRISTI LOW-TEMPERATURE PROCESS.

The description of the Caracristi process of low-temperature carbonisation that we published a fortnight ago has aroused considerable interect. The remarkable claims made for the process, the apparent absence of serious engineering difficulties, and the fact that the firm of Henry Ford have definitely adopted the method and are already constructing a large plant at the Ford motor-car factory at Walkerville, all conspire to make the Caracristi process the object of serious attention by British fuel technologists. It appears that the process has been investigated continuously for nearly three years now, and that after the ingenious conveyor system had been perfected, the minor difficulties subsequently encountered were easily surmounted. It will be remembered that the conveyor system, upon which the roughly pulverised raw coal travels, is constructed of three strands of cast-iron plates held together by steel hinge-pins with flanged ends, and with the hinge joints overlapping so that no cracks can be forced. These conveyors float on and travel over the molten lead. The process is continuous, and the claim is made that carbonisation can actually be completed in five minutes. No mention is made of any difficulties arising from the oxidation of the lead, which is kept in a molten state, at 1,200° F., for weeks on end, and this, as our engineer-correspondent pointed out two weeks ago, is somewhat difficult to explain, unless, as is possible, the construction of the plant is such that the lead is at no point exposed to the external atmosphere. The most recent news about the Caracristi process is that successful tests have just been completed at the Ford by-product plant at Detroit to determine whether the semi-coke resulting from the carbonisation can be used in making foundry coke.

BRITISH PROGRESS IN NITROGEN FIXATION.

The announcement made by Mr. Kenneth M. Chance, the managing director of the British Cyanides Company, at the annual general meeting held on Wednesday, that he hoped the passage of another few months would witness the successful large-scale operation of the barium cyanide process for the fixation of atmospheric nitrogen, makes very welcome reading. Whether the atmospheric nitrogen can be fixed at a sufficiently low price to enable the resulting cyanide compounds to be converted into ammonia at a price which will enable the ammonia to compete with the directly prepared synthetic product, remains to be seen, but in any case the direct manufacture of cyanogen products is a notable achievement which will help in the conservation of the world's natural resources of fixed nitrogen. The manufacture of potassium permanganate by electrolysis has presented many practical difficulties, but, according to Mr. Chance, all these difficulties have been surmounted, and a plant for the purpose will shortly be in operation at the Tat Bank works. Both achievements are a great tribute to the efficiency and courage of British manufacturers, chemists, and chemical engineers.

THE ASSOCIATION OF BRITISH CHEMICAL MANUFACTURERS.

ANNUAL GENERAL MEETING.

THE Seventh Annual General Meeting was held at the Chemical Society's Rooms, Burlington House, Piccadilly, W. 1, on Thursday, July 12. Sir Max Muspratt, Bart., Chairman of the Association, presided. The Chairman, in proposing that the report and the accounts of the Association be adopted, said: There is not a single member who is not very proud of the Association, and its sphere of usefulness is constantly increasing.

In spite of being chemical manufacturers, we have in recent years overcome somewhat the modesty of previous eras of chemical industry, and we believe that we have a message of a two-fold nature to give to the nation. We have a duty to perform in instructing Ministers of the Crown and other members of the Government and the Civil Service as to what they ought to know about this most important industry. We have also to impress upon the nation at large that in Great Britain the chemical industry is a very important national asset and, like every other important national asset, it has got to go forward or go back. We intend, by every means in our power, to further the progress of this industry by getting the public and the Government to understand what it means and how it should be treated.

The British Empire Exhibition.

The British Industries Fair of 1923 is dealt with in the report in an efficient manner, but I think I might accentuate the fact that in the British Industries Fair, both this year and on previous occasions, we have tried to carry out the policy of showing the close interlocking of the various branches of the chemical industry. The British Industries Fair is, we hope and believe, an annual factor, but next year when the British Empire Exhibition also takes place we felt that it would be calling too much upon our members to make an adequate chemical section on both those occasions and so, although a small minority objected, we are not taking any part in the British Industries Fair of next year. In the British Empire Exhibition of 1924 we are taking a very great part. We intend the Chemical Section of the British Empire Exhibition to be a complete survey of Great Britain's services to chemistry, from top to bottom. In carrying this out we are very much indebted to Dr. Levinstein for the manner in which, as Chairman of the Sub-committee, he has taken up the idea and brought it home to all those who can assist. When I tell you that the Royal Society is going to take part in an Exhibition I think you will admit that we are bringing even the academic section of chemistry into the services of mankind and the Empire. Sir Herbert Jackson is *liaison* officer in conjunction with our General Manager, to see that the most complete linking up in absolute harmony of every aspect of chemistry is duly and properly carried out at the British Empire Exhibition next year.

Gravity of the Ruhr Situation.

With regard to the Continental situation, I need only deal with it purely from the aspect of chemical industry. The whole position of the Ruhr is one which the chemical industry, especially the fine chemicals and the dyestuff branches of the industry, has to look upon with great apprehension. There are superficial advantages in having competitors closed, but I am sure that nobody with the broad training of a chemist will for a moment take that aspect; it is bigger and larger than that. On the purely material side, it is even better to have the chemicals in the hands of a competitive manufacturer than to have them in the hands of an irresponsible Government Department, and when that irresponsible Government Department is not even in this country, I need hardly say that what is going to happen to those dyes and other chemicals which have been taken by the French Government is causing grave doubt and grave uneasiness in the minds of everyone connected with the Council of the Association of British Chemical Manufacturers. We have taken every step that we think humanly possible; we have kept all the necessary Government Departments in this country well advised. I should like to repeat here the very timely warning which Mr. Woolcock gave to the dyers and colourists, that what had happened in the Ruhr was a reminder to the dye-users of the very unstable foundation upon which their supplies of dyes still rested, and that the Government of this country was free at any rate, from one grave anxiety by the fact that the great textile industry could go on with the assistance of the British dye manufacturers, whatever happened on the Ruhr.

Co-operation between Chemical Manufacturers.

With regard to the Dyestuffs Act, I will only refer to the agitation for the repeal of that Act, and to ask if the real trouble of the textile industry is not the high price of cotton. I am confident that last year great advances were made in our dyestuff industry not only on the technical and business side, great as those are, but towards a better understanding of the economic position. What is wanted is patience, co-operation, and goodwill. On the subject of co-operation, I know I am speaking for everyone occupied with the heavy chemical industry in assuring Sir William Alexander and his colleagues in other branches of the dye industry that the heavy chemical industry does desire to assist and co-operate with them in every possible way. Co-operation has proceeded appreciably but, if I may just drop a gentle hint, I believe that co-operation can be speeded up to the advantage of the heavy chemical industry and to the very great advantage of the dye industry.

Turning to the question of alcohol, I should like to say how deeply we are indebted to Mr. Carr for the way in which he has handled this problem in conjunction with the Committee. After long negotiations had been carried out, further concessions have been made which I understand Mr. Carr and the Committee are convinced are as far as any manufacturers can reasonably ask the Customs officials at the present time to go.

Mr. R. G. Perry, C.B.E., in the absence, owing to illness of the Vice-Chairman, Sir William Pearce, seconded the resolution. He said there was only one point to which he would like to refer. It was the paragraph in the report which read as follows:—"The Council records with satisfaction and appreciation the honour which has been conferred by His Majesty the King upon its Chairman, Sir Max Muspratt, Bart." He would like to say for that meeting that they all wished to congratulate their Chairman upon that honour.

The Treasurer (Mr. C. A. Hill), in commenting on the accounts, said that in case it should be thought they were working on too narrow a margin, he would like to put forward the view that the Association belonged to the members and it should be worked very much on the lines of a club; that is to say, the subscriptions of the members should be based so that they get the most efficient service possible without any stint, and yet they were not building up too big a reserve for posterity; that is to say, they were not being asked to pay more than they were receiving, so that if the Council could give a satisfactory service, and yet end up with a small balance, that was a result which was satisfactory.

Dr. E. F. Armstrong, F.R.S., said that the Association had certainly done well during the year, but it was desirable that the chemical industry should try to stand on its own feet and not rely too much on Government patronage. It was only by research and by its technical work that they could get an advantage in the future.

Sir William Alexander said his company had received from the large members of the heavy chemical industry in recent times very real and concrete assistance in bringing down the prices of their products. He felt certain that their industry was going to pull through.

The Transport of Chemicals by Rail.

The Rt. Hon. J. W. Wilson said he was very glad that the Transport Committee had pursued the policy of negotiation and, as far as possible, co-operation in the matter of railway rates and services. He foresaw that during the next twelve months, and probably over a longer period, the lines were being set for a battle between two sets of business men—shareholders of the railway companies on the one hand, and the traders on the other. The carriers of the country were faced with a great burden, a legacy of the war from the Government to them to maintain certain rates of wages. They were paying two or three times as much as in pre-war times for labour; and Labour was quite ready to appreciate and, he believed, to a large extent they did co-operate with the railway companies. At the same time, if Labour saw that there was a chance of their fighting each other in public, they would seize the opportunity for using all the arguments to their advantage and, incidentally, to reflect on other industries besides the railway companies. Therefore, he was

sorry the invitation had gone out to join hands, and that the Federation of British Industries had hastened to court straight away. He hoped that they, as another set of traders, would, at any rate, pause before they joined issue.

Relaxation of Restrictions on Industrial Alcohol.

Mr. F. H. Carr, C.B.E., F.I.C., referred to the alcohol question. The importance of alcohol to the fine chemical industry had perhaps never been stated, and yet it was the raw material, the coal tar, of the pharmaceutical chemical. The work that had been done by the Committee had only been possible because of an entirely new state of affairs at the Board of Customs and Excise, and it was to such people as Sir Horace Hamilton and Sir Robert Robertson that their thanks must be chiefly given. They had in the concessions which they had given shown that we are at the dawn of a new era as regards the use of alcohol in chemical manufacture. The concessions which had been made permitted manufacturers who are commencing to use alcohol to use quantities up to 100 gallons without any restrictions as regards their receivers, without the necessity of an officer being on the spot; and, provided adequate figures were shown as regards the destination of the alcohol that was being used, they were quite satisfied to leave it with fairly moderate restrictions.

Road Transport: A Weapon Against High Railway Rates.

Mr. Kenneth Chance, M.A., associated himself with the remarks of Mr. Wilson as to the question of transport. He did not believe they were going to do the least bit of good by fighting under the Act. He thought the Federation of British Industries had made a great mistake. But there was a way in which they could act on purely business lines. The Association by the co-operation of its members one with another could bring a great deal of pressure to bear on the railway companies. These latter were not without competition; they had very strong competitors in road transport, and the chemical industry was in an infinitely better position to take advantage of that than any of the heavy industries such as steel, iron, and coal, because while some of the members made purely heavy chemicals which were no doubt carried at very low rates, others made chemicals the railway rates on which were so high that road transport could be obtained at very much lower figures. His company had during the last six or twelve months made a great deal of use of road transport, and as a result of that they had obtained special rates from the railway companies on chemicals. If one small company by its individual efforts could do that, could they not make use of that form of co-operation together?

Significance of the B.E.E. Chemical Exhibit.

Dr. H. Levinstein, M.Sc., referring to the organisation of the Chemical Section of the Exhibition to be held at Wembley next year, said the mere fact that when they had a British Empire Exhibition the whole of the chemical exhibit could be dealt with by one organisation of this kind showed what an enormous stride the chemical industry had made in organisation since the last Exhibition of the same kind was held. People coming from abroad were apt not to attach too much importance to an exhibit made by a company, possibly because it was made by a company. But no person who took a long view would so regard their exhibit. They would know there was in it, beyond that desire of the State for having an Exhibition, a really strong, vigorous, intelligent, and organised school carrying out research on a large scale.

Mr. Bernard Hickson said he would like to endorse the remarks of Mr. Chance with regard to the railway companies. He would like to add that they had received very much assistance from the Traffic Department of the Association.

Mr. T. D. Morson said he hoped that publicity would remain in the forefront of the policy of the Association. The propaganda work of the chemical industry as a whole must obviously be carried on by the Association.

The Chairman, having briefly replied, then put the motion to the meeting, and declared the report and accounts unanimously adopted. The auditors (Messrs. Feasey and Co.) were reappointed, and the report of the scrutineers was received and adopted. That concluded the business of the ordinary meeting, which was followed by a special general meeting, when the amount of the annual subscription payable by members of the Association for the year 1923-1924 was fixed at four-fifths of the sums laid down in Article 17 of the Articles of Association.

Sir John Brunner, Bart., proposed, and Mr. R. G. Perry, C.B.E., seconded, a vote of thanks to the chairman, which was carried unanimously.

THE GRAVIMETRIC ESTIMATION OF IRON.

USE OF MERCUROUS AMMONIUM CHLORIDE.

THE usual method for the gravimetric estimation of iron is to precipitate the metal in the ferric state with ammonia, and to ignite the resulting ferric hydroxide to ferric oxide. This method of precipitation is not altogether satisfactory, for the $Fe(OH)_3$ separates out in the colloidal condition, is not an ideal material to filter, and has a pronounced tendency to revert to the soluble sol condition on washing with water. In addition it possesses a great absorptive capacity, especially for alkali salts. For accurate work by this method the precipitate must be dissolved up and reprecipitated several times, a procedure entailing not only much loss of time, but also increasing the liability to experimental error.

An inspection of the chemical literature during the past 30 years shows that the drawbacks of free ammonia have been fully realised by analysts, and that many proposals have been made for the replacement of the ammonia itself by its inorganic or organic derivatives. These are usually weaker bases than the free ammonia, and precipitate heavy metals either as insoluble complex salts or as hydroxides. Mention in this connection must be made of dimethylglyoxime suggested by Tschugaeff, dicyandiamin by Grossman, trimethyl-phenylammonium carbonate by Schirm, cupferron by Baudisch, and aniline and pyridine by Sanchez. Amongst the inorganic ammonia derivatives, Jannasch has suggested hydroxylamin and hydrazine.

According to B. Solaja (*Chemiker-Zeitung*, June 30, 1923) the mercury ammonium chloride usually known as "infusible white precipitate" $HgNH_2Cl$ is also a highly efficient ammonia substitute when used for the precipitation of iron salts. The precipitate is not colloidal, is easily filtered, and can be washed for any length of time without any of the precipitate going into solution. The following table of results shows that the precipitation is absolutely quantitative:—

Expt. No.	Actual Fe_2O_3 Present.	Fe_2O_3 Found by Precipitation with Ammonia.	Fe_2O_3 Found by Precipitation with "White Precipitate".
	Grammes.	Grammes.	Grammes.
1	0.1500	0.1498	0.1498
2	0.1500	0.1484	0.1499
3	0.1500	0.1503	0.1496
4	0.1500	0.1488	0.1496

For the above experiments a standard solution was prepared by dissolving 5.9981 grammes of the purest Fe_2O_3 in HCl., and making up to one litre; 25 c.c.s of this solution was used for each experiment.

Reagent Also Effects Quantitative Separation from Manganese.

Not only can iron be estimated quantitatively by means of "white precipitate," but it can also be separated quantitatively from manganese. The method was tested in a standard solution made by dissolving about 18 grammes of pure $MnCl_2.4H_2O$ in water and making up the solution to 1 litre. The mean of eight gravimetric estimations carried out by precipitation with hydrogen peroxide and ammonia, with ammonium persulphate and with sodium biphosphate gave its exact strength as 0.007068 gramme of Mn_3O_4 per c.c. The following table gives the results of the test experiments in the method:—

Expt. No	Ccs. $FeCl_3$.	Ccs. $MnCl_2$.	Fe_2O_3 Present.	Fe_2O_3 Found.	Mn_3O_4 Present.	Mn_3O_4 Found.
			Grammes.	Grammes.	Grammes.	Grammes.
1	25	25	0.1500	0.1513	0.1767	0.1770
2	25	25	0.1500	0.1511	0.1767	—
3	25	25	0.1500	0.1500	0.1767	0.1774
4	25	25	0.1500	0.1513	0.1767	0.1775
5	25	25	0.1500	0.1511	0.1767	—
6	25	25	0.1500	0.1508	0.1767	0.1756
7	50	25	0.3000	0.2998	0.1767	—
8	50	25	0.3000	0.3004	0.1767	—
9	50	10	0.3000	0.2993	0.0707	0.0711
10	50	10	0.3000	0.2997	0.0707	0.0706
11	25	1	0.1500	0.1495	0.0071	0.0074
12	25	1	0.1500	0.1502	0.0071	0.0071

The results recorded are very satisfactory, and further experiments are being conducted by B. Solaja to determine the utility of basic mercury ammonium compounds in other branches of analytical work.

SODIUM PERBORATE.

MANUFACTURE, PROPERTIES AND INDUSTRIAL APPLICATIONS.

By "Omega."

SODIUM perborate is one of the soluble salts of perboric acid, crystallises with four molecules of water, and contains 10.4 per cent. available oxygen. The acid itself has not yet been isolated owing to its instability, and differs from boric acid in that it contains an additional atom of oxygen. A solution of a perborate resembles a mixed solution of hydrogen peroxide and borax, inasmuch as decomposition takes place, the nascent oxygen liberated, immediately combining with the elements of water to form hydrogen peroxide. Temperature has a marked effect on the course of this reaction; in the cold, partial dissociation takes place, giving hydrogen peroxide and sodium meta-borate, whilst hot solutions evolve oxygen freely. The oxygen may also be liberated by the addition of organic or inorganic catalysts—*e.g.*, ferments, animal tissue, oxydases and manganese dioxide.

Sodium perborate was first prepared by Tanatar in 1898, who produced it by treating sodium ortho-borate with a concentrated solution of hydrogen peroxide, and its preparation has since been the subject of numerous patents. Jaubert (*Ger. Pats.* Nos. 193,559, 207,580) states that a high yield is obtained by the addition of a mixture of 12 parts of boric acid and 16 parts of sodium peroxide to 170 parts of a cooled solution of 7 per cent. sulphuric acid. The crystals are separated, washed, and dried with alcohol. Contamination with sodium sulphate may be avoided by the substitution of carbon dioxide for the sulphuric acid. A highly-pure product may be obtained by the addition of theoretical quantities of borax and sodium carbonate to a 5 per cent. solution of hydrogen peroxide. Hinkel et Cie (*Ger. Pat.* No. 283,894) suggest the auto-oxidation of aqueous solutions of borax and lime by means of aluminium amalgam in the presence of a current of oxygen.

Manufacture from Sodium Peroxide.

The two modern methods used in the manufacture of sodium perborate are: (I.) The interaction of sodium peroxide and sodium meta-borate; and (II.) electrolytic methods.

(1). The details of the first of these two processes have been patented by the Deutsche-Gold und Silberscheideanstalt, Frankfürt-on-Main, and also by the Société d'Oxylithe, and consist in dissolving 500 parts of sodium peroxide in 1,000 parts of water, the solution being kept cold throughout the operation. The solution is then saturated with carbon dioxide or filtered flue gases, and 500 parts of a saturated solution of sodium meta-borate added. The crystallised sodium perborate is separated by filtration and dried. A further addition to this patent proposes preparation by the addition of an alcoholic solution of hydrogen peroxide to an aqueous solution of borax. Tanatar (*Zeit. physikal Chem.* XXVI., p. 132) claims that a coarsely crystalline and stable product is obtained by pouring 140 parts of a solution containing 54 per cent. borax and 15 per cent. caustic soda into 1,000 parts of a 3 per cent. hydrogen peroxide solution, a yield of 88 per cent. of sodium perborate being obtained. Jaubert states that a highly-pure and stable perborate is obtained by adding sodium peroxide to an aqueous solution of hydrogen peroxide and boric acid, the reaction being according to the following equation—

$$2\,H_3BO_3 + Na_2O_2 + H_2O_2 = 2\,NaBO_3 \cdot 4\,H_2O$$

Electrolytic Production of Sodium Perborate.

(2). The pioneer researches in connection with the electrolytic production of sodium perborate are due to Arndt and Valeur, who prepared the pure product by electrolysis at 20° C. of an aqueous solution of 4 per cent. borax and 12 per cent. sodium carbonate, applying a current density of 20-30 ampères per sq. dm. at 5-10 volts. Liebknecht (*U.S. Pat.* 128,193) proposes the electrolysis of fairly concentrated aqueous solutions of sodium meta-borate and sodium carbonate, using cathodes of lead or nickel, which are platinum-coated to prevent corrosion. The established electrolytic method now in use for the commercial production of sodium perborate is due to Alsgaard (*Trans. American Electrochem Soc.* 40, 1921). The apparatus is so arranged that the operation is continuous for the electrolysis of a solution containing 4.5 per cent. borax, 13 per cent. sodium bicarbonate, 0.2 per cent. potassium bichromate, and 0.2 per cent. sodium silicate, the density of the current used being 20 ampères per sq. dm. at about 7 volts. Langhard (Assr. to Frederickstad Electrochem. Fabr. A/S, *U.S. Pat.* 1,375,596), has patented an electrolytic process, where a solution of an alkaline borate is electrolysed in the presence of sodium carbonate containing a small percentage of a cyanogen compound. Aschkenasi (*Ger. Pat.* 329,845), proposes the production by an electrolytic method of perborate containing an active oxygen content of 28 per cent. Experience has shown that the product is unstable, much of the oxygen being lost on storage. A stable compound containing 19.5 per cent. available oxygen can, however, be obtained by continued desiccation of the crystallised sodium perborate over phosphorus pentoxide.

Properties and Constitution.

The properties and constitution of sodium perborate have been extensively studied by Bosshard and Zwicky (*Zeitsch. Angew. Chem.*, 1912, XXV. p. 993-999)) and also by Foerster (*Z. Angew. Chem.*, XXXIV., p. 354-355, 1921). The latter brings forward evidence that the perborates are additive, and not substitution products of hydrogen peroxide. Sodium perborate has a high percentage of available oxygen, which is liberated in solution by either acidifying, high dilution, or heat. It is stable in the presence of its water of crystallisation, but decomposition sets in if the water content exceeds that amount. A concentrated solution of hydrogen peroxide—even up to 200 volumes—may be prepared by the solution of sodium perborate crystals in dilute sulphuric acid. With concentrated mineral acids, perborates give ozone. Commercial application has been made of the preparation of peroxide solutions from perborates, the solution obtained being highly pure and very suitable for the bleaching and washing of delicate textile fabrics. As a general oxidising agent, sodium perborate is equivalent to double its weight of hydrogen peroxide. The activity of sodium perborate as an oxidising agent may be shown by the oxidation of chromates and molybdates to perchromates and permolybdates respectively, and in the higher oxidation of proto-oxides.

Uses as a Bleaching Agent.

Sodium perborate has found various applications in several technical industries, and is now a commercial product of considerable technical importance. It is largely used in the textile industry as a bleaching detergent, and enters into the composition of deodorants, germicides, decolourising agents, antiseptics, dentifrices, and various pharmaceutical products. It is used in the determination of bile pigments. Sodium perborate has been found to be a superior bleaching agent in the textile industry, particularly for cleaning whites after the use of logwood black dyes; its superiority lies in the fact that most of the stereotyped bleaching agents tend to lower the strength of the textile material, and this is not the case with perborate. It blends strong bleaching and antiseptic properties, and has been found particularly suitable for cotton goods, and is now in general application at Austrian and German textile factories and laundries. As a detergent it possesses many advantages over sodium peroxide, and has been used effectively as an antiseptic in the treatment of wounds.

Well-crystallised sodium perborate preserves its strength, and is now manufactured on a commercial scale, and many anticipate that it will soon compete successfully with and replace hydrogen and sodium peroxides in the various industries. It has the advantage over hydrogen peroxide of being highly stable, and being a solid it is more easily and economically transported.

Preparation of Metallic Uranium.—R. W. Moore, of the Research Laboratory, General Electric Company, presented before the forty-third meeting of the American Electrochemical Society a procedure for obtaining uranium in a satisfactory condition by means of the action of sodium on the chloride. He gives full description of the method of preparing the chloride, which must be anhydrous, and of using the sodium. The fusion of the reduced metal was accomplished by arc operating in argon at from 50 to 100 atmospheres on a water-cooled table. The metal prepared by this method had the appearance of polished iron, but tarnished when exposed to the air for a few days. It was very ductile.—*Journ. Franklin Inst.*

CHEMISTS AND THE LAW OF CONTRACT.

IMPORTANT PRACTICAL POINTS.

AN interesting and comprehensive lecture on "Some Aspects of the Law of England Affecting Chemists" was delivered by Mr. E. J. MacGillivray, barrister-at-law, before the Institute of Chemistry, in London, on March 9 of this year. Short accounts of the lecture appeared at the time, but the complete text has now been issued in booklet form by the Institute. In view of the importance of certain branches of the subject, we abstract below that part of Mr. MacGillivray's address dealing with the law of contract. The paper was divided into seven parts, the first dealing with the chemist's right to the title of chemist, the second with the charter of the Institute, the third with the chemist's protection in respect of his discoveries, the fourth with the chemist in relation to his contracts, the fifth with the chemist in relation to public health, the sixth with the chemist in relation to public safety, and the last with the chemist in relation to the safeguarding of industries. Dealing with the fourth section of his subject, Mr. MacGillivray said:

Control Over Reports and Certificates.

To the chemist, as to everyone else, the whole law of contract is interesting, but I will not attempt to expound the whole law, or even the general principles of it; I think the most interesting thing I could do would be to take one or two points in the law of contract which might be said more than others to affect you as chemists. It has been suggested to me by your Registrar that it might be interesting if I were to state how the law stands with regard to reports and certificates made by you in the exercise of your profession. This, of course, has special relation to a provision in your by-laws. By-law 57 provides that certain acts shall be deemed to be discreditable within the meaning of section 16 (*c*) of the Charter, and among such discreditable acts is the issue for improper use of reports and certificates. The question thus arises—What is your right in law to control the matter after the report or certificate which you have made has, as a physical thing, left your hands? What right have you got to prevent it being published in your name in a way which you did not contemplate when you made it, and which might discredit you professionally?

Protection by the Law of Libel.

First of all, there is the law of libel, on which you can rely for your protection. It is libellous to publish anything which holds a man up to hatred, ridicule, or contempt. If your report or your certificate is, without your consent, used in such a way as will place upon you the stigma of unprofessional conduct, that would be clearly libellous, and you would have your remedy at law. You could go to the Court and get an injunction to prevent it being used in that way. Of course, it cannot be said that the use of the analysis or certificate of a chemist in connection with any advertisement of any sort is necessarily unprofessional. For instance, take the case of a company prospectus. I can conceive that a formal scientific report of an analyst might quite properly be used in connection with a prospectus, and a chemist might quite properly give such a report for such a purpose, although such a prospectus is, of course, an advertisement. No doubt there are other forms of advertisement of a serious nature, not being "puff" advertisements, in which your certificates might quite properly be used, without any infringement of professional etiquette. At the same time you may not wish your name or your report or certificate to be used in any way at all other than that for which you intended it at the time you made it, so that you must, for your own protection in such cases, look to something other than the law of libel, and it is here that the law of copyright may come in to protect you.

Protection by the Law of Copyright.

When you write a certificate or a report on any analysis or investigation which you have made, you have got copyright in that certificate or report, and *prima facie* you alone have got the right to reproduce the written matter in any form whatsoever. That is your copyright as author, so that, unless you have parted with your copyright or unless you have given some other person a licence to reproduce the written matter, you can stop the reproduction under the law of copyright. In what ways, then, can you part with your copyright? First of all, you part with your copyright if you are employed under a contract of service, and if what you prepare in the way of a certificate or report is prepared for your employer under such contract of service. In such a case the copyright, *ipso facto*, passes to him, and in that way you lose control of it. When there is no contract of service, and you are what is called in law an independent contractor and are employed by someone to make a report or give a certificate, even though you are paid for it, the copyright does not thereby pass to the person who has employed you; the copyright remains with you unless you have assigned it in writing—unless there is something in writing to show that it was intended that the copyright should pass. For example, you may give a report or certificate for the purpose of being used in Court in some legal proceedings. You give it for that purpose only, and you are paid for it. If whoever obtained it and paid you for it were afterwards to use it in connection with some other matter, to publish it as an advertisement in the public press, for instance, you could at once get an injunction to stop that. You may also call in aid the law of contract. You may make it an express term of your contract with the person who employs you that your report or certificate shall not be used except for a specified purpose. As a rule, however, you probably do not have any formal contract, and then you have to rely on one or other of those two branches of the law which I have already indicated—libel and copyright—and they give you quite good protection.

Legal Interpretation of Restraint of Trade.

A very interesting branch of the law of contract, and one which is of special interest to chemists, is that relating to contracts made in restraint of trade. The general principle of the law is that any agreement whatsoever by which a man undertakes not to exercise his trade or calling, whether wholly or partially, or for all time or for a limited time, is *prima facie* void. The law does, however, permit, in the interests of freedom of contract, restraints within limits, but the party to a contract who has imposed a restraint on the free exercise of his trade or profession by the other party, must show that such restraint was reasonably required for his legitimate protection as a contracting party, and, secondly, he must show that the restraint which he seeks to impose is no wider than is reasonably necessary for such protection.

In considering this question of restraint of trade, we have to distinguish very clearly between two different classes of contract. The first are contracts under which a man sells the goodwill of his business. As you know, it is very common, in cases where a man sells his business, for the purchaser of the business to impose upon him a restraint; that is to say, the vendor is restrained from exercising the trade or calling to which the business relates for perhaps a specified time, say five years, or within a specified area. Such a restraint may be absolutely necessary in a contract of that kind. The law, therefore, does permit a restraint of that kind, and any restraint which is reasonably necessary to protect the purchaser and so secure to him the value of what he has paid for is legitimate. But even in the case of the sale of a business, a general restraint prohibiting the vendor of the business from exercising his trade or calling at any place and for the rest of his life would be bad. The question always is whether the restraint which is imposed is reasonably necessary, and no wider than is reasonably necessary for the protection of the purchaser.

Contracts of Service or Apprenticeship.

There is, however, another class of contract—that is, contracts of service or apprenticeship—where you frequently find a clause in restraint of trade. An employee or apprentice may purport to bind himself not to practise or enter other employment after the termination of his service. There the law takes a rather different view of the matter. It will not allow so wide a restraint as it will in the case of a man who sells his business. In the case of a contract of service, the law will not allow an employer to protect himself merely against fair competition by the employee, after he leaves his service. In the case of a contract of service, where an employer attempts to impose a restraint upon his employee in the exercise of his profession after he leaves his business, the purpose of the restraint must be something other than merely to prevent fair competition. It is not lawful for an employer to impose upon an employee a restraint against fair competition, because the law takes the view that that is not in the public interest.

There are certain matters, however, with respect to which an employer is entitled to impose a restraint for his own protection, and the first of these is with regard to his professional or trade connections. An employer is entitled to impose a restraint on his employee in so far as it is reasonably necessary for that purpose. Another thing with regard to which an employer is entitled to protection is in respect of trade secrets. If the restraint is imposed for the purpose of protecting the trade secrets which the employee may acquire in the course of his employment, then, if it is no wider than is reasonably necessary for that purpose, it will be permitted.

Trade Connections and Trade Secrets.

In the case of the employment of a chemist in manufacturing works, I doubt whether, in the great majority of cases, any restraint is permissible on the exercise of his profession after he leaves such employment. With regard to trade connections, restraint for the purpose of protecting the employer's trade connections is not as a rule necessary, because a chemist in manufacturing works is not concerned with the trade connections of his employer. It might be legitimate in the case of a manager who is in charge of a business and who comes into contact with the employer's customers. With regard to trade secrets, it may be that in some cases restraint is permissible for the purpose of protecting the employer's trade secrets, but I doubt if there are many cases where such a clause would be enforced by injunction. The employer would have to show that there were some definite trade secrets of very vital importance to his business, and that the employee had acquired knowledge of these, and that unless an injunction was granted restraining the employee from taking employment in rival works, there would be serious danger of such secrets being divulged. Apart from definite trade secrets an employee is entitled to take away with him and use elsewhere his knowledge of his late employer's methods of business and manufacturing processes. No restraint directed only to prevent that would be permissible. In my opinion the cases are very rare indeed where an employer would be able to get an injunction to enforce a covenant in restraint of trade on the ground that its object was to protect trade secrets. It must be remembered that the restriction, if it is imposed for that purpose, must not be wider than is necessary for the protection of the trade secret which it is designed to protect, and it is very difficult to frame a clause in such cases that is not too wide. For instance, there might be a trade secret which related to a particular class of manufacture; in a soap works, for example, there might be a trade secret which related to the manufacture of a particular class of soap. It might be permissible, if the employee had, in his employment, gained a knowledge of that trade secret, to prevent him, for a period of time after he left the employment, from entering any other soap works which were manufacturing that particular class of soap. I do not think, however, it would be permissible to restrain him generally from taking employment from any soap manufacturer, even within a limited district and for a limited time. You will see, therefore, that it is very seldom, in the case of a chemist engaged in manufacturing works, that a clause in his contract restraining him from entering other similar employment after leaving his employer would be enforced. Most of such clauses are, in my opinion, void, as being in restraint of trade.

Where a chemist is employed as an apprentice or assistant to a professional chemist carrying on a general practice as an analytical and consulting chemist it would no doubt be reasonable, and therefore permissible in law, to restrain him from setting up a similar business on his own account either alone or in partnership within a limited area and for a limited time after leaving such employment, but I doubt whether it would be permissible to extend such restraint so as to prevent him entering the employment in a subordinate capacity of a rival practitioner.

An Important Test Case.

Another question which sometimes arises is whether an employee who has left the service of his employer before its termination, that is to say, who has broken his contract of service, can be restrained by injunction from taking employment with a rival firm before the legal expiration of his period of service. I do not want to say anything which would encourage any of you to break his contract; but there are cases where such a course is morally justifiable. An example of this was the case where a chemist was engaged in certain works on the terms of six months' notice on either side to determine the employment. Business was slack and the employer was cutting down his expenses, and he wished to discharge this particular chemist because the reduced business could not carry the cost of his salary. He therefore gave him six months' notice. The chemist had an opportunity of getting good employment at once with a rival firm. A similar opportunity might not have offered itself at the expiration of six months. The employer took up a dog-in-the-manger attitude and threatened to apply for an injunction to restrain his employee from taking this good job which he was offered. The chemist, as employee, had agreed to give his whole time to his employer's business, and he was undoubtedly contemplating a breach of this agreement by taking other employment before the expiration of the six months' notice. The chemist was advised that the Court would not grant an injunction restraining him from doing so, and in pursuance of that advice he took the good job which was offered, and his late employer did not carry out his threat of taking proceedings.

The principle which the Court applies in such cases is that it will not by its order compel a man to work for any particular employer, and it will not by granting an injunction compel him, as an alternative, to remain idle. If a contract of service is broken by an employee the employer's proper remedy is an action for damages if he has suffered any by, for instance, having to employ another man at a higher salary; but in this particular case it was obvious that there was no pecuniary damage suffered by the employer, as his reason for discharging the chemist was that he had not sufficient work for him to do, and could not afford the salary. The case might have been different if the chemist had in his contract of service with his first employer entered into an express negative covenant not to work for anyone else during the period of his service. There have been cases where the Court has enforced such an express negative covenant by restraining the employee from taking employment elsewhere. Considerable doubt, however, has been thrown on the legal position with regard to this. In the present state of the authorities a Court of first instance at any rate would probably feel bound by the authority of the earlier decisions to grant an injunction where there was an express negative covenant, but I am inclined to the opinion that the House of Lords, if the question came before them at the present day, would take a broader view and refuse an injunction even in such a case where the effect of an injunction would be to compel a man either to perform specifically his contract to render personal service to a particular employer or to remain idle. The tendency would be to regard the granting of such an injunction as contrary to public policy in that the services of a skilled man might thus be lost to the detriment of the national interest.

Arbitration Clauses in Contracts.

While dealing with the chemist in relation to his contracts I should also like to mention the subject of arbitration. There are different kinds of arbitration clauses: you can have an arbitration clause which merely refers, or rather is an agreement to refer, any dispute which may arise under the contract to arbitration, or you may go further and have not only an agreement to refer to arbitration, but also a condition that reference to arbitration and the award of the arbitrator shall be a condition precedent to any action brought in connection with the contract.

No arbitration clause, however, can altogether oust the jurisdiction of the Courts. If you have an arbitration clause which is merely an agreement to refer disputes to an arbitrator, it is always open to either party to the contract to commence an action, and the remedy of the other party, if he wishes to enforce the agreement to arbitrate, is to apply to the Court to stay the proceedings in the action so that the matter may be referred to an arbitrator according to the terms of the arbitration clause. But although a party may apply for a stay, it does not follow that the Court will grant one. As a general rule, if fraud is alleged by one party against the other, the Court will not grant a stay, because the Court considers that allegations of fraud are so serious, as affecting the honour and reputation of the party charged with fraud, that the Court itself ought to deal with them. Another class of case where the Court may refuse to stay the action and to refer the matter to arbitration is where the main issue raised in the dispute is an important and difficult question of law.

If the award of an arbitrator is made a condition precedent to the bringing of any action on the contract, then a party may be compelled to go to arbitration in the first instance, because if either party were to bring an action in the Courts without first having obtained the award of an arbitrator in his favour, the arbitration clause would not merely be a good ground for the other party applying to the Court to stay the action, but it would afford a complete defence to the action. The dispute, however, must be one arising solely on the contract itself, and if one party repudiates the contract altogether, for instance, on the ground that it was induced by fraud or even by innocent misrepresentation, then it is open to the other party who maintains the validity of the contract and claims under it to disregard the arbitration clause and bring his action in the Courts. His opponent, having repudiated the contract altogether, cannot at the same time set up as a defence to the action the arbitration clause, which is part of the contract which he has repudiated.

But even after a dispute comes before an arbitrator the Courts still have jurisdiction in respect of all questions of law which may arise in the course of the arbitration. The decision of the arbitrator, provided he conducts the arbitration properly, is final on all questions of fact, but either party is entitled to go from the arbitrator to the Court on any question of law. An agreement that neither party shall require the arbitrator to state a case for the opinion of the Court, or apply to the Court to direct the arbitrator to state a case, is void as against public policy. If nothing is said in the arbitration clause as to the nomination of an arbitrator, then under the Arbitration Act the reference will be deemed to be to a single arbitrator to be agreed on by the parties when the dispute arises, or in default of agreement to be nominated by the Court. If the agreement in the arbitration clause is to refer disputes to two arbitrators, one to be chosen by either party, the two arbitrators when so chosen may appoint an umpire, as without an umpire there might be, and usually would be, a deadlock. On the whole a reference to a single arbitrator is the most satisfactory and the cheapest. When the reference is to two arbitrators, one to be appointed by each party, and one party appoints his arbitrator and the other party refuses or delays unreasonably in appointing his arbitrator, the arbitrator appointed by the one party may proceed with the reference as if he were the sole arbitrator.

THE MARKETS FOR OILS AND FATS.*

REVIEW OF 1922 AND FORECAST FOR 1923.

IT may be taken as an unalterable economic law that the cycle in which trade moves consists of four phases, viz.:

1st Phase.—A prolonged period of general dullness, which might be described as the period of convalescence after the slump, sellers slowly liquidating the remnants of purchases made during the last boom, and buyers confining themselves to purchases to cover their immediate requirements. As a result of this policy less and less capital is required to carry on trade, with the result that discount rates are reduced and we are automatically carried into the

2nd Phase—when the money released by trade flows to the Stock Exchange, producing an all-round improvement in stock markets. At the same time cheap money assists to re-establish the general confidence, and we are unconsciously carried into the

3rd Phase—when, assisted by low rates of interest, the tendency gradually springs up to cover requirements further ahead, thus producing a wave of all-round buying which generally tends to be exaggerated and to develop into a boom which inevitably develops into the

4th Phase—the period of the slump and which, as a rule, comes practically without any warning. It is the period of reaction after the fever, and its intensity depends on the extent to which prices during the boom have been driven up without justification.

The Four Phases of the Trade Cycle.

The first indication that the tide is turning is generally found in an advance in money rates with an attendant drop in values on the Stock Exchange, and sometimes a restriction of credit by the banks, accentuating thereby the process of the rapid liquidation. When this movement has more or less spent itself, and prices have settled down to a reasonable level, we again pass into Phase 1, in which position we find the markets during the period under review, namely, the year 1922.

The year opened at a time when the 1920-1921 slump had spent itself, and the whole year was noted for a general disinclination to take a view any distance ahead, traders all over the world mainly confining their efforts to setting their houses in order after the upheavals through which trade had passed during the preceding six years. Consumers throughout the year lived from hand to mouth, and, on the whole, this policy paid them well, as sellers could nearly always be found of material on the spot or available for early delivery at a discount under prices quoted for later delivery. Consumers who, for a considerable time, had followed a hand-to-mouth policy, found themselves compelled to be in the market continually as buyers, and we were thus steadily getting ready for an improvement in markets which was bound to set in as soon as offers for early delivery became scarcer. Markets towards the end of the year were, therefore, in a distinctly healthy position. Prices were low, consumers had only covered their immediate requirements, and old stocks had gradually passed into consumption. Dealers were still shy after their 1920 and 1921 experiences, and probaby had smaller commitments on their books than usual. It is hardly surprising, therefore, that a steady improvement set in towards the end of the year.

General Trend of Prices.

Generally speaking, the prices of oils and fats during the year have been distinctly low, when compared with other commodities. The trade index figure shows the average figure for the year was 55 per cent. above the July, 1914, figure, and taking the average value of Straits copra just before the war at £26 to £28 per ton, palm kernels at £20 to £21, and good mixed tallow at £36 to £38 per ton, the average figure for these three articles, if brought into line with other commodities, viz., 55 per cent. above pre-war prices, would give us £40 to £43 for copra, £31 to £33 for palm kernels, £56 to £59 for tallow, whereas we find that Straits copra actually stood at £23 2s. 6d. in September, 1922, palm kernels at £16 10s. in September, 1922, and good mixed tallow at £38 10s. in May, 1922. The only notable exception was linseed oil, which rose to £44 15s. in May, 1922, against £24 in July, 1914, and this was due entirely to strong American buying on the expectation of the new Tariff coming in, which put an end to conditions ruling under the Fordney Emergency Tariff, introduced in 1921, by which the duty on linseed oil remained at 10 cents per gallon, whereas linseed was put up to 30 cents per bushel. There is no doubt that the U.S.A. markets have, during 1922, played a more important rôle in the world's oil and fat markets than at any other time, and the tendency is for the rôle to increase in importance.

America the Predominant Factor in the Market.

The slump in the U.S.A. was probably more severe than anywhere else, but the U.S.A. markets recovered more quickly, which, in view of their enormous wealth, is hardly surprising. Trade in America was showing distinct signs of recovery early in the summer, but the improvement was retarded by various strikes, principally the railroad strike. Once their labour troubles were settled a quick improvement set in, and has been maintained ever since, and the introduction of the new Tariff which, after various delays, finally materialised in September last, and whereby the import duties all round were heavily increased, had the natural effect of advancing all prices in the U.S.A. very considerably, with the result that a fresh inflation, which might almost be termed a boom, was started and is still continuing at the present time. To what extent the country will ultimately benefit economically by this increase in prices is a problem which we must leave to the political economists to settle. So far as oils and fats are concerned, the fresh duties imposed were as given in the table below.

A most interesting position was thereby created. We may say that last summer the whole position of the world's oil and fat markets hinged very largely on American cotton oil. We have seen in previous years, when we had a normal crop of 12/13,000,000 bales of cotton, that the U.S.A. have always exported from 50,000 to 160,000 tons of oil. The 1921-22 crop, which was abnormally small, viz., below 8,000,000 bales, only produced sufficient cottonseed oil for

* Messrs. Thornett and Fehr, of Baltic House, Leadenhall Street, London, E.C. 3, have just published their "Review of the Oil and Fat Markets for 1922." In view of the considerable trade interest of their observations, we are printing above the greater part of the introductory chapter to the "Review."

Tariff Rates in the United States of America.

	Old Tariff. (before 28/5/21).	Emergency Tariff (from 28/5/21 to 21/9/22).	Present Tariff (from 21/9/22).
Copra	Free	—	
Palm kernels	Free	—	
Rape seed	Free	—	
Sesame seed	20 cents per bushel	—	Free
Palm oil	Free	—	
Palm kernel oil	Free	—	
Sesame oil	1 cent per lb.	—	
Castor oil	1⅜ cents per lb.	Unchanged	3 cents per lb.
Linseed oil	1¼ cents per lb.	Unchanged	3¾ cents per lb.
Rape seed oil	1¼ cents per lb.	Unchanged	Unchanged
Cocoanut oil	Free	2⅝ cents per lb.	2 cents per lb.
Cotton seed oil	Free	2⅝ cents per lb.	3 cents per lb.
Groundnut oil	6 cents per gal.	26 cents per gal.	30 cents per gal.
Soya bean oil	Free	2⅝ cents per lb.	2½ cents per lb.
Groundnuts undec.	1¼ cents per lb.	3 cents per lb.	3 cents. per lb.
Groundnuts, dec.	¾ cents per lb.	Unchanged	4 cents per lb.
Castor seed	¼ cent per lb.	Unchanged	½ cent per lb.
Flax seed	20 cents per bushel	30 cents per bushel	40 cents per bushel.
Soya beans	Free	Free	½ cent per lb.
Cottonseed	Free	Free	⅛ cent per lb.
Tallow	Free	—	½ cent. per lb.
Oleo oil	—	—	1 cent per lb.
Oleo stearine	Free	—	1 cent per lb.
Oleo margarine	2½ cents per lb.	—	8 cents per lb.
Butter	2½ cents per lb.	—	8 cents per lb.
Whale oil	5 cents per gal.	Unchanged	6 cents per gal.
Fish oils	3 cents per gal.	Unchanged	20% *ad valorem*.

American requirements, with a margin for export of only 33,620 tons, the bulk of which went to Canada and Central and South America. In the summer of 1922, when it was known that 1922-23 cotton crop would amount to 8,500,000-9,000,000 bales, the problem to be solved was whether the U.S.A. would again be able to consume the whole of the resultant cotton oil or whether there would be an appreciable surplus available for export. In the latter case the price of oil, which fluctuated around 8 cents per lb. in New York in August, 1922, would obviously have to go down, as Europe was not in a position to absorb any oil at that figure. On the other hand, if the American consumption was sufficiently big to absorb the whole of the crop, the price of 8 cents per lb. was undoubtedly too low, and we now see that this has actually been the position, for, as a result of the high Tariff wall built up against soya bean oil, combined with a poor peanut crop in the U.S.A., no surplus of cotton oil for export to Europe was available, and the price actually passed 10 cents for refined oil in December, 1922. Europe, therefore, had to satisfy its requirements in liquid edible oils with soya bean oil, groundnut oil and sesame oil.

A remarkable feature of the year 1922 was the general world shortage of liquid oils. The 1921-22 olive oil crop and cotton oil crop could almost be termed failures, whereas the linseed crop was also well below the average, and yet, notwithstanding the fact that the principal oil-producing crops were so very short, prices for oils and fats generally were distinctly low, and, in some cases, for instance copra and palm kernels, the lowest post-war record was established. There is no doubt that the general economical position has been slowly improving throughout the year, and, at the time of writing, we find distinct indications that we are slowly passing from the first phase to the second phase of the usual trade cycle. Exchanges, generally, have been fluctuating wildly throughout the year. Marks stood at 795 to the £ in January, 1922, and at 33,000 to the £ in December, 1922. A few years ago we would have thought that trade in these circumstances would come to an entire standstill, but, on the contrary, we find that, during the past year, the German import trade has not been very greatly affected by exchange fluctuations. Apparently the Germans find no difficulty in adjusting the prices in the interior very rapidly to the fluctuations of their exchange. This is borne out by the Trade Index Figure of the principal articles. The German figure stood at 205.417 per cent. in December, 1922, based on 100 per cent. in 1913, and, taking into account the depreciation in the exchange, reduced to a gold basis, prices have appreciated about the same as elsewhere, that is to say, from 40 per cent. to 50 per cent.

Position in the European Markets.

The margarine industry in the United Kingdom has, generally speaking, not been very profitable, due mainly to the price of standard margarine having been maintained steadily at 6d. per lb., which only shows a return on the cheapest raw material prices of the year. On the other hand, margarine makers seem to have been successful in increasing the sale of their higher grades, which is more profitable. The soap industry in the U.K. has been flourishing, and it has even been possible again to increase the exports somewhat. An interesting proof that there has been little competition in the soap trade as opposed to the margarine trade is to be found in the fact that it has been possible to maintain the price of soap over that of the low-grade margarine.

Figures of the imports and exports of oils, fats, and oilseeds into and from the U.K. during the year 1922, as compared with the previous two years, are well worth studying closely. The total net imports, excluding butter, margarine, and lard, arrived at by deducting the exports from the imports, amount to 480,371 tons in 1922, as against 473,959 tons in 1921 and 558,964 tons in 1920, and, including butter, margarine, and lard, to 838,007 tons in 1922, as against 807,494 tons in 1921 and 752,597 tons in 1920. We see, therefore, that, so far as the U.K. is concerned, supplies have been well in excess of the previous two years, indicating a steady increase in the demand. There has been a very large increase in the imports of butter, which reached the figure of 213,428 tons in 1922, and which is up to the average imports of the years just preceding the war.

As regards imports to the U.S.A. for 1922, the figures which are most striking are those for linseed oil, amounting to 64,347 tons, and palm oil amounting to 25,677 tons, both of which establish a record considerably in excess of any previous year's import. For the first time we notice that cotton seed figures among the import articles, the imports for 1922 being 17,761 tons. As regards the exports from the U.S.A., what strikes us first are the cotton oil exports, which amounted to only 33,620 tons, and are far and away the smallest on record. The lard exports have again been on a heavy scale, viz., 342,375 tons, a figure which was only surpassed by the 1921 exports, which amounted to 387,916 tons.

Dutch exports again show a further increase in the export of cocoanut oil, which no doubt consists principally of refined cocoanut oil exported to Germany. The margarine exports are somewhat smaller, and amount to 47,330 tons. We now seem to have reverted to the pre-war position, when practically the whole of the Dutch margarine exports went to the U.K. In recent years Holland has been shipping margarine on a fairly large scale to Germany, but apparently the German margarine manufacturing capacity is again sufficient for home requirements. It is quite clear that the German crushing industry, notwithstanding the fluctuations in the exchange, is again gradually getting into its stride. Generally speaking, there is a considerable increase in the quantities of seed imported. We see, for instance, that in rape seed 106,301 tons were imported during May-December, 1922, as against 15,695 tons during May-December, 1921. The palm kernel imports for May-December, 1922, amounted to 95,477 tons, and for the whole year 126,880 tons, and the copra imports during May-December, 1922, amounted to 206.574 tons, and for the whole year to 282,676 tons. The oil imports, generally speaking, show a decrease with the exception of fish oil and whale oil, of which 62,621 tons were imported into Germany last year. The margarine imports for the year have dropped to 359 tons.

The Present Outlook.

As regards the present outlook it is clear that we cannot really say that there is any shortage of supplies, and the general advance in prices which we are experiencing at the present time can only be attributed to a general adjustment of oils and fats prices to those of other commodities. The principal factors which, in our opinion, will influence the course of markets during 1923 are:— (1) The economic position of the U.S.A. generally. (2) Any important fluctuations taking place in the general commodity Index Figure. (3) The Chicago lard situation. (4) The estimates of the American cotton crop, and especially whether the U.S.A. will again be able to consume their own cotton oil or whether they will have to export an appreciable surplus oil to Europe. (5) The position of the butter market; and (6) The world's linseed crops. These, we think, are the factors which will mainly shape the course of the markets, and their development should, therefore, be closely watched, as they may give us some warning of impending movements.

Another factor which would naturally affect markets is any serious complication in the European political situation, but it is never possible to gauge the effect of political trouble on the markets beforehand. All we know is that, in case of serious political trouble, markets are sure to be affected, but in which direction no one can possibly estimate until we see how matters develop.

PYRITES TRADE PROSPECTS.

PROPOSED PRODUCERS' COMBINE.

COMMENTING upon the agreement between the producers of pyrites, which although not yet signed is almost certain to materialise and which has already led to a general increase in prices of ten shillings per ton, Pierre Bancigny, writing in *Le Phosphate et Les Engrais Chimiques*, states:

The large producers such as the Rio Tinto which can deal with 2 to 3 million tons of pyrites per annum, the Tharsis Company which has now an annual productive capacity of a million tons, but which in 1922 only produced 220,000 tons, the Huelva Company which sold 300,000 tons of pyrites in 1922 as compared with 263,000 tons in 1921, the Pena Copper Company with 100,000 tons, San Platon with 40,000 tons, Campanario with 35,000 tons and Montecatini with 400,000 tons would by now have arrived at complete agreement, if the offers made to the producers of less importance as to their share in the markets had been accepted.

The Position of the Tharsis Company.

Another factor, which if rumour is to be relied upon, has operated against the conclusion of the formal agreement is the attitude adopted by the Tharsis Company, who claim that in their case it is unfair, in fixing the amount of pyrites that the individual producer may sell under the agreement, to take their present production as the basis. It must be admitted that within recent years the Tharsis Company has developed appreciably its possibilities. Only a short time ago it was thought that the pyrites reserves of the Company were approaching the point of exhaustion, but the systematic developmental and prospecting work of the Company has indicated the existence of huge unsuspected reserves, particularly in the neighbourhood of Tharsis and Calanas. So far back as the general meeting of shareholders of the Tharsis Company in 1921, the chairman intimated the probable results of these developments. Two new lodes have been discovered, the one at Calanas equalling in thickness that of the Perrunal deposit belonging to the Huelva firm.

The Tharsis Company realising the immense potentialities of its new reserves has adopted a vigorous developmental policy and erected a new block of factory buildings. It has also improved its transport system and built a new loading quay to cope with the anticipated larger output. A production of 5 to 6 times the present amount is anticipated within a few years and the company, quite naturally, demurred at being valued at present figures.

The other producers on their part, cannot be blamed, when the narrowness of the present day market for pyrites is taken into consideration, for refusing to allow the quota of the Tharsis Company to be assessed on a principle fundamentally different from that applied to the other companies. At one time, owing to this real difficulty, the negotiations had every appearance of dropping through altogether, but the insistent pressure of the competition of American sulphur has compelled some sort of an agreement to be made.

At present the world's productive capacity for pyrites is five million tons per annum. The production of American sulphur has grown from 250,000 tons in 1910 to 1,250,000 tons in 1920, with exports to Europe, which were nil before the war rising to a present figure of 500,000 tons per annum. For the past two years not more than two and a half million tons of pyrites per annum have been required by the chemical industry, and prices have been cut to such an extent that the margin of profit has been practically eliminated.

THE PLATINUM INDUSTRY OF COLOMBIA.

WORLD'S PRESENT LARGEST PRODUCER.

PLATINUM is distributed widely in Colombia, but is found mainly in the rivers Atrato, San Juan, Condoto, Opogodó, and their affluents in the Chocó region, and also in the region of Barbacoas, on the Pacific side. In the absence of Russia, this region is the largest exporter of platinum in the world. The Condoto river is to-day the centre of the platinum industry. The recent prospecting in the river Patia is expected to give very satisfactory results. Several companies are now dredging with very promising results.

The platinum exported during 1922 was valued at £3,000,000. The richest known platinum region in Colombia (and as far as is at present known in the world) lies in the now famous Chocó district—the metal being recovered from the head waters of the Atrato river, also from the San Juan river and its tributaries, the chief of which being the Condoto river. In the Condoto river district platinum predominates over gold in the alluvial ground, the percentage of the former being about 96 per cent. of the two mixed metals; whilst in the Atrato (Quibdo) deposits gold predominates, the platinum content being only from 10 to 15 per cent. of the combined metals.

The platinum recovered in Colombia has generally been obtained from the sand and gravels of present stream channels. Careful investigation in recent years has proved the existence of platinum-gold alluvial deposits covering a total area of more than 5,000 square miles, many of those in the Chocó district being suitable for dredging and others for hydraulising. In 1915 it was estimated that the reserves of gravel in the productive areas held by British and American companies amounted to 336 million cubic yards, of which 68 million cubic yards could be considered as proved ground capable of being worked at a profit under the conditions then existing—since 1915 the estimated reserves have been largely increased and the working conditions also much improved.

Although platinum is found quite abundantly in the beds of present Colombian rivers, it is also said to occur there in a conglomerate of the Tertiary age, which appears to have been laid down in a basin whose upper surface is now about 1,600 feet above sea level. Platinum is found in the rivers only where this conglomerate has been eroded, their beds being barren of the metal above the areas underlain by that formation; the stream or river deposits are re-concentrations from the older gravels.

The total production of platinum in Colombia since 1778 has been estimated at more than 700,000oz. Most of the platinum recovery has been obtained irregularly by crude native methods (ground-sluicing and panning), but in recent years British and American capital has been attracted to the platinum region, and dredging-plants operated by steam-power or (as in the case of the No. 2 dredge of the South American Gold and Platinum Corporation) by internal combustion engines have been installed in such localities as are suitable for exploitation by that method. It is to the adoption of dredging that the Colombian industry owes its recent progress and its promising outlook. The Chocó district has shown a steadily increasing output of platinum in recent years, rising from about 10,000 crude oz. in 1910, and 12,000 crude oz. in 1911 and 1912, to about 35,000 crude oz. in 1920.—*The Colombian Trade Review.*

CORRESPONDENCE.

THE COLOURING OF POISONS.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—In the interests of public safety it will be unfortunate if a recent decision of the General Medical Council be accepted as the final word in the highly important question of colouring deadly poisons. The facts are simple. After careful experimenting by British dyemakers and pharmacists the Pharmaceutical Society of Great Britain recommended brilliant green to the Privy Council as a colouring for a preparation of strychnine. The Privy Council forwarded the suggestion to the General Medical Council, as the body who could say whether brilliant green would interfere with the healing properties of the strychnine preparation in question. Thereupon the General Medical Council unanimously condemned the proposal, and that for six reasons, only two of which can be said to have a remote connection with the curative aspect of the question—namely, that in certain mixtures brilliant green undergoes colour changes which "might be objectionable" to patients, and that a coloured solution "would be objectionable" for hypodermic injection.

The four other points made were: (1) That it was only proposed to colour one strychnine preparation; (2) that risk would arise from keeping coloured solutions side by side with uncoloured; (3) that the preparation being uncoloured in other countries, difficulties of an international kind would arise; and (4) that the question was a general one, and should not be determined in the case of a single preparation of a single poison. These four objections may be just, or they may not. What I do submit is that they are matters of policy to be determined by Parliament in open debate, rather than settled autocratically by the most conservative of our trade unions.—Yours, etc. James Sexton, M.P.

House of Commons, S.W. 1, July 16, 1923.

ITEMS OF INTEREST.

Obituary.—We regret to announce the death, at the age of 63, of Sir Robert Park Lyle, Bt., chairman of Tate and Lyle, Limited, sugar refiners, which occurred on Wednesday last week.

Gas Prices Reduced.—It is announced that the Gas Light and Coke Company have reduced their charges for gas from 9.2d. to 8.6d. per therm.

British Empire Exhibition.—It is officially announced that the Prince of Wales has consented to become president of the British Empire Exhibition. His Royal Highness has hitherto been president of the general committee.

American Cellulose Developments.—Preparations are being made for the issue of more capital for the American Cellulose and Chemical Manufacturing Company, whose debentures were placed in this market some time ago.

Trade Agreement with Czecho Slovakia.—On Saturday, July 14, a commercial treaty, based on the principle of the most-favoured nation, was signed by Lord Curzon on behalf of this country and by Dr. Benes on the part of Czecho Slovakia.

American Butyl Alcohol Production.—It is announced that the Commercial Solvents Co. has bought the plant of the United States Food Products Co., at Peoria, Ill., to be remodelled and used for butyl alcohol manufacture. The U.S. demand for butyl alcohol or "butanol" as it is now usually termed there, is growing rapidly.

Literary Intelligence.—Volume II., Part II., of Molinari's Organic Chemistry will shortly be ready. This volume completes the Organic Section of the work, thus making available a comprehensive treatise covering the whole ground of industrial chemistry, both inorganic and organic. The publishers are Messrs. J. and A. Churchill.

New Companies in 1923.—During the first half of this year 4,247 new companies were registered at Somerset House—or 207 more than for the corresponding half of 1922—of which 239 were public and 4,008 private, states a report issued by Messrs. Jordan and Sons. The total amount of capital involved was £67,307,328., as compared with £65,087,216. last year.

Magadi Soda Reconstruction.—The board of the Magadi Soda Company announce that arrangements for a reconstruction scheme are now well advanced, but are subject to certain assents which, it is feared, cannot be obtained before the long vacation. It is hoped to have everything in order when the Courts reassemble in October. The reconstruction scheme cannot be circulated pending the completion of certain negotiations with the Government.

Oil-refining by Silica-gel.—The Standard Oil Co., of Indiana states that the company does not contemplate taking over the silica-gel process of refining gasoline. It is further stated that some time ago the process was looked into, but the results obtained did not seem to warrant the purchase of the rights to use the process. The Standard plants are equipped with the improved Burton stills, and the results obtained are said to be very satisfactory.

Pig-iron Production Decreasing.—The production of pig-iron in the United Kingdom in June amounted to 692,900 tons, compared with 714,200 tons in May, and 369,200 tons in June, 1922. The furnaces in blast at the end of the month numbered 222, four having been blown in and five having gone out of blast during the month. The production includes 246,700 tons of hematite, 215,200 tons of basic, 146,500 tons of foundry, and 41,600 tons of forge pig-iron.

Official Report on Oil-heater Explosion.—The official report has been issued of Mr. R. W. Gunston, of the Board of Trade, as the result of the inquiry into the explosion from an oil pre-heater at a colliery by-products works at Wombwell. Since the explosion, states the report, a new pre-heater of similar design, and by the same makers, has been installed. All cocks have been removed from the oil line, and the two pre-heaters are now permanently in series. The safety valves have been removed from the top covers, and one is now fitted on the pump delivery pipe, where it comes in contact with cold oil, and is not so liable to gum. It is also fitted with a smaller weight than previously. In this new position it is under the more immediate notice of the still-room attendant, and an oil pressure gauge is fitted alongside it.

Coal Output.—The output of coal for the week ended July 7 was 5,305,800 tons, compared with 5,400,700 tons in the preceding week and 4,597,800 tons a year ago.

German Zinc Smelting Association.—According to the *Kolnische Zeitung*, the Zinc Smelting Association has decided to prolong its activites until the end of the year.

American Wool-scouring Laboratory.—It is reported that the United States Department of Agriculture have completed plans for the establishment of a wool-scouring laboratory.

Change of Address.—The London offices of the United States Department of Commerce have been moved from the neighbourhood of the American Embassy in Grosvenor Gardens to Bush House, Aldwych.

Absent Debtor's Examination Adjourned.—At the public examination of William W. Coe, jun., chemical manufacturer, of 24-26, Holborn, it was stated by the Official Receiver that the debtor had not surrendered and was believed to be in New York. The examination was adjourned *sine die*.

Institution of Electrical Engineers.—The result of the ballot for the election of new members of the council of the Institution of Electrical Engineers, for the session 1923-24, is as follows:—President, Dr. A. Russell; vice-president, Sir James Devonshire; hon. treasurer, P. D. Tuckett.

Ironstone Miners' Wages.—Negotiations at Middlesbrough yesterday between Cleveland mineowners and the miners' executive resulted in an agreement for a 14 per cent. advance for the Cleveland ironstone miners, to date from Monday next. The wages will be 102½ per cent. above the standard.

Freights to South Africa.—It is officially announced that where cement and superphosphates are carried from European to South African ports under 17s. 6d. a ton of 2,240lb. for superphosphates, and of 2,000lb. for cement (gross weight), a dumping freight duty will be imposed equivalent to the difference between 17s. 6d. and the frieght charged. The duty will become immediately effective.

Price of Motor Spirit Reduced.—From Thursday, July 19, there has been a further reduction made in the price of motor spirit and refined oils. The reduction amounts to 3½d. per gallon in the case of motor spirit, which now makes the price of No. 1, in tins, 1s. 8½d. per gallon, against the old price of 2s. The price of No. 3 grade spirit will be 1s. 6½d., against the old price of 1s. 10d. per gallon. Refined lubricating oil is reduced by a penny per gallon.

Poisoning Fatality in Metal Foundry.—At the inquest held on Saturday last on E. George Wright, a labourer employed at Fry's Metal Foundry, Holland Street, Southwark, it was thought by the police divisional surgeon that death was due to poisoning by arseniuretted hydrogen. He had preserved certain organs with a view to analysis. Mr. Alfred Munday, chief metallurgist and London manager at Fry's Metal Foundry, said he could not account for the arsenic being evolved, if it caused Wright's death. The inquest was adjourned.

University News.—At a meeting of the Leeds University Court, held on Wednesday, the regulations for the degree of Master of Science were modified considerably. Whereas up to the present it has been possible for Bachelors of Science graduated at the University with honours to be awarded the M.Sc. degree without further examination, from October 1, 1923, candidates for the M.Sc. degree will be required to prosecute research, present a thesis on the research, and, if required, to submit themselves for examination. This new degree ordinance rectifies an anomaly and places Leeds in uniformity with most University centres.

Personal.—The Court of the Salters' Company has appointed Professor Arthur Smithells to be director of the Salters' Institute of Industrial Chemistry.—Mr. Wm. Smith has been appointed agricultural adviser to the Potash Syndicate for the Border and Northern English counties.—Mr. L. M. Clark, of Sidney Sussex College, Cambridge, has been elected by the College to a research scholarship in chemistry of the value of £150.—The retirement of Mr. Thomas Clarkson, chief accountant of the United Alkali Company, has been marked by the presentation of a silver tea and coffee service from his colleagues. The presentation was made by Sir Max Muspratt, who said Mr. Clarkson had been chief accountant since the company's formation in 1891. He is now succeeded by Mr. T. Whinyates.

Potash Feldspar in Ontario.—Five miles from Perth, in Lanark County, Eastern Ontario, a deposit of high potash feldspar has been discovered. Operations to date have been confined to a dyke of feldspar 1,000ft. long and 300ft. wide. This dyke contains many thousands of tons of marketable feldspar, sufficient to supply the ceramic industry of America for a long time. Samples tested by a large manufacturer of insulators have been reported upon as being satisfactory.

Petroleum Bill Report.—The House of Lords Committee on the Petroleum Bill state that they consider that a new Bill should be introduced to amend and improve the existing law. In such a revision opportunity would be offered to bring every aspect of the whole petroleum industry under the Petroleum Department of the Board of Trade. The present Bill was therefore reported without amendment.

British Engineering Standards Association.—The fifth annual general meeting was held in London on Thursday, July 12. The Chairman, Sir Archibald Denny, Bart., in reviewing the year's work, laid stress on the fact that the Association was faced with a deficit of some £1,700. and he hoped that both His Majesty's Government, as well as industry as a whole, would assist in putting the finances of the Association on a more stable basis.

New Benzol Plant in Canada.—The Ford Motor Co., of Canada, is constructing at its works at Walkerville, Ontario, a by-product coking plant, primarily for the purpose of producing benzol for motor fuel. The plant will cost about $500,000, and its capacity will be 400 tons of coal a day. It is understood that if this plant is successful in operation the Ford interests will erect a number in different localities.

Tariff Notes.—As from July 4, inorganic acids from all countries are admitted into New Zealand duty-free. The duties on crude oils and greases are suspended. From September 16 empty glass bottles and glass jars will be subject to preferential duties at 20 per cent., and general duties at 35 per cent. *ad val.*—In the proposed new Finnish tariff it is anticipated that there will be a reduction in the import duties on salt, caustic soda, and bleaching powder. The duty on cement is expected to be increased.

Institution of Civil Engineers.—At the annual conversazione of the Institution of Civil Engineers, held at Westminster on Thursday of last week, Professor Sir George Scott Moncrieff demonstrated an emulsion that has been tried with great success on the roads in eliminating dust, and expressed the hope that the method might prove equally successful in eliminating the coaldust that is so fatal a cause of catastrophe in coalmines. Professor Hele-Shaw produced on an engineering scale the stream line filters that he showed some months ago at the Royal Society.

Injunction Against Oil Refiners.—In the Chancery Division last week Mr. Justice P. O. Lawrence made an order for the release of Charles Wm. Kendall and his brother Charlie, committed to prison for contempt of Court upon the application of C. T. Bowring and Co., Ltd., of Grimsby. Messrs. Bowring and Co. had obtained an injunction to restrain Charles Wm. Kendall from being concerned in the business of fish or whale oil extraction within 100 miles of Grimsby. His lordship held that Charles Wm. Kendall was concerned in a business at Pyewipe, which, he said, he had sold to his brother Charlie, and Charles Wm. Kendall was accordingly committed for contempt of Court, and his brother Charlie for aiding and abetting him. Mr. Baines (for C. T. Bowring and Co.) said there were negotiations afoot to enable the Kendalls to carry on business at Gildersome.

Ramsay Memorial Fellowships.—The Ramsay Memorial Fellowship Trustees announce the following elections to Fellowships and renewals of Fellowships for the Session 1923-24:—A British Fellowship of £300. to Mr. Samuel Coffey, M.Sc. Ph.D. A British Fellowship of £300. to Mr. Alan Francis Titley, B.Sc., D.Phil. A British Fellowship of £300. renewed to Dr. R. W. Lunt, B.Sc., M.Sc., Ph.D. A Glasgow Fellowship of £300. to Mr. Thomas S. Stevens, B.Sc. A Glasgow Fellowship of £300. renewed to Mr. J. A. Mair. A Norwegian Fellowship of 5,400 kroner to Mr. Gunnar Weidsmann, to work at Cambridge under Professor Gowland Hopkins. A French Fellowship of the value of £100., plus 14,000f., to Dr. H Weiss, of La Sorbonne, who will work under Professor Sir William Bragg at the Royal Institution (Davy Faraday Laboratory). A Netherlands Fellowship of £300. to Mr. J. Kalff, doctorandus in chemistry of Amsterdam. A Danish Fellowship of £300. to Mr. Kristian Hjandahl. Appointments to the Canadian, Greek, Italian, and Swedish Fellowships will be announced shortly.

OUR BOOKSHELF.

Second Year College Chemistry. By William H. Chapin, Associate Professor of Chemistry in Oberlin College, Ohio. London: Messrs. Chapman and Hall, 11, Henrietta Street, Covent Garden, W.C. 2; price, 15s. net.

A very useful text book which teaches the student to think for himself, and to realise that the chemistry of to-day is a rapidly-growing science. Although modelled on an American University course the work should meet with a favourable reception from all teachers of chemistry, who believe that a thorough grasp of fundamental principles rather than the accumulation of a mass of details is the goal to be aimed at in their work. Starting with the kinetic theory, the book deals with the gas laws, the laws governing change of state, Avogadro's law and molecular weights, the quantitative laws of chemical combination, the atomic hypothesis and atomic weights, equations and chemical valency. The periodic system which is next discussed is followed immediately by chapters in the most modern developments in radioactivity and atomic structure. After physical chemical considerations of solution and osmotic pressure have been examined the theory of ionisation and chemical indicators are discussed. Chapters on homogeneous, heterogeneous and complex equilibria and electrochemistry, complete a volume, the contents of which we have but imperfectly described. The exercises at the end of the chapters strike us as being particularly excellent, and we can confidently recommend the work to English teachers and students.

Second Year College Chemistry (A Manual of Laboratory Exercises.—By William H. Chapin. London: Messrs. Chapman and Hall. Price, 7s. 6d. net.

A companion volume to the one discussed above, comprising a course of practical laboratory work, which may be used in connection with a course in quantitative analysis. The apparatus required throughout is simple and the work is well within the scope of an ordinary University year. Fundamental experiments of a physico-chemical nature, which are usually left to the third year in an English University course, are here presented in a simple and intelligible manner. The experimental work in connection with the theory of indicators is particularly good, and the student who has worked through the course should be well able to comprehend the limitations of the single indicators and the reason for the existence of the great number of compounds now in use.

Perfumes and Cosmetics. W. A. Poucher, Ph.C. London: Chapman and Hall, Ltd.; 21s. net.

An English book, with special reference to synthetics, which certainly deals very thoroughly with practical aspects. There are three main sections—varieties, sources, properties and in many cases formulæ—details of preparation—modern and older cosmetics. It is embellished with many very excellent illustrations, and should prove of considerable value to all of whom the practical side of this branch of chemistry is important.

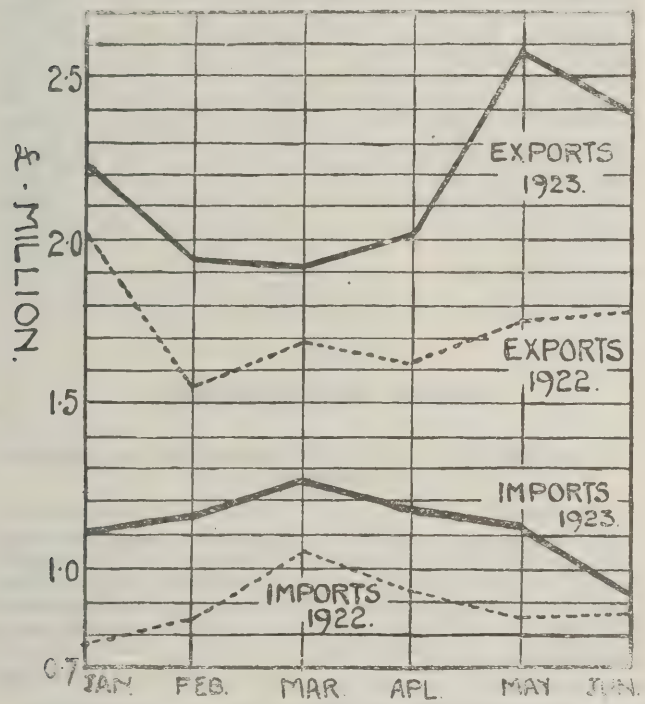
Gesammelte Abhandlungen. (Collected Essays) Vol. II. By Dr. F. Kehrmann. Leipsig, Verlag von Georg Thieme. Paper backs, 600 pages; price, 16s

The author, who is professor of chemistry at the University of Lausanne, presents the results of the researches carried out by himself with the collaboration of his staff and his advanced students. The volume is divided into two parts, the first of which deals with investigations on the hydroquinones and quinones, and the second with the azines and azonium compounds. Many new results are incorporated in the work, such as the discovery of the amino derivatives of benzoquinone, the relationship between the constitution of the hydroquinones and their tendency to quinone formation. Since a quinonoid structure is assigned to all the organic colouring matter by many of our leading tinctorial chemists increased detailed knowledge of the chemistry of this class of compounds should be valuable. The section dealing with the azines and the azonium compounds is the larger, and deals mainly with the azine dyestuffs, such as the safranines and indulines. The complexity of the chemistry of this class of compound is remarkable, and we cannot do more than indicate the general character of this work, which must appeal chiefly to the specialist in limited regions of organic chemistry.

BRITISH OVERSEAS CHEMICAL TRADE.

JUNE IMPORTS AND EXPORTS.

BASED on the statistics published in the Board of Trade returns for June, the foreign trade in chemicals and allied products continues to be satisfactory. It is true that actually the exports of products under the group heading of "Chemicals, drugs, dyes, and colours" have declined from £2,573,000. in May to £2,385,000. in June, but the latter figure still is higher, with the exception of the previous month, than that for any month since February, 1921. Exports during the half year, as indicated in the following graph, have been consistently higher than for the same period in 1922, while imports show an encouraging tendency to fall, the June figure of £933,234. comparing favourably with £1,119,000. in May. During the past six months, total imports of chemicals, drugs, etc., amounted to £6,863,000., an increase of £1,509,000. on the total of £5,354,000. in the same period of 1922. In the export branch an increase over the half year of £2,705,000. is to be recorded, the figures being £13,121,000. and £10,416,000 respectively. This revival is all the more encouraging when it is remembered that values in many export lines have decreased, indicating an even larger increase in tonnage during the past two



Overseas Chemical Trade for the Half-years ending June 30, 1923 and 1922.

months. The weakening of competition from Germany, on account of the dislocation in the chemical industry due to the French occupation of the Ruhr is undoubtedly a large factor in the stimulation of the foreign trade in chemicals of the United Kingdom. So long as the present situation in the Ruhr continues, so long will the British manufacturer have an opportunity of exploiting markets previously supplied from German sources. One of the conditions of settlement in the question of reparations will undoubtedly be the stabilisation, for international purposes, of the mark, at whatever value, and when this takes place one of the greatest—if not *the* greatest—obstacles to the development of the British chemical industry will be removed. The present dullness in the home market, resulting from the uncertain conditions and fear of the future, would also be relieved by the clearing of the political situation.

In the following table are given the imports and exports, by weight, of various representative chemical products, for the months of June and May. The recent dislocation resulting from the exclusion of the Irish Free State from the official returns does not affect this table, as the new arrangement came into force on April 1 last.

IMPORTS—Increases on May Quantities.

		1923. June.	May.
Acetic acid	tons	987	717
Bleaching materials	cwts.	4,981	1,113
Boron minerals	tons	1,824	645
Dyeing extracts	cwts.	8,070	5,416
Gums and resins (except rosin)	,,	30,690	27,402
Phosphate of lime	tons	23,731	14,868
Rosin	cwts.	118,413	106,631
Sulphur	tons	17,670	7,503
Tartaric acid	cwts.	4,616	3,428
Turpentine	,,	35,346	27,332
Zinc oxide	tons	811	627

Decreases on May Quantities.

Barytes, ground	cwts.	52,148	68,061
Borax	,,	2,610	5,009
Calcium carbide	,,	28,355	41,301
Cream of tartar	,,	2,064	3,134
Glycerine, crude and distilled	,,	362	653
Indigo, natural	,,	12	237
Manganese ore	tons	39,467	57,227
Mercury	lb.	150,899	561,067
Nickel oxide	cwts.	3,614	4,401
Paraffin wax	,,	73,515	133,844
Petroleum, crude mineral	galls.	25,589,804	40,073,000
Potassium compounds (except nitrate)	cwts.	125,202	204,429
Potassium nitrate	,,	1,049	4,860
Pyrites, iron	tons	11,743	35,114
Sodium compounds (except nitrate)	cwts.	16,626	20,367
Sodium nitrate	,,	20,294	138,867
Tanning extracts	,,	92,129	115,411
White lead	,,	7,427	11,021

EXPORTS—Increases on May Quantities.

Ammonium sulphate	tons	24,965	21,476
Barytes, ground	cwts.	20,023	2,072
Carbolic acid	,,	8,123	21,613
Cement	tons	57,629	44,147
Glue and size	cwts.	15,222	12,559
Naphtha, coal-tar	galls.	39,020	13,722
Potassium compounds (except chromate and bi-chromate)	cwts.	4,557	4,533
Sodium carbonate	,,	564,615	554,712
Sulphuric acid	,,	2,779	2,225
Tar oil, creosote, etc	galls.	8,577,741	6,248,029
Tar, coal	tons	256	245
White lead	cwts.	18,775	17,049

Decreases on May Quantities.

Ammonium chloride	tons	337	352
Bleaching powder	cwts.	12,443	30,296
Benzol and toluol	galls.	247,393	301,158
Caustic soda	cwts.	117,380	137,383
Copper sulphate	tons	3,282	8,441
Disinfectants, insecticides, etc.	cwts.	31,488	34,001
Glycerine, distilled	,,	5,815	7,697
Naphthalene	,,	19,303	21,966
Paraffin wax	,,	9,990	10,468
Pitch, coal-tar	tons	18,499	50,234
Potassium chromate and bi-chromate	cwts.	3,451	5,163
Salt (other than table)	tons	24,601	26,067
Soaps (total)	cwts.	111,844	121,443
Sodium sulphate	,,	151,884	180,602
Tartaric acid	,,	1,086	1,769
Zinc oxide	tons	258	314

Plumbago Trade of Ceylon.—Statistics published in the report of the Ceylon Chamber of Commerce for the year ended December 31 last show a very satisfactory increase in the exports of plumbago from Ceylon during 1922, the total shipment being 211,235cwt., as compared with 85,153cwt. in 1921. There appear to be signs of a general improvement setting in slowly not only for dusts, but for the higher grades of plumbago as well.

PARLIAMENTARY NEWS.

Surplus Government Property.

In the House of Commons on Wednesday (July 11), Sir W. Joynson-Hicks, replying to Mr. Burgess, said: There are in all some 30 properties under the description of munition factories and some 16 miscellaneous properties, apart from vacant sites, all of which properties are available for disposal. In addition there are 11 factory properties and eight miscellaneous properties at present being used for Government purposes, some of which may hereafter become available for disposal.

Sewage Purification.

Mr. Rhys Davies on Friday (July 13) asked the Minister of Health: Whether his attention has been called to the process of sewage purification covered by the world's patents which are the property of the Septic Gas Company of Australia, Limited; whether he is aware that it is claimed that a mechanical self-contained process has been discovered for the purification of sewage and trades waste by the production of gas, without the formation of organic sludge, whereby the pollution of air, land, and river is eliminated, and that the gas produced as a result is the purest and of the highest calorific value and is highly suitable for the working of any type of internal-combustion engine; and whether, having regard to the vast sums expended on the disposal of sewage, he will institute an inquiry into the merits of this process?

Mr. Chamberlain: I am aware of the process to which the hon. member refers, and my Department is watching this and various other experiments which are being made for producing gas from sewage. I am advised, however, that the particular process referred to by the hon. member is essentially a process for making gas from sewage sludge, and that it should not be assumed that its adoption would obviate the need for other measures of purification.

White Lead in Painting.

On Thursday (July 12), a debate took place on the Home Office estimates, in the course of which Mr. Locker-Lampson, speaking on behalf of the Home Secretary, in regard to the White Lead Convention of 1922, said: A good many hon. members think that the Convention of 1922 at Geneva ought to be recognised. As a matter of fact, the present Minister of Labour was present at Geneva, and he agreed to the terms of the agreement, but unfortunately since that date a certain misunderstanding has arisen about one of the principal agreements under the Convention—the employment of young people under 18 and the employment of women for industrial purposes. Apparently a good many of the members at Geneva were under the impression that that Article referred only to the painting of houses. Other members declared they believed it referred to the whole of industrial painting, whether in regard to houses or not. Until that point has been cleared up satisfactorily, it is rather difficult for this country to agree to the ratification of the Convention.

SOUTH WALES NOTES.

[Specially Contributed.]

Some uneasiness is being experienced in the tinplate industry. Several demands put forward by the men have been rejected by the employers, the four claims accepted being of a modified character. The Industrial Council are to be called together on the 30th inst. to discuss the affairs. The patent fuel trade still keeps active, and makers have sufficient orders to keep their works going for several weeks. There is a good supply of small coal. The nickel trade is improving there being a better demand for the metal, while residuals are in good call. Cokes are much more active and the ovens are now in full operation. By-products are selling well, though sulphate of ammonia is being put to stock, that material being a neglected market at present. The copper situation does not improve and there are several works idle. Sulphuric acid is steady, and the output is showing a gradual increase. Among the imports for the week to Cardiff were 10 tons rock salt, 64cwt. zinc oxide, 12 casks lithopone from Hamburg; to Swansea, 108cwt. red oxide, 15 tons magnesite from Hamburg, 30 tons zinc ashes, 6 tons lead ashes from Libau, 1,860cwt. nickel oxide from Montreal; to Newport, 2,000 tons iron pyrites from Huelva. Included in the exports were 54 tons sulphate of iron to Hamburg from Newport.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The depression in the hematite pig-iron trade though more extensive this week than last has not yet affected West Cumberland, and for that reason the coal and coke industries continue to be very briskly employed. If the uncertainty as to the result of the efforts being made to clear up affairs in the Ruhr is prolonged, a curtailment of iron production here as well as in the Furness districts seems inevitable. However, the position this week is that all the coal that can be raised is being disposed of, and that the make of coke is likewise being absorbed. Practically all the smalls are going to the ovens. Of the coking industry it should be noted that there is now a spirited Continental demand. It has apparently arisen during the last few days, though it may be remembered that some time ago it was stated in this report that there would be substantial shipments for export in August. What is taking place is that coke is being sent to the Continent at the rate of between 1,000 tons and 2,000 tons per week. The price is a little in excess of that being paid locally. Hematite pig-iron smelters under the new iron ascertainment are paying from 35s. to 37s., and the Continent from 35s. to 40s. per ton. Residuals are all a good market. The tar is going to the chemical works, and sulphate of ammonia is moving away satisfactorily. Crude benzol is in good request at higher rates and creosote and road tar are being marketed quickly. There is a further drop in the imports of East Coast coke, the total this week being short of 6,000 tons, that being due of course to damping down of furnaces in the Furness district.

LEGAL INTELLIGENCE.

DISPUTE OVER TAR AND AMMONIACAL LIQUOR CONTRACT.

Brotherton and Co., Ltd. *v.* Glasgow Corporation.

At the Edinburgh Court of Session on Thursday (July 12), an appeal by the plaintiffs was heard against Lord Blackburn's judgment in the action by Brotherton and Co., Ltd., ammonia and tar distillers, Leeds, against the Corporation of Glasgow. In October, 1904, the plaintiffs entered into a contract with the defendants whereby they acquired from them right to certain chemical works, buildings, and ground appertaining to the gas works at Provan, and also to the tar and ammoniacal liquor produced by the defendants in the course of their manufacture of gas. The duration of the contract was for five years from July 1, 1904, but on its expiry a new contract for a period of five years was entered into. A third contract extended it for an indefinite period. The contract was finally terminated on July 31, 1920, by the defendants, and they took over the works on that date, and had since carried them on themselves. The parties were at issue as to the construction of an article of the contract which dealt with the price to be paid by the plaintiffs for the tar and ammoniacal liquor supplied to them by the defendants under the contract. In the Outer House, Lord Blackburn gave judgment for the defendants, holding that the plaintiffs construction of the article was erroneous. The Court recalled the interlocutor of the Lord Ordinary and allowed parties a proof.

The Lord President said he was not prepared to accept the construction which the Lord Ordinary had given to the Article. There was more than one possible construction open to the article, and in all probability the choice of which ought to be selected as the true one might be very greatly affected by the way parties had conducted themselves in relation to the contracts up to 1916. There was apparently no prospect of agreement as to the facts, and his Lordship saw no alternative but to send the case back to the Lord Ordinary in order that parties might have an opportunity of clearing up these matters.

FERTILISER NEWS.

Nitrate of Soda.—There seems to be little doubt that the United States, as the largest individual purchaser of Chilean nitrate, is becoming increasingly dissatisfied with the system of price-fixing adopted by the producers of the material. The lack of interest in the American spot market for some little time testifies to the belief that prices may weaken, instead of rise, later on. As has been stated in this column previously, the Government had ordered a comprehensive investigation into the nitrate industry, certain representatives of the United States visiting Chile to obtain first-hand information as to processes and costs of manufacture, while the conditions in the European market were being closely studied at the same time. The Government have now taken further steps, and the Department of Agriculture has issued to the Press a report, apparently based on information supplied by the investigator visiting Europe, in which it is stated that the present system of fixing the price of nitrate is inimical to the interests of consumers. It is complained that the United States, despite the fact of its premier position as a consumer, has no say in the matter of prices. In fact, in the actual words of the report "the evolution of the nitrate trade is operating to give Great Britain a strong advantage over the United States." The report further states "in theory, the price-fixing is done by a committee in Chile, but in reality by a London sub-committee, whose recommendations are almost invariably adopted." In the light of this very definite statement, the views expressed by the various chairmen at the recent shareholders' meetings of the English nitrate companies regarding the new season's prices, can be understood. At most of these meetings, it was regretted that the scale of prices had not been fixed at a higher level, but these regrets now appear to be something in the nature of propaganda. By making public announcements of this nature, the agriculturist, already heavily burdened, is led to believe that things might have been worse!

Sulphate of Ammonia.—The export tonnage of British sulphate again increased in the month of June, reaching the satisfactory total of 24,065 tons, compared with 21,476 tons in May and 11,563 tons in June of last year. Customers during the month, in order of importance, were Spain and the Canaries 7,955 tons, Japan 4,790 tons, the Dutch East Indies 3,838 tons, British West Indies 1,114 tons, France 433 tons, and Italy 360 tons, while countries not specially mentioned accounted in the aggregate for 5,575 tons. The end of June marks the end of the season, and therefore of the fertiliser year, and it is interesting to note that for the past six months, exports are almost double the quantity recorded for the same period in last year. So far this year, some 123,560 tons of sulphate have been despatched from British ports. This figure becomes more significant when it is remembered that total exports for 1922 were 145,292 tons, for 1921 128,493 tons and for 1920 109,620 tons. There is still much lost ground to regain if pre-war figures are to be reached, exports in 1913 amounting to 323,054 tons. The difficulties of competition, in spite of the factor of increasing consumption, are evident when it is found that America is able, even under the handicap of a great coal and railway strike, to export 147,331 tons last year, against an importation in 1914 amounting to 83,377 tons. There is some talk at the present time in the United States, of the existence of an agreement between the British Sulphate of Ammonia Federation and the leading distributors of American material, touching the apportioning of the world's markets for the commodity. Should such be the case, consumers will hardly welcome such an alliance, governing practically the whole of the available exportable sulphate, Germany being too busy looking after her own requirements under the stress of decreasing production. This rumour, however, is hardly supported by the fact that Japan is taking more sulphate than ever before from Great Britain, total imports for the past six months amounting to 20,392 tons—one sixth of the total exportation. This is all the more gratifying in view of the fact that in the corresponding period of 1922, only 50 tons of British material found its way to Japan. According to the Alkali Inspectors' Report, recently published, the total production in Great Britain of ammonia expressed in terms of 25¾ per cent. sulphate amounted to 351,142 tons, and was made up as follows: from gasworks, 163,863 tons, iron works 3,079 tons, shale works 45,860 tons, coke ovens, producer gas and carbonising works 138,340 tons.

Other Fertilisers.—The total turnover of basic slag during the half year ended June 30 last amounted to practically 17,800 tons, made up of 12,033 tons exported and 5,752 tons imported, against 13,343 tons (exports 5,763 and imports 7,580) in 1922 and 3,206 tons (exports 1,434 and imports 1,772) in 1921. The activity in the iron and steel industries, dating back for some time, is primarily responsible for the improvement, and it is gratifying to see that the relation of exports to imports is now more than 2 to 1. In the home market for this material, there is very little activity, and movements are at a minimum. Exports of compound fertilisers show an expanding tendency, the figure for 1923, up to the end of June, amounting to 29,619 tons, compared with 15,780 tons in 1922 and 6,456 in 1921. On the raw materials side, imports of raw guano during the first six months of this year, at 10,954 tons, are just double the quantity brought in in the same period of last year, and compare still more favourably with 4,050 tons in 1921. This increasing importation is reflected in the larger trade in the compound fertilisers noted above. Shipments of phosphate rock have been on a declining scale, imports for the half-year being 171,802 tons against 191,663 tons in 1922 and 212,685 tons in 1921. This may be accounted for by the fact of the depression existing for so long in the superphosphate industry of this country. Large imports of foreign superphosphates at prices below the cost of manufacture in this country have contributed in no small degree to the decline, while high prices for raw materials, and the general poverty of the agricultural consumer have added to the troubles of the superphosphate producer.

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IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JUNE.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of June, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the returns.

ARTICLES.	QUANTITIES. Month ended June 30.			VALUE. Month ended June 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):						
Acids:						
Acetic (including Acetic Anhydride, tons	89	567	987	3,975	20,600	32,106
Tartaric, including tartrates, not elsewhere specified ..cwts.	2,450	5,452	4,616	20,247	26,334	25,179
Bleaching Materials ,,	1,264	4,171	4,981	7,493	4,478	8,281
Borax ..... ,,	400	3,105	2,610	675	3,000	2,918
Calcium Carbide . ,,	16,443	17,263	28,355	17,507	11,127	19,390
Coal Tar Products not elsewhere specified ..... val.	—	—	—	103,247	109,859	34,551
Glycerine:						
Crude ..... cwts	1,499	3,406	60	5,043	8,665	120
Distilled ..... ,,	426	86	302	2,196	238	1,111
Lead Compounds:						
Red Lead and Orange Lead .. ,,	726	3,155	4,220	1,105	4,902	7,225
Nickel Oxide ... ,,	85	—	3,614	591	—	13,956
Potassium Compounds:						
Nitrate (Saltpetre) ..... cwts	10,429	13,095	1,049	15,500	14,134	1,413
Other C'pounds ,,	8,300	157,689	125,202	20,536	43,551	39,764
Sodium Compounds:						
Nitrate ..... cwts.	19,800	20,740	20,294	16,901	14,658	12,948
Other Compounds ,,	76,037	10,715	16,626	40,501	11,823	13,769
Tartar, Cream of ,,	5,300	3,447	2,064	37,972	16,975	8,911
Zinc Oxide ..... tons	340	500	811	11,788	15,253	28,385
All other Sorts .. val.	—	—	—	141,170	166,093	217,607
DRUGS, MEDICINES, AND MEDICINAL PREPARATIONS containing no Dutiable Ingredient:						
Quinine and Quinine Salts ..... ozs.	8,000	51,074	93,331	1,092	6,676	9,782
Bark, Cinchona (Bark, Peruvian, etc.) ..... cwts.	1,176	55	166	10,882	150	711
Other Sorts ..... val.	—	—	—	99,402	105,047	85,692
DYES and DYE STUFFS (except Dye Woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning:						
Intermediate Coal Tar Products used in the manufacture of Dyes (including Aniline Oil and Salt, and Phenyl-Glycine) ..... cwts.	—	—	—	—	—	—
Finished Dye Stuffs obtained from Coal Tar:						
Alizarine ..... cwts.	2,612	175	63	4,750	6,528	2,146
Indigo, synthetic ,,	21	—	—	312	—	—
Other Sorts ..... ,,	526	1,956	3,138	19,189	76,075	91,879
Extracts for Dyeing:						
Cutch ..... ,,	200	2,059	3,684	362	3,020	6,420
All other Sorts . ,,	3,189	10,980	4,386	30,031	49,876	19,257
Indigo, natural .. ,,	—	45	12	—	885	403
Extracts for Tanning (solid or liquid),,	37,937	44,613	92,129	38,575	50,749	92,059
PAINTERS' COLOURS and MATERIALS, not elsewhere specified:						
Barytes, ground (including Blanc Fixe) ..... ,,	12,187	44,566	52,148	3,509	10,539	13,469
White Lead (basic carbonate) ..... ,,	4,323	9,845	7,427	8,995	16,629	13,660
Other Sorts ..... ,,	30,396	59,491	81,322	48,036	89,635	120,828
OILS, REFINED:						
Essential (other than Turpentine):						
Natural ..... lb.	91,482	261,234	242,977	24,335	60,270	60,847
Petroleum:						
Lamp Oil ..... galls	16,939,269	7,256,693	6,044,285	743,117	189,965	135,966
Motor Spirit .... ,,	16,390,603	32,376,261	29,135,848	1,520,069	2,219,555	1,553,259
Spirit other than Motor Spirit ... ,,	—	1,800	568	—	200	38
Lubricating Oil .. ,,	1,953,902	5,365,168	11,197,026	222,291	326,668	601,717
Gas Oil ..... ,,	7,181,277	9,160,832	9,308,559	258,890	142,084	149,014
Fuel Oil ..... ,,	54,321,777	29,589,699	31,469,675	1,101,150	418,677	432,985
Other Sorts ..... ,,	2,400	—	6,339	308	—	1,004
Total ..... ,,	96,789,219	84,750,663	87,162,300	3,845,805	3,297,149	2,873,983

ARTICLES.	QUANTITIES Month ended June 30.			VALUE. Month ended June 30.		
	1921	1922.	1923.	1921.	1922.	1923.
				£	£	£
SOAP, not containing Spirit:						
Soft ..... cwts.	5	—	363	7	—	768
Hard, Household and Laundry, in bars and tablets ..... cwts.	8,553	9,102	12,729	28,931	25,271	29,547
Polishing and Scouring ..... ,,	5,947	6,200	6,624	7,766	7,155	9,428
Hard Toilet Soap and Shaving Soap .. ,,	1,983	2,116	5,721	18,204	13,797	28,185
Soap not elsewhere specified ..... ,,	100	773	148	150	1,655	365
Total ..... ,,	16,588	18,191	25,585	55,058	47,878	68,293
TURPENTINE..... ,,	17,201	45,220	35,346	65,130	130,772	139,340
WAX:						
Paraffin Wax.... ,,	45,154	70,830	73,515	65,863	73,367	70,666
OILS and FATS, refined edible:						
Animal (except Marine Animal), Refined:						
Lard:						
From U.S.A. .... tons	5,022	8,340	7,252	343,536	556,636	455,874
,, Other C'tries ,,	1,502	1,119	1,899	92,754	74,189	119,932
Total ..... ,,	6,524	9,459	9,151	436,290	630,855	575,806
Lard, Imitation . ,,	641	218	293	36,246	12,668	18,017
Oleo - margarine and Oleo-oil and Refined Tallow . ,,	2,242	3,385	2,434	104,484	158,468	125,031
Vegetable, other than Essential, Refined:						
Coconut Oil, Refined ..... tons	327	805	662	20,236	38,355	33,157
Cotton - seed Oil, Refined ..... ,,	1,168	219	19	74,752	10,506	1,445
Olive Oil, Refined ,,	225	787	331	34,291	58,468	27,269
Palm and Palm-Kernel Oil, Refined ,,	70	—	35	3,857	—	2,318
All other Sorts, Refined ..... ,,	816	513	680	59,659	36,670	43,547
Total ..... ,,	12,013	15,387	13,608	769,818	945,990	826,590
SEEDS for expressing Oil:						
Castor ..... tons	302	1,175	1,113	4,281	18,828	22,353
Cotton:						
From Egypt .... ,,	25,486	21,777	23,792	292,111	258,113	270,265
,, Brit. India ,,	5,081	11,265	6,922	46,289	102,526	64,646
,, Other C'tries ,,	10,133	6,612	5,081	94,994	70,279	46,860
Total ..... ,,	40,700	39,654	35,795	433,394	430,928	381,771
Flax or Linseed:						
From Russia ... ,,	—	—	—	—	—	—
,, U.S.A. ... ,,	—	—	—	—	—	—
,, Argentine Republic ,,	25,378	19,790	10,938	395,778	387,827	216,034
,, British East Indies ... ,,	847	15,978	25,918	15,205	334,202	548,729
,, Canada .. ,,	—	—	—	—	—	—
,, Other C'tries ,,	427	3,474	36	7,079	66,080	752
Total ..... ,,	26,652	39,242	36,922	418,062	788,109	765,515
Rape:						
From B. East In dies ,,	800	3,334	4,789	13,675	57,173	80,729
,, Other C'tries ,,	1	64	24	20	2,247	777
Total ..... ,,	801	3,398	4,813	13,695	59,420	81,506
Sesame (or Sesamum, Benni, Gingelly or Teel):						
From China .... tons	260	—	—	4,400	—	—
,, Other C'tries ,,	31	—	—	516	—	—
Total ..... ,,	231	—	—	4,916	—	—
Soya Beans:						
From Russia ... ,,	—	4,879	19,615	—	63,181	229,514
,, China .... ,,	—	4,120	9,503	—	51,128	112,051
,, Japan ... ,,	—	2,000	1,154	—	25,680	14,415
,, Other C'tries ,,	—	—	—	—	—	—
Total ..... ,,	—	10,999	30,272	—	139,989	355,980
Other Sorts, including Sunflower ..... tons	122	4,685	411	2,417	56,101	7,728
NUTS and KERNELS for expressing Oil therefrom:						
Copra ..... tons	5,664	5,247	5,018	168,291	133,542	143,614
Ground Nuts (Arachide, Pea, or Monkey Nuts) . ,,	8,774	6,376	7,831	143,367	120,182	155,412
Palm Kernels ... ,,	11,033	19,925	23,076	218,623	368,314	448,946
Other Sorts ..... ,,	87	92	661	1,741	1,091	16,141
Total ..... ,,	25,558	31,640	36,679	532,022	613,129	764,113

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JUNE.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month of June, 1923, compared with 1921 and 1922. As from April 1, 1923, the export trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended June 30.			Value. Month ended June 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):				£	£	£
ACIDS:						
Sulphuric ..... cwts.	1,042	1,531	2,779	2,089	2,540	3,381
Tartaric (including Tartrates not elsewhere specified) ..... ,,	308	195	1,083	4,416	1,452	6,754
AMMONIUM COMPOUNDS:						
Chloride (Muriate) tons	214	347	337	10,550	13,453	11,743
Sulphate—						
To France..... tons	—	21	433	—	401	7,246
,, Spain and Canaries .... ,,	419	3,941	7,955	7,970	68,298	129,095
,, Italy ..... ,,	65	736	360	1,048	12,210	6,188
,, Dutch East Indies ..... ,,	400	2,531	3,838	5,200	40,761	65,921
,, Japan ..... ,,	2,330	—	4,790	35,895	—	78,473
,, British West India Islands (including Bahamas) and British Guiana ,,	1,060	808	1,114	17,237	13,254	18,551
,, Other C'ntries ,,	710	3,526	5,575	11,525	59,178	89,020
Total ..... ,,	4,984	11,563	24,065	78,875	194,102	394,494
BLEACHING POWDER cwts.	3,425	25,581	12,443	3,785	14,696	6,781
COAL TAR PRODUCTS, not elsewhere specified:						
Anthracene..... cwts.	—	—	—	—	—	—
Benzol and Toluol galls.	317	4,544	247,393	62	710	21,247
Carbolic Acid ... cwts.	3,921	10,917	8,123	9,365	22,419	27,851
Naphtha ..... galls.	1,475	6,011	39,020	224	1,196	4,123
Naphthalene .... cwts.	3,091	1,480	19,303	2,683	1,744	11,370
Tar Oil, Creosote, etc. ..... galls.	569,290	3,896,646	8,577,741	29,031	101,060	313,195
Other Sorts ..... cwts.	9,025	15,102	41,933	7,235	13,915	19,983
Total ..... val.	—	—	—	48,600	141,044	397,769
COPPER, Sulphate of ..... tons	1,221	4,682	3,282	41,582	122,401	81,232
DISINFECTANTS, Insecticides, Weed-killers and Sheep and Cattle Dressings, except Tobacco Offal, containing no Dutiable Ingred'nt cwts.	13,503	18,098	31,488	38,287	47,444	74,874
GLYCERINE—						
Crude ..... cwts.	5,316	1,546	4,580	23,215	5,345	11,803
Distilled ..... ,,	1,669	2,949	5,815	10,701	12,134	23,219
Total ..... ,,	6,985	4,495	10,395	33,916	17,479	35,022
POTASSIUM COMPOUNDS:						
Chromate and Bichromate ..... cwts.	267	2,500	2,451	1,142	7,626	6,241
Nitrate (Saltpetre)						
British prepared ,,	833	851	1,098	1,971	1,922	2,189
Other Sorts ..... ,,	1,149	1,815	3,459	8,334	16,686	26,397
Total ..... ,,	2,249	5,166	7,008	11,447	26,234	34,827
SODIUM COMPOUNDS:						
Carbonate (including Soda Crystals, Soda Ash, and Bi-carbonate)... cwts.	172,428	368,948	564,615	68,552	115,934	154,497
Caustic ..... ,,	22,069	136,307	117,380	24,702	142,738	105,603
Chromate and Bichromate ..... ,,	1,197	4,107	4,171	3,932	10,193	8,902
Sulphate, including Saltcake ... ,,	28,249	142,420	151,884	16,862	28,985	38,201
Other Sorts ..... ,,	15,644	50,920	47,103	45,068	88,097	94,175
Total ..... ,,	239,587	702,702	885,153	159,116	385,947	401,378
ZINC OXIDE ..... tons	39	509	258	2,234	14,889	11,097
CHEMICALS, all other sorts ..... val.	—	—	—	142,156	288,932	283,703
DRUGS, MEDICINES, and MEDICINAL PREPARATIONS:						
Quinine and Quinine Salts .. ozs.	27,833	172,729	169,880	6,384	26,193	21,533
Opium, dried and powdered in the United Kingdom lbs.	346	143	1,155	280	165	1,051
Other Sorts ..... val.	—	—	—	142,470	177,666	199,808
Total ..... ,,	—	—	—	149,134	204,024	222,392

Articles.	Quantities. Month ended June 30.			Value. Month ended June 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
DYES and DYESTUFFS (except Dye-woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning: Products of Coal Tar ..... cwts.	3,568	4,000	9,191	79,364	61,146	82,142
Other Sorts ..... ,,	3,645	3,761	4,673	6,121	7,859	8,426
Total ..... ,,	7,213	7,761	13,864	85,485	69,005	90,568
PAINTERS' COLOURS and MATERIALS not elsewhere specified:						
Barytes, Ground (including Blanc Fixe). cwts.	708	7,573	20,023	315	3,981	8,466
White Lead (basic carbonate) ..... ,,	7,200	18,724	18,775	17,537	41,426	43,854
Paints and Colours Ground in Oil or Water ..... ,,	13,396	20,389	29,099	39,992	48,446	71,251
Paints and Enamels Prepared (including Ready-Mixed) ,,	13,967	14,878	29,754	56,771	51,445	93,641
Other Sorts ..... ,,	24,620	43,041	59,073	71,678	96,171	111,845
Total ..... ,,	59,891	104,605	156,724	186,293	241,469	329,057
CANDLES ..... cwts.	3,583	13,758	9,358	12,541	33,668	22,566
OILS, REFINED—						
*Lubricating Mixed: galls.	—	57,018	128,302	—	8,839	12,362
Petroleum:						
Lubricating .... ,,	293,432	438,170	645,782	58,919	59,253	80,634
Other Sorts ..... ,,	250,203	77,943	5,919,534	17,638	7,917	152,024
SOAP, not containing Spirit:						
Soft ..... cwts.	1,162	1,385	2,729	2,789	2,270	3,017
Hard: Household and Laundry, in bars and tablets:						
To China..... cwts.	364	1,209	1,291	1,138	3,087	3,049
,, Other Foreign Countries ... ,,	20,294	43,257	28,508	46,515	95,754	55,460
,, British South Africa ..... ,,	11	39	189	33	146	383
,, British East Indies ..... ,,	17,340	19,564	26,986	36,414	42,706	50,534
,, Other British Possessions . ,,	22,036	37,682	39,326	58,169	80,132	81,139
Total ..... ,,	60,045	101,751	93,290	142,269	221,825	190,565
Toilet (including Shaving..... cwts.	1,843	3,960	6,284	22,290	42,045	58,464
Polishing and Scouring ..... ,,	371	1,801	1,314	1,175	4,877	4,152
Soap, not elsewhere specified . ,,	809	2,693	5,227	3,978	15,928	23,549
Total of Soap ,,	64,221	111,590	111,844	172,501	286,945	279,747
VARNISH ..... galls.	66,507	82,095	117,831	50,551	52,269	66,998
WAX: Paraffin Wax cwts.	5,627	7,911	9,990	8,412	10,383	10,879
OIL-SEED CAKE:						
Cotton-seed Cake. tons	10	483	286	148	3,475	2,771
Linseed Cake ... ,,	723	348	1,487	11,156	4,499	16,175
Rape-seed Cake . ,,	—	—	—	—	—	5
Soya Bean Cake . ,,	—	182	730	—	2,055	7,015
All Other Sorts .. ,,	1,309	1,883	2,660	10,346	14,097	17,188
Total ..... ,,	2,042	2,899	5,163	21,650	24,126	43,454
OILS and FATS, refined edible—Animal (except Marine Animal), refined:						
Lard ..... tons	14	23	35	1,273	2,132	3,442
,, Imitation ,,	9	12	53	634	658	3,318
Vegetable (other than Essential), refined:						
Coconut Oil ..... ,,	70	21	195	5,609	1,247	11,036
Cotton-seed Oil .. ,,	286	155	390	13,100	7,738	18,318
Olive Oil ..... ,,	5	2	5	1,007	1,155	2,186
Palm Oil ..... ,,	40	52	61	1,611	1,874	2,818
Palm Kernel Oil . ,,	2	5	172	84	284	7,038
All other Sorts... ,,	783	940	424	35,465	42,743	17,642
Total ..... ,,	1,209	1,210	1,335	58,783	57,831	65,798
SALT (other than Table Salt):						
To Sweden ..... tons	665	1,664	4,233	2,445	4,496	14,529
,, U.S.A. ..... ,,	775	390	531	3,756	1,440	2,021
,, Nigeria ..... ,,	2,252	5,515	1,797	12,712	24,646	7,242
,, Brit. E. Indies ,,	3,354	9,445	5,349	10,084	28,407	10,705
,, Australia..... ,,	531	685	449	1,659	1,908	1,358
,, New Zealand . ,,	101	3,124	1,910	563	11,364	7,487
,, Canada ..... ,,	3,132	3,771	3,079	8,859	10,590	6,885
,, Other Countries ,,	4,311	6,086	7,262	17,162	17,972	20,685
Total ..... ,,	15,121	30,680	24,601	57,240	100,823	70,912

* Included in "Oils, Refined: Petroleum—Lubricating" prior to 1922.

(To be concluded.)

REPORTS OF COMPANIES.

Welsbach Light Company, Ltd.

The ordinary general meeting was held in London on Thursday (July 12), Mr. J. R. Yates (the chairman) presiding. The Chairman in moving the adoption of the report and accounts and the declaration of the dividend and bonus recommended, said that despite foreign and other competition, they sold more mantles last year than in the previous year, and considerably more sundries. In both cases they sold at lower prices, and, while in the case of mantles their aggregate receipts in pounds sterling were below those of the previous year, in the case of sundries, notwithstanding the lower prices, they were in excess of those of the preceding year. The company's advertising campaign had been one of the most extensive character of any in its history. The range of their burners had been considerably increased, partly in the development of aluminium burners, but especially in superheater and economy burners. They had broken fresh ground by introducing highly efficient electrical appliances for various uses on the table and elsewhere, the sales of which showed progress.

The motion was adopted.

Forth Glass Works, Ltd.

Accounts show that, after deduction of £597. for depreciation, there is a loss for the year to March 31 last of £2,623.; to this there falls to be added the debit balance from the previous year of £4,819., leaving a balance at debit of profit and loss account of £7,442. Report states that during the past year the trading conditions continued to be unsatisfactory and the works were on short time throughout the year.

Cape Asbestos Company, Ltd.

After providing for taxation, doubtful debts, and including income from Capamianto S.A.I., Turin, the profit for 1922 amounted to £13,840. (against £17,396. for 1921). Adding £9,422. brought forward, the total available is £23,263. An addition of £5,000. (the same) is made to reserve, and a dividend of 10 per cent., less tax, is proposed on the ordinary shares (the same). This dividend requires £5,273., and the preference shareholders receive an equivalent amount (under the terms of issue), in addition to the fixed 5 per cent. dividend. A balance of £5,504. is carried forward.

DIVIDENDS.

John Knight, Ltd.—Dividend on the 25 per cent. cumulative preferred ordinary shares, at rate of 12½ per cent. for half-year to May 31, 1923.

Major and Company, Ltd.—Net profits for 1922 were £30,403., and £2,140. was brought forward. A dividend on the ordinary shares of 10 per cent. is proposed, carrying forward £2,443.

South Metropolitan Gas Co.—Interim dividend declared at rate of 5 per cent. per annum, less tax, on ordinary for half-year.

Courtalds, Ltd.—Interim dividend of 1s. 3d. per share, free of income-tax. The total dividend for 1922 was 15 per cent., which included an interim distribution of 6¼ per cent. (1s. 3d.), paid in August last year.

Boots Pure Drug Company, Ltd. — The directors have declared an interim dividend of 9 per cent. (less tax) on the new ordinary shares with respect to the quarter ended June 30, 1923.

Gas Light and Coke Company.—Dividends for the half-year ended June 30, on the 4 per cent. consolidated preference stock at the rate of £4. per cent. per annum, on the 3½ per cent. maximum stock at the rate of £3. 10s. per cent. per annum, and on the ordinary stock at the rate of £5. 4s. per cent. per annum. Similar dividends were declared a year ago.

Electrolytic Zinc Co. of Australasia, Ltd.—Dividend at 8 per cent. per annum on the ordinary shares for the six months ended June 30 (against nil), and at the same rate on the 8 per cent. participating preference shares.

Mather and Platt, Ltd.—Interim dividend of 5 per cent., actual, on the ordinary shares, tax free.

International Nickel Co.—Directors have declared quarterly dividend of 1¼ per cent. on preferred stock.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained.

Belgium.

A Belgian agent in Brussels desires to secure the representation, on a commission basis or otherwise, of British manufacturers of shellac, Manilla gum, fish glues, and chemical products. (Ref. No. 31.)

A Belgian firm at Liége desire to secure the agency of British manufacturers or exporters of beeswax, turpentine essence, stearine, talc, carnauba wax, petroleum jelly, coconut, cotton-seed and soya-bean oils, calcium carbonate, calcined magnesite, and gum tragacanth. (Ref. No. 35.)

Czecho-Slovakia.

An old-established retail chemist in Bratislava is desirous of obtaining the sole agency for Slovakia, or for the whole of the republic, of a British firm of wholesale chemists. (Ref. No. 37.)

Denmark.

A firm of agents in Christiania are desirous of securing the agency in Denmark of a British merchant supplying agar agar. (Ref. No. 38.)

Netherlands.

An old-established and experienced agent at The Hague desires to obtain the sole representation for the Netherlands of British manufacturers of toilet articles, lavender water, and soap. (Ref. No. 45.)

United States.

A San Francisco firm of import and export merchants are desirous of receiving c.i.f. quotations for linseed and refined deodorised rapeseed oil. In the case of the former the company wish to deal with London exporters alone, and in the case of the latter only with manufacturers. (Ref. 20,066/F.W./C.C.2.)

NEW COMPANIES.

Associated Paint Manufacturers, Ltd.—Capital £5,000. Min. sub. £7. Solicitors: J. D. Langton and Passmore, 57½, Old Broad Street, E.C.

Tarslag (1923), Ltd.—Capital £250,000., in 150,000 8 per cent. cum preference shares of £1. and 1,000,000 shares of 2s. Solicitors: Coburn and Co., 6, Drapers Gardens, E.C.

British International Industries Ltd.—Private company. Capital £1,000. To acquire, develop, and turn to account chemical, manufacturing, and other formulæ. Office: 3 and 4, Clement's Inn, W.C.

Cleveland Scientific and Technical Institution.—Limited by guarantee. Secretary: Lt.-Col. E. L. Johnson, Corporation Road, Middlesbrough.

F. Lamplough and Co., Ltd.—Private company. Capital £4,000. 1s. shares. Oil and manufacturing chemists. Office: 25, Victoria Street, S.W. 1.

Lafarge Aluminous Cement Co., Ltd.—Private company. Capital £30,000. £1. shares (17,000 preferred ordinary and 13,000 deferred). Solicitors: Linklaters and Paines, 2, Bond Court, Walbrook, E.C.

Pierre Roustan (Grasse), Ltd.—Private company. Capital £1,000. Manufacturers and sellers of perfumes, lotions, etc. Office: 36. Mincing Lane, E.C.

New American Alcohol Denaturant.—The American Commission of Internal Revenue has authorised a new denaturant for alcohol used in the manufacture of fungicides, insecticides, deodourants and similar substances. The formula provides that for every 100 gals. of ethyl alcohol, there shall be added half a gallon of benzol and one gallon of the following solution: 5 gallons of an aqueous solution containing 40 per cent. nicotine, 0.4lb. of the acid yellow dyestuff Fast Yellow Y, 0.4lb. of Tetrazo Brilliant Blue 12B conc. and water to make 100 gallons.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

July 2 to 7 (inclusive).

Rotary Pumps for Gases. Akt.-Ges. Brown, Boveri, et Cie. 17,372.
Extraction of Liquids from Paper Pulp, Sewage Sludges, etc. Ardern, E.; and Huebner, J. 17,537.
Metal Catalyst. Barker, R. W. (*Vegetable Oil Securities Co.*). 17,221.
Recovering Ammonia from Gases or Vapours. Bone, W. A.; and Finch, G. I. 17,681.
Lime-sand Concrete. Caccia, R. 17,238.
White Lead. Campbell, F. H.; Clapp, F. B.; and Lloyd, G. F. 17,278.
Aminobenzoyl Derivatives of 1-methyl-4-diethylaminopentanol-5 and 2-methyl-4-dimethylaminopentanol-5. Chemische Fabrik Flora. 17,375.
Breaking Emulsions. Dixon, W. H.; and Hood, A. V. 17,386.
Artificial Marble. Douzal, E. 17,484.
Carboxylic-acid Chlorides. Farbwerke vorm. Meister, Lucius, and Brüning. 17,390.
Sizing Liquor. Grundy, R. E. 17,053.
Combined Developing and Fixing Compositions. Hashimoto, H. 17,138.
Drying Clay, Bone, Paint, etc. Hobson, W. 17,172.
Water Gas. Humphreys and Glasgow, Ltd. (*Evans*). 17,269.
Alkaline-earth Metal Compounds of the Organic Phosphorus Compound in Milk Casein. Imray, O. Y. (*Soc. of Chemical Industry in Basle*). 17,388.
Catalytic Reactions. Johnson, J. Y. (*Badische Anilin and Soda-Fabrik*. 17,467.
Aqueous Solutions for Producing Gases for Power or Fuel. Kelly, T. D. 17,576.
Cellulose Solutions. Lilienfeld, L. 17,130.
Cleaning Gases. Lodge-Cottrell, Ltd. (*Metallbank-und Metallurgische Ges.*). 17,147.
Electrical Precipitation of Suspended Particles from Gaseous Fluids. Lodge-Cottrell, Ltd. (*Metallbank-und Metallurgische Ges.*). 17,329.
Varnish. Mohlman, G. F.; and Snape, J. W. 17,265.
Obtaining Organic Super-oxides in a Finely Divided Condition. Naamlooze Vennootschap Vereenigde Fabriken van Chemische Producten. 17,256.
Separating Impurities in Suspension from Liquids. Petree, C. G. 17,480.
Iron Oxide for Purification of Coal Gas. Plausen's (Parent Co.), Ltd.; and Schotz, S. P. 17,290.
Calcining Kiln. Reber, J. W. 17,456.
Cement. Rigby, T. 17,285.
Diethylchloracetamide. Soc. Chimiques des Usines du Rhône. 17,466.
Aqueous Solutions from Difficultly Soluble Gums. Soc. Italiana E. De-Angeli per l'Industria dei Tessuti Stampati. 17,663.
Sulphurised Dyestuffs. Soc. of Chemical Industry in Basle. 17,389.
Burning of Sulphur. Texas Gulf Sulphur Co., Inc. 17,237.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. *in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.*

1921.

Hydrazine. Joyner, R. A.; and Nobel's Explosives Co., Ltd. 34,970. **199,750**
Vegetable Charcoal. Bonnard, L. H. 35,127. **199,751**

1922.

Flotation of Particles of Solid Matter. Eldred, B. E. 383. **199,753**
Dyeing of Cellulose Acetates. Clavel, Dr. R. 415. **199,754**
Evaporators with Tubular Heating-elements. Griscom-Russell Co. 2,522. **186,028**
Aqueous Solutions of Formaldehyde. Hirchberg L. M. 5,212. **199,759**
Formaldehyde by Catalysis. Hirchberg L. M. 5,214. **199,760**
Continuous Production of Low Boiling-point Hydrocarbons from Petroleum Oils. Hanna, R. W. 5,784. **199,766**
Azo Dyestuffs. Bloxam, A. G. (*Chemische Fabrik Griesheim Elektron*). 6,256. **199,771**
Anti-syphilis Substance. Marks, E. C. R. (*Bergel, Dr. S.; Chemische Fabrik Grünau Landshoff and Meyer Akt.-Ges; and Kahlbaum Chemische Fabrik Ges., C. A. F.*). 8,483. **199,784**
Preventing Oxidation. Hancock, L. J.; and Hancock, T. R. 8,591. **199,787**
Purification of Clay. Feldenheimer, W.; and Plowman, W. W. 8,817. **199,795**
Evaporating-pans. Pallister, F. 9,329. **199,829**
Sprinklers for Gas-scrubbers, Cooling-towers, and the Like. Still, C. (firm of); and Kuhn, A. 9,878. **199,847**
Rotary Filters. Plauson's (Parent Co.), Ltd. (*Plauson, Dr. H.*). 10,121. **199,853**
Therapeutically Active Acridine Derivatives. Imray, O. Y. (*Farbwerke vorm. Meister, Lucius, and Brüning*). 11,034. **199,870**
Oxidation Processes. Johnson, J. Y. (*Badische Anilin and Soda Fabrik*). 12,345. **199,886**
Retorts and Method of Protecting the Same. Fairweather, H. G. C. 13,621. **199,900**
Bating and Liming Hides or Skins. Moeller, Dr. W. 16,516 **199,937**
Purification of Hydrofluoric Acid. Howard, H. 25,221. **186,606**
Thermo-resistant Glassware. Nieuwenburg, C. J. van. 29,884. **200,020**
Extracting Sodium Bicarbonate and Other Salts Contained in Natural Soda Bicarbonated Mineral Waters. Appareils et Evaporateurs Kestner. 30,103. **188,335**
Zinc Electrolytes. Bianco, C. 31,376. **192,041**

1923.

Disinfectant Washing-powder. Grimshaw, A. 1,258. **200,033**
Porous Material for Use with Compressed Acetylene. Acétyléne Dissous et Applications de L'Acétyléne. 15,338. **199,394**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Mixed Fertiliser by the Utilisation of Distillers' Wash or Similar Organic Matters. Soc. E. Coppée et Cie. 14,304. **200,070**
Metal-iodide-alkali-iodide Compounds. Truttwin, H. 15,876. **200,081**
Polymerisation Products of Acetylene. Elektrizitätswerk Lonza. 16,283. **200,087**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Thymol. Howards and Sons, Ltd., Ilford; and J. Blagden, South Woodford, both in Essex. British Patent, **197,848**, of 1922.

Thymol is prepared by sulphonating *m*-cresol under conditions suitable for producing a polysulphonic acid, such as the di- or even tri-sulphonic acid, which is then condensed with isopropyl alcohol, the sulphonic groups split off and the thymol steam-distilled. According to an example *m*-cresol is treated with oleum, containing 88 per cent. total sulphur trioxide, first at 100° and then at 150° C. A solution of isopropyl alcohol in sulphuric acid is run in and the mixture maintained at 80-90° C. for several hours. It is then heated to 130° C. and a current of steam passed in, the thymol distilling off. A small quantity of by-product may be removed by solution of the thymol in alkali. A little isomeric thymol, melting at 114° C., is also formed.

Dyestuffs for Cellulose-acetate Silk. A. G. Green and K. H. Saunders, Manchester; and British Dyestuffs Corporation, Ltd., London. British Patent, **197,809**, of 1922.

N-Methyl-ω-sulphonic acids of diamido-azo compounds are obtained by sodium sulphide reduction of compounds of the general formula $X\text{-}N_2\text{-}Y\text{-}NH.CH_2.SO_3H$ or $X\text{-}N_2\text{-}Y\text{-}N_2\text{-}Z\text{-}NH.CH_2.SO_3H$ (in which X contains a *p*-nitro group), the N-methyl-ω-sulphonic groups remaining intact; a second ω-sulphonic residue can then be introduced into the molecule by treatment with formaldehyde bisulphite. Examples are gives of the reduction with cold sodium sulphide solution of monoazo dyes from diazotised *p*-nitraniline and the sodium N-methyl-ω-sulphonates of aniline, 2-amido-4-cresolmethyl-ether, and α-naphthylamine, and of the secondary disazo dye from *p*-nitraniline, 2-amino-4-cresolmethylether, and aniline-N-methyl-ω-sulphonate of sodium; the last named dyestuff may be diazotised upon the fibre and developed. The compounds which contain no sulphonic group in the nucleus are of especial value in dyeing acetyl silk. Specification 11343/99 is referred to.

Phosphorus Pentoxide. Sir R. Threlfall, Birmingham. British Patent, **197,863**, of 1922.

Phosphorus pentoxide made by burning phosphorus in a stream of dry air is condensed at a temperature of 125 to 200° C. in a compact, crystalline form. To avoid the presence of a small amount of the amorphous, bulky variety a portion of the vapour at about 160° C. is led through a filter containing glass wool to a second condensing chamber.

Catalytic Apparatus. I. W. Cederberg, Berlin, and H. M. Bäckström, Djursholm, Sweden. British Patent, **197,872**, of 1922.

Apparatus for carrying out exothermic catalytic reactions in gases, particularly the oxidation of ammonia and the production of sulphuric anhydride, comprises a series of rings in which the contact elements are supported, and which when pressed together, as by bolts, form a gas-tight chamber having inwardly and outwardly projecting flanges. The flanges serve to dissipate the heat of the reaction, and at the same time ensure that no portion of the gas flow shall evade passage over or through the contact material. The contacting faces of the rings are preferably conical; and in the case of an ammonia-oxidation apparatus, the rings are preferably of aluminium or a nickel alloy.

Recording Filter-bed Resistance. W. G. Kent, London. British Patent, **197,736,** of 1922.

Records of the resistance of a filter bed and of the rate of flow therethrough are made on drums, rotated by clockwork and preferably coaxial, by pencils whose movements are controlled by the movements of rocking beams or wheels, each connected to two displacers. The chambers for the displacers of the resistance record are respectively connected to a pipe leading from just above the filter bed and to a pipe leading from just below the bed. The chambers for the flow record are connected respectively to a constriction or throat on a pipe through which the filtered liquid flows and to the upstream end of the pipe.

Alkali Thiosulphates and Barium Salts. Rhenania Verein Chemischer Fabriken Akt.-Ges. Zweigniederlassung Mannheim and F. Rusberg, both in Mannheim, Germany. British Patent, **197,898,** of 1923.

Alkali thiosulphates are obtained by passing sulphuretted hydrogen into a solution of alkali bisulphite and sulphite. The sulphuretted hydrogen is advantageously obtained by lixiviating crude barium sulphide, and treating the solution with an acid such as carbonic or hydrochloric acid or similarly acting substance; or by treating crude barium sulphide mixed with water with an acid such as dilute hydrochloric or nitric acid or a similarly acting substance such as magnesium chloride, the corresponding barium salts being obtained in either case.

Ammonium Sulphate. Pease and Partners, Ltd., and G. Stephenson, Darlington. British Patent, **197,724,** of 1922.

Gases containing ammonia, such as coke-oven gases, are used to neutralise crude ammonium sulphate by arranging the neutralising vessel either in the main conveying the gas from the producer, or in a bye-pass to the main, the residual gases from the neutralisation being then led on to the saturators, scrubbers, or other bye-product recovery plant. Steam may be introduced into the neutralising vessel.

Sulphur Burners. A. T. Prentice, Somerset West, South Africa. British Patent, **197,845,** of 1922.

In a sulphur-burning furnace the primary combustion chamber is surrounded by a flue in which the combustion of the sulphurous gases is completed, and this in turn is surrounded by flues, for heating the primary and secondary air supplies. The primary combustion chamber is fitted with superposed hearths, and the air supply is delivered thereto through the ports. The sulphurous gases and the secondary air pass into the flue through the ports respectively. Valves are provided for regulating the primary and secondary supplies of air.

Pure Chromium. G. Brewer, London. (F. Krupp Akt.-Ges., Essen, Germany.) British Patent, **197,887,** of 1922.

An electrolyte for the continuous separation of pure chromium in thick layers contains chromic acid, a salt of trivalent chromium and chromium chromate, the amount of chromic acid being at least more than double that of the chromic oxide. The ratio of the current density at the anode to that at the cathode must be such that all the lower oxides produced at the cathode are oxidised continuously at the anode to chromium trioxide. In an example, the bath contains 25 per cent. of chromium trioxide, a little chromic sulphate, a little sulphuric acid and a little chromic oxide; it is electrolysed without a diaphragm at ordinary temperatures with lead peroxide anodes with a current density at the cathode of 10 amps per sq. dem. and at the anode of 5 amps per sq. dem. Chromium trioxide is added as electrolysis proceeds. Specification 1344/68 is referred to.

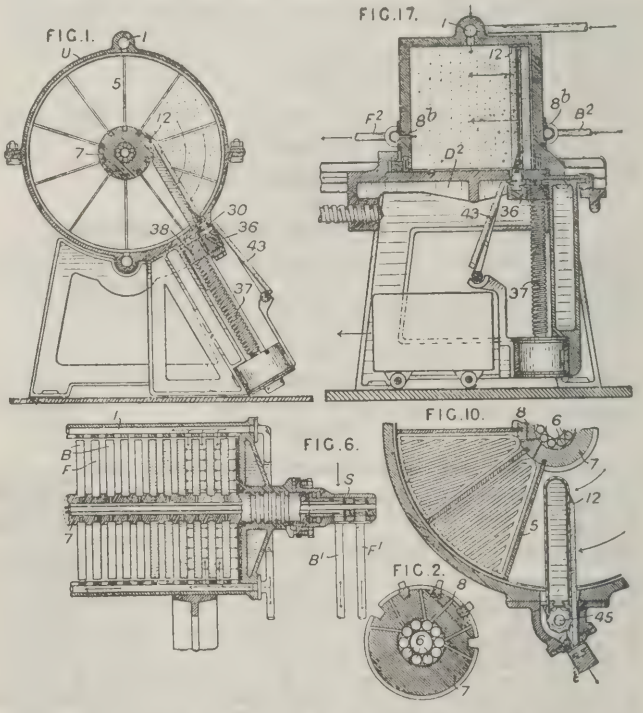
Colloids in Electro-Deposition. A. Classen, Aachen, Germany. British Patent, **197,885,** of 1922.

Colloids having the property of preventing the generation of hydrogen at the cathode are added to a bath for depositing glossy metallic coatings, for example, a coating of zinc on iron. A suitable addition may be prepared by covering a jelly containing gelatine with hydrogen peroxide until it liquefies. Other colloids such as gum, albumen, starch, or dextrin may be used instead of gelatine. Persulphates, perborates, percarbonates, persilicates, perphosphates, pyroperphosphates, persulphuric acid or permonosulphuric acid may be used instead of hydrogen peroxide, and are preferably acted upon—*e.g.*, by sulphuric acid so as to yield hydrogen peroxide.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Rotary and other Filters. H. Jung, Berlin. British Patent, **197,910.** Convention date, May 19.

Rotating-disc filter elements F, B, Fig. 6, are built up of sectors, mounted between spokes 5, Figs. 1 and 10, on a shaft 7 in a casing U to which the material to be filtered is supplied by pipes 1. The shaft 7 is hollow, and contains two series of pipes 6, Fig. 2, with which the elements are in communication alternately through passages 8. A stationary outlet-head S at one end of the shaft has apertures and passages which place one series of the pipes 6 in communication with the pipe F^1 and the outer series with a pipe B^1. When cakes have formed between the elements, treating fluid introduced through the pipe B^1 and elements B passes through the cakes to the elements F, and away by the pipe F^1. The solid matter forming the cakes is subsequently discharged from the casing by means of claws 12 which, with cones or valves 30—which close the necessary openings in the casing—are attached to a longitudinal rail 36 and a nut 38, which is reciprocated by means of a screw-spindle 37. During the operation of the claws, the filtering elements are slowly rotated, so that the cake is removed in strips, and directed away by a resiliently-supported plate 43. Fig. 10 shows an arrangement in which two claws 12 are attached to a chain passing round a driving-wheel 45. The apparatus shown in Fig. 17 has square filter elements which do not rotate,



but are connected by passages 8^b with pipes F^2, B^2 alternately. For the discharge of the cakes the lower wall D^2 of the casing is arranged to slide transversely, carrying with it the claws 12 and the connected parts, and the cakes are removed in strips as with the apparatus described above. Or the casing may move transversely relatively to the wall D^2 and the discharging apparatus. The Specification describes an arrangement in which all the valves used in apparatus of this type, including valves which control the supply of material under treatment, of different fluids to treat the cakes formed and cleanse the filter elements, and of fluid for actuating the cake-discharge devices, are operated pneumatically and automatically in the required sequence, a switch and indicator board being provided with means for regulating the duration of the several cake-treating processes.

GAZETTE NEWS.

SATISFACTIONS.

Industrial Chemical Co. Ltd., London, E.C.—Satisfaction registered July 4, £1,210., registered October 9, 1914.

Western Laboratories Ltd., London, W.—Satisfaction registered June 27, all moneys, etc., registered October 18, 1922.

BANKRUPTCY INFORMATION.

Wheatly, Albt. Edwd., 170, Lord Street, Southport, late trading as Confectioners' Colour and Essence Co., 20, Wood Street, Liverpool. Adj. July 3.

de Cesari, Enea, 9, Ampthill Square, Hampstead Road, N.W., manufacturer of vermin killer. June 6. Discharge suspended for two years.

DISSOLUTIONS OF PARTNERSHIP.

(*Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.*)

Oldfield, Pattinson and Co. (Thos. Ross Pattinson, Hy. Keeler Oldfield, and Wm. Ross Pattinson), Umpire Buildings, New Bridge Street, Manchester, wholesale druggists, April 30. Debts by H. K. Oldfield, who continues. (July 3).

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

British Boiler Fluid and Engineers' Stores Co., Ltd.; chemists; £11. 1s. 11d.; June 4. Registered office: 23, Tanner street, S.E.

Lewis, E., Smithfield-ho., Pontardawe; boot polish manufacturer; £37. 9s. 10d. May 29.

Ryland and Sons, 6, Boscombe Road, Tooting Junction; paste manufacturers; £19. 8s. 6d. May 24.

Smith, Sidney, 11, St. Silas Street, Hull; oil refiner; £41. 7s. 6d. May 31.

Stansfield, J. L., Booth Fold, Waterfoot; chemical manufacturer; £16. 7s. 1d. May 30.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

China Clay Corporation, Ltd.—Resolved June 5, confirmed June 22: That the company be voluntarily wound up. F. F. Fuller, 638, Salisbury House, E.C., liquidator.

Bitumen Products, Ltd.—Resolved June 2, confirmed June 27: That the company be wound up voluntarily. G. F. Todd, 224, St. Vincent Street, Glasgow, liquidator.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," July 21, 1888.)

Society of Chemical Industry.—We were unable from want of space in our last issue to give a full report of the address delivered at the Bute Hall of the Glasgow University, by Professor Dewar, F.R.S., president. He said that there was no problem at the present time which was more likely to modify in every respect chemical changes on a large scale than the question of fuel. More and more people were struck with the fact that this is becoming either a petroleum age or a natural gas age. One had only to visit the petroleum regions of America and to see the application of natural gas on a vast scale, to be convinced that sooner or later the supply of caloric would be the most telling agent as regarded all our manufactures. This more and more forced a small country to economise. The great development of the paraffin industry in this country, the application more and more largely of and the utilisation of waste products, had in recent years certainly struck everyone as being very closely connected with Glasgow manufactures. Of course he referred to the vast utilisation of the salts of ammonia which had now been undertaken by Scotch ironmasters, of whom three were engaged in the matter. Since the Messrs. Baird, of Gartsherrie adopted the process, practically something like one million cubic feet of gas were treated per diem for the absorption of ammonia yielding about seven tons, while an amount of air weighing 3,000 tons was dealt with. When they considered there the small amount of material to be separated, and the ingenuity of the apparatus, it could not be said that industrial chemistry was dormant in Glasgow.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—The slowness and smallness of business continues to be the main feature of the heavy chemical markets. One or two items are a shade easier, but generally the quoted rates are being fairly well maintained. The continued hold-up of business is certainly due to the grave and uncertain position on the Continent. **Acetic Acid,** 80% technical, £47. to £48.; 80% pure, about £50; 98% glacial, £60. in casks, and £75. in glass demi-johns, ex wharf, London. This item keeps very firm, with spot supplies still very limited. **Acetone,** British Government specification, about £120. per ton. There seems to have been plenty of inquiry about, but very little material available; price as quoted is firm. **Arsenic,** Cornish, white powdered, about £72. to £73. per ton. Supplies are still restricted and the high rates are maintained; business is small. **Alum,** lump, £10. 10s. to £11. per ton, in casks; dealers are offering continental material at these figures, with little doing. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb. The season's business is dropping off; prices are about the same

Barium Chloride, 98/100%, £15. to £15. 10s. per ton for spot parcels; offering here at these prices, with little inquiry received. **Bleaching Powder,** 35/37%, £10. to £10. 10s. per ton. Dealers are quoting continental material at about these levels with the demand poor. **Borax,** commercial, granulated, £26. 10s.; crystals, £27.; powdered, £28.; extra fine, £29.; B.P. crystals £31., powdered £32., extra fine £33. per ton, for home trade only, in free 2 cwt. bags, carriage paid to destination. British makers continue to quote at these levels. Importers are offering under similar conditions at: Commercial, granulated, £25. 10s., and powdered £27. per ton. **Borax Glass,** lump £74., powdered £75. per ton. British makers' prices remain at these figures for home trade only, carriage paid, packages free. **Boric Acid,** commercial, crystals, £50.; powdered, £52.; B.P., crystals £56, powdered £60, extra fine £62 per ton, in free bags, carriage paid to destination. British makers continue to quote at these rates for home trade only; dealers are competing at keen rates. **Cream of Tartar,** 99/100%, 92s. to 94s. per cwt., less 2½%. This material keeps very steady in price, and a fair volume of business has been on the market. **Citric Acid,** B.P., crystals, about 1s. 7¾d. to 1s. 8¾d. per lb. Dealers are offering spot material at these cheaper prices; a fair amount of business has been done. **Epsom Salts,** commercial quality, about £5. per ton, in bags. There has been no improvement in demand. **Formaldehyde,** 40%, about £96. per ton, ex wharf, London. This price is nominal; the market is at a standstill and is likely to remain so until the referee's decision on the recent appeal case is issued. **Glauber's Salt,** commercial quality, about £3. 15s. to £4. per ton, in bags. There has been but the smallest inquiry for this product; quotations unchanged. **Lead Acetate,** brown, about £42. 10s.;

white crystals, about £43. per ton. There has been some inquiry on the market but little actual business, owing to the high prices prevailing. **Litharge,** pure flake, British, about £37. Importers are offering at about £36. per ton. **Lithopone,** 30% continental red seal, about £22. to £22. 10s. per ton. Business has been rather quieter and prices just a shade easier; the market keeps steady. **Ammonium Chloride,** grey galvanising, about £30. 10s. per ton. Spot rates are well maintained at this level, and continental supplies are still interrupted. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b. British makers' prices are quoted unchanged. **Oxalic Acid,** about 6d. per lb. This is a dull feature with the price as quoted not very steady. **Bichromate of Potash,** about 6d. per lb. This market has been dull with quoted rates about the same. **Carbonate of Potash,** 90/92%, about £28. to £28. 10s.; 96/98%, about £32. per ton. This market keeps rather dull and prices as quoted are inclined to weaken. **Chlorate** of potash, crystals and granulated, about 3d. per lb. Very little inquiry is coming to dealers. **Caustic Potash,** 88/92% solid, about £32. 10s. to £33. per ton, in drums. These figures are being mentioned for spot parcels; demand poor. **Permanganate of Potash,** commercial quality, about 9¾d. to 10d. per lb. The market has been rather quieter of late; prices seem fairly steady. **Prussiate of Potash,** yellow, about 1s. 3d. per lb.; a further slight decline in quoted values is recorded, with business confined to small quantities only. **Sulphate of Potash,** 90%, £11. 10s. per ton, ex ship. There is no change on the week. **Mercury,** £10. 10s. to £11. per bottle of 75/76lbs. Spot rates are easier this week, and business is reported poor. **Red Lead,** imported, about £36. per ton. Dealers are doing a little business in small lots. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49. 10s.; medium, £43. to £44.; fine white crystals, £26. to £27. per ton. Dealers holding spot stocks are offering at these slightly easier prices this week, but business has been limited. **Saltcake,** ground and unground, home trade, about £4. 10s. to £5.; export, about £5. 10s. per ton, f.o.b. The demand for home trade has been quieter. **Acetate of Soda,** about £25. 10s. per ton. There is a much firmer tone in this market. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid to destination. British makers are quoting at this figure for home trade only; makers' prices for export vary according to destination **Soda Crystals,** £5. 5s. per ton, in bags, carriage paid to destination. British makers selling at this figure for home trade only, and dealers are offering at keen competitive rates. **Caustic Soda,** 70/72%, £18. 10s.; 76/77%, £20. 10s. per ton, in drums, ex wharf, shipping port. Dealers continue to offer at the cheaper prices reported last week. British makers' prices for home trade only show no change at £19. to £21. 10s. per ton, in drums, carriage paid to destination. Prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination. British makers' price given; dealers are quoting at about level rates. **Chlorate of Soda,** crystals and granular, 2¾d. per lb. Dealers are doing little business, and quoted rates are unchanged. **Cyanide of Soda,** 98/100%, export 8½d. to 9d. per lb.; home trade about 10½d. per lb. British makers quote at about these figures. **Nitrate of Soda,** 96%, about £13 7s. 6d. per ton, f.o.r. Liverpool. The market keeps steady at this unaltered figure. **Nitrite of Soda,** 100%, about £26. 10s. per ton. A slight decline in value is recorded here. **Prussiate of Soda,** about 7d. per lb. This market has been very quiet, and cheaper offers than the price quoted have been on the market. **Hyposulphite of Soda,** pea crystals, about £15. 10s per ton, in 1cwt. kegs, on the spot; commercial quality, about £10 10s. per ton, in casks. These prices are being mentioned by dealers, but they would probably be shaded for good sales. **Sodium Sulphide,** 60/62% solid, about £14. per ton; ditto, broken, £15. to £15. 10s. per ton, in drums; 60/65% concentrated, about £15. per ton, in casks. Very little business about at present. **Sulphate of Copper,** £25. to £25. 10s. per ton, f.o.b. continent. Offers at about these figures are being made but there is very little business about and the market seems weak. **Tin Crystals,** about 1s. 4d. per lb. The market is unchanged on the week. **White Lead,** imported, about £43. to £44. per ton. Dealers continue to find a little business at about these levels. **Zinc Oxide,** B.P., about £51. 10s.; white seal, about £43. 10s.; 99.5%, about £37. per ton, f.o.r. makers' works. British makers offering at about these prices, with business dull.

Pharmaceutical Chemicals.—Without exception, all reports to hand this week record the market as being very quiet indeed. The little business that has been done has been almost invariably for small quantities only; prices in a number of products are quoted on a lower level this week. **Acetanilid,** crystals and powder, about 1s. 5d. per lb. Values in this article have declined and the market is still weak and dull. **Acetyl-Salicyclic Acid,** B.P., about 3s. to 3s. 1d. per lb. At these slightly easier levels the market seems fairly steady. **Benzoic Acid,** B.P., about 2s. 3d. per lb. Quoted rates are down on the week, but there is very little doing. **Diethylbarbituric Acid,** B.P. (barbitone), about 21s. per lb. This rate is maintained on a dull market. **Salicyclic Acid,** B.P., about 2s. 2d. per lb. This market has been a quiet one, and prices are a shade easier. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb. Slightly easier prices are being quoted for large quantities. **Amidopyrin,** about 14s. per lb. There is seldom any inquiry for this article. Quoted unchanged on the week. **Ammonium Bromide,** 7d. to 9d. per lb., according to quantity. Spot parcels seem plentiful, with not much business about and prices are irregular. **Benzonaphthol,** about 5s. 6d. per lb. Somewhat dearer rates are asked this week. **Benzaldehyde 03,** about 3s. per lb. This market remains very flat; quoted rates unchanged. **Betanaphthol,** resublimed, about 1s. 10d. per lb. Some small inquiry about, but not much business. **Calcium Lactate,** 1s. 11d. to 2s. per lb. Slightly firmer rates are now being quoted, with some limited business passing. **Chloral Hydrate,** duty paid, 4s. to 4s. 3d. per lb. The market keeps very steady at about this level, with business moderate. **Creosote Carbonate,** about 8s 9d. to 9s. per lb. This market is a shade firmer on the week. **Creosote,** B.P., about 2s. 2d. There has been no improvement in demand; quoted at unchanged rates. **Guaiacol Carbonate,** about 8s. 3d. per lb., for small quantities. There has been very little inquiry of late. **Hexamine,** about 3s. 10d. to 4s. per lb. These slightly cheaper prices are being quoted for quantities; business is quiet. **Hydroquinone,** 3s. 6d. to 3s. 9d. per lb. At these levels the market seems very steady and a fair volume of business has been done. **Methyl Salicylate,** 2s. 5d. to 2s. 6d. per lb. The lower rate is being quoted for good quantities; at these prices the market seems steady. **Methyl Sulphonal,** about 15s. per lb. Hardly any movement in this product; quoted unchanged. **Paraformaldehyde,** 3s. 9d. to 4s. per lb. This market is a shade firmer this week. **Paraldehyde,** 1s. 5d. to 1s. 6d. per lb. Values are well maintained at about these levels; business limited. **Phenacetin,** about 6s. 3d. to 6s. 6d. per lb., according to quantity. Spot goods are on offer; business has been quieter. **Phenazone,** about 7s. 3d. to 7s. 6d. per lb. There is a slightly easier tendency in this market and business has fallen off. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb. Further material advances have taken place and the market holds very firm. **Piperazine,** about 4s. 6d. per oz., nominal. Some spot offers are said to be much cheaper than this rate. **Potassium Bromide,** B.P., crystals and granular, 6½d. to 7¼d. per lb. There seems to be plenty of material offering on spot, and prices asked are varying very much; the demand is not good. **Potassium Permanganate,** B.P., 10d. to 11d. per lb., as to quantity. At these rates the market seems fairly steady and some fair business has been done. **Potassium Sulphoguaiacolate,** 5s. 9d. to 6s. per lb. Quoted at these prices, with little inquiry on the market. **Salol,** about 2s. 8d. to 2s. 9d. per lb. Slightly easier prices are being asked this week, with business much quieter. **Sodium Benzoate,** about 2s. 6d. per lb. This market remains lifeless. **Sodium Bromide,** B.P., crystals and granular, 7d. to 8d. per lb., as to quantity. The market is not firm at these rates, and some large spot parcels are said to be offering at low figures. **Sodium Diethylbarbiturate,** about 21s. per lb. A sudden advance has been notified here; business seems difficult at this higher level. **Sodium Salicylate,** powder, 2s. 4d. to 2s. 7d. per lb.; crystals, 2s. 8d. to 2s. 10d.; phys. pure flake, 2s. 10d. to 3s. per lb. This market keeps fairly steady, but business has not been at all brisk of late. **Sulphonal,** 14s. to 15s. per lb. lower prices are being quoted here, with the market still dull. **Terpin Hydrate,** about 1s. 9d. per lb. This market keeps very steady, but business is limited. **Thymol,** about 15s. per lb. Spot material offering, but business slow.

Coal-tar Products, Intermediates, Etc.—The only change of importance to record is a firmer tone in pitch. All other items have been decidedly slow of sale, with quoted rates

returned unchanged. **Aniline Oil,** about 9½d. to 10d. per lb., drums free. This market has livened up a little. **Aniline Salt,** about 9½d. to 10d. per lb., casks free. Prices are quoted unchanged on a quiet market. **Betanaphthol,** about 1s. 1d. per lb. Quoted rates are unaltered on the week, with matters slow. **Benzol,** about 1s. 7d. per gallon, f.o.r. makers' works, in buyers' packages. This price is quoted still, but the demand has been very slow of late. **Toluol,** 2s. per gallon, f.o.r. makers' works, in buyers' packages. Business continues to move slowly; quoted prices unaltered. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra. Prices show no change on the week; market dull. **Naphtha,** about 1s. 5d. per gallon. This recently lowered rate is so far maintained, but the market is flat. **Solvent Naphtha,** 90/160, 1s. 5d. per gallon, drums extra. There has been but little doing, and quoted rates are unaltered. **Heavy Solvent Naphtha,** 90/190, 1s. 4d. per gallon, drums extra. The market remains dull, with quoted rates unchanged. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free. This market has shown but little activity of late, and quoted prices remain unchanged. **Burning Oil,** crude, No. 3, 8½d.; No. 2, 8d., per gallon, barrels free. This market continues dull, and prices show no change. **Creosote Oil,** about 10d. per gallon, naked, f.o.b. The market seems quite steady, but business is lacking. **Carbolic Acid,** crystals, about 1s. 2d. per lb. Prices seem to be very irregular, with some offers asking up to 1s. 5d. per lb.; any business about would be at the lower figure. **Naphthalene,** about £20 per ton. The market has been dull and is inclined to be a little easier. Crude, £7. to £13.; crystals, £21.; powder, about £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free. Hardly any inquiry about. **Pyridine,** about 18s. per gallon. There does not appear to be any material to offer on spot; quoted price is firm. **Hexamethylene,** 4s. to 4s. 3d. per gallon. The market keeps well up to these rates, and some business has been done. **Pure Methyl Alcohol,** £100. per ton, ex wharf, London. There is no sign of a break in this market; inquiry has been fair. **Pitch,** 135s., London, spot. The market has improved slightly during the week, and the better tone recently reported is well maintained. Forward offers in the region of 147s. 6d. to 150s. per ton are proving of interest.

LONDON METAL MARKET. WEDNESDAY.

Copper: Standard brands, £65. to £65. 2s. 6d., cash; £65. 15s. to £65. 17s. 6d., three months; electrolytic, £72. 10s. to £73. **Tin:** Standard, £171. 7s. 6d. to £178. 10s., cash; £179. 12s. 6d. to £177. 15s., three months; Straits, £181. 7s. 6d.; English, £179. **Lead,** soft foreign, £24. prompt; English, £25. 5s.; chemical sheet, 33s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £29. 2s. 6d.; hard, £24. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £16. 5s **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 13s. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust,** quotations are lower, as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. WEDNESDAY.

There has been rather more inquiry for heavy chemicals during the past week, but business as a whole still continues unsatisfactory, and values generally are in buyers' favour. The quotations for alkali products remain steady at recent rates. **Bleaching Powder,** softwoods is quiet at £11. 7s. 6d. on rails. **Chlorates** are dull; **Potash** at 3d., and **Soda** 2¾d. per lb. respectively. **Bichromates** unchanged. **Roasted Saltcake,** firm for home trade, at £4 10s. delivered; demand for export is still brisk. For **Copper Sulphate** there is little or no inquiry, and quotations are nominal at £26. f.o.b. **Phosphate** and **Hypo Soda** are lower; **Nitrite,** firm, at £26. 10s. ex store. Concentrated **Sodium Sulphide,** easy, at £15. per ton. **White Powdered Arsenic** dull, at £70. on rails, Cornish works. **Yellow Prussiate of Potash,** weak, at 1s. 2¾d. per lb.; **Soda,** unchanged, at 6¾d. per lb. **Caustic Potash,** higher, at £29. for 88/90%; **Carbonate,** 90%, steady, at £28. per ton. Grey and brown **Acetate of Lime** are in short supply, and prices have an upward tendency. **Acetic Acid** and **Acetate of Soda** are firmer. **Acetone,** steady, at £120. **Miscible Wood Naphtha,** easier, at 6s. 6d. per gallon. There is not much inquiry for **Lead Salts,** but values are firmly maintained; white **Acetate** at £40., brown £42.; and **Nitrate** £42., delivered. **Copperas** is in good request. **American Rock Sulphur,** steady, at £5 5s. on rails. **Oxalic Acid,** neglected, at 6¼d. per lb. **Permanganate of Potash,** 9¾d. per lb.

SWANSEA MARKET REPORT. WEDNESDAY.

Tinplates moved very slowly and business for forward delivery was practically nil on the basis of £1. 3s. 1½d. per standard box. **Galvanised Sheets,** weak, at £18. 2s. 6d. per ton. **Copper,** fairly active, with firmer prices at £64. 17s. 6d. per ton prompt, and £65. 12s. 6d. three months. **Tin,** very irregular, at £178. 17s. 6d. per ton, cash, and £180. 2s. 6d. three months. **Lead,** more active; soft foreign, prompt £23. 17s. 6d., and forward £23. 7s. 6d. per ton; English £25. 5s. **Spelter,** £28. 12s. 6d. per ton for foreign, prompt, and £28. 17s. 6d. forward. **Zinc Sheets** in fair demand at £38. 7s. 6d. per ton, on rails makers' works. **Sulphate of Ammonia,** quiet, at £14 15s. and £13. 12s. per ton for home purposes; little export, at slightly higher rates. **Sulphate of Copper,** slow, with prompt delivery; £26. 5s. per ton, less 5%. **Nitrate of Soda,** very quiet, at £13. 12s. 6d. per ton. **Bonemeal** slow; Indian, prompt, £8. 17s. 6d. per ton. **Sulphuric Acid,** in steady demand, with easier conditions, at £3. 7s. 6d. to £6. 17s. 6d. per ton, f.o.r. **Oxalic Acid** remains very quiet, at 6¼d. per lb., f.o.r. **Arsenic** is neglected and white powdered on small supplies was quoted £70. 17s. 6d. per ton, f.o.b. **Pitch** met with poor turnover, with lower tendency at £6 12s. 6d. **Copperas,** delivered in bulk, £2 per ton. **Coal** business was of a steady character, with numerous foreign inquiries. Admiralty qualities were firmly held, with best smokeless at £1 10s. to £1. 12s. 6d.; seconds £1. 9s.; ordinaries £1. 8s.; Monmouthshire black vein £1. 8s. 6d. per ton, all f.o.b. **Anthracite** was very firm, with less inquiry. Best large £2 10s., seconds £2 2s. 6d., Paris nuts £3 2s. 6d. per ton, f.o.b. **Patent Fuel,** quiet, from £1 13s. to £1. 15s. per ton, f.o.b. **Cokes,** firmer, especially the foundry grades; export £2. 10s. to £2. 15s. per ton, f.o.b.; foundry £2 to £2 5s., and furnace £1. 10s. to £1. 15s. per ton.

LIVERPOOL CHEMICAL MARKET. WEDNESDAY.

Business in the heavier chemicals continues to be done on a moderate scale, so far as home-trade requirements are concerned. The quietness is generally attributed to the tension between France and Germany and the interruption of trade between these countries and the United Kingdom. Shipments for other foreign countries continue fairly active, so that an element of life is maintained in the market through the movement in the export branch of the trade. **Bleaching Powder** has had a slightly freer inquiry. The price is £10. to £11. per ton for use in the United Kingdom, and £11. per ton for export. **Calcium Chloride** has been in very fair request, the warmer weather having increased the demand for this commodity for brine making. It is £5. 17s. 6d. per ton. **Caustic Soda** has had a steady inquiry for use in the U.K. and a moderate shipment to overseas ports. Quotations are £20. 7s. 6d. to £21. 7s. 6d. per ton for 76%, carriage paid for home-trade use, and £20. 10s. per ton. for export. **Bicarbonate of Soda** has sold with some freedom on home-trade account and has had a moderately active shipment for export. It is £10 10s. per ton, carriage paid, for use in the United Kingdom. **Soda Crystals** have been in fair demand and are £5 5s. per ton for home-trade uses. **Nitrate of Soda** continues quiet and is £13 5s. to £13 10s. per ton. **Borax** has been rather more in request for use in the U.K. and has had a moderate shipment. Commercial crystals are £27. per ton, and powdered £28. Higher grades are: Crystals £31. per ton, powdered £32. per ton, carriage paid in the U.K. **Saltcake** has again been in fair demand for home-trade uses. The price is £4. 10s. to £5. per ton for the U.K., and £5. 10s. to £6. per ton for export. **Bichromates of Soda** has been but little in demand and is 4½d. per lb., c.i.f. to usual ports. **Ammonia Alkali** has been in very fair request for home-trade uses, and has moved rather freely on export

account. It is £7. 12s. 6d. per ton for use in the U.K., and £8. per ton for export. **Hyposulphite of Soda** has been in rather good request. It is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £16. per ton, in 1cwt. kegs, for photographic. **Sulphide of Soda** has been but little called for. Solid is £16. per ton, and crystals £10. 10s. to £11. 10s. per ton. **Chlorate of Soda** has been in moderate demand, and is 3d. to 3½d. per lb. **Phosphate of Soda** has moved but slowly, and is £15. to £16. per ton. **Prussiate of Soda** has been but little in request, and is 7d. to 8d. per lb. **Yellow Prussiate of Potash** has been rather more in demand, and is 1s. 4d. to 1s. 4½d. per lb. **Red Prussiate** has moved but slowly, and the price is easier; it is 3s. 3d. to 3s. 6d. per lb. **Carbonates of Potash** has had a small sale, and is £26. to £32. per ton, according to quality. **Nitrate of Potash** has had a steady though moderate inquiry, and is £33. to £35. per ton for refined. **Chlorate of Potash** has been very quiet, and is 4d. to 4½d. per lb. **Caustic Potash** has been in slightly freer demand, and is £32. to £33. per ton. **Permanganate of Potash** has been quieter, and is 10d. to 10½d. per lb. **Bichromate of Potash** has had a fair inquiry, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has moved but slowly. First quality is £63. per ton, second quality £60., and third £57. **Sulphate of Ammonia** has been quiet for home-trade uses, but has had a fairly heavy shipment for foreign ports. Neutral is £14. 15s. per ton, and ordinary £13. 12s. per ton, to the end of August. **Carbonate of Ammonia** has had a steady inquiry, and is 4d. per lb. **Muriate of Ammonia** has been but little in demand, and is £32. to £33. per ton. **Magnesia** continues to meet with a fair inquiry. **Carbonate** is £2. 5s. per cwt. and **Sulphate** £5. to £6. per ton. **Alum** has been in moderate demand. The price is £12. to £13. per ton for home trade and £11. 10s. to £12. per ton for export. **Sulphate of Alumina** has been rather more in demand, and is £8. to £12. per ton, according to quality. **Sulphur** has again been in good request. Flowers are £10. per ton; roll is £8. 10s. per ton; rock £8. to £8. 10s. per ton; and American £5. to £5. 10s. per ton. **Tartaric Acid** has been in fair request, and is 1s. 3d. to 1s. 3½d. per lb. **Cream of Tartar** has been more in demand, and is £4. 14s. to £4. 17s. per cwt. **Boric Acid** has had a slightly freer inquiry. Commercial crystals are £55. per ton, and powdered £58., and £2. per ton more if in casks. **Citric Acid** has been in very fair request, and is 1s. 9d. to 1s. 10d. per lb. **Oxalic Acid** has had a limited inquiry, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** has moved but slowly, and is £42. to £43. per ton. **Sulphate of Copper** has been in moderate demand for use in the U.K., and is £26. to £26. 5s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been but little called for. White powdered is £71. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

The approach of the holidays is reflected in the easing-off in the demand for chemicals on home account during the week. Export inquiries also continue to be limited. Prices are easier in certain lines, but otherwise nominal quotations still hold steady. The following prices are at Glasgow, unless otherwise stated:—**Alum,** little doing, and in small demand; prices have been reduced and now stand at £12. 5s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; it is quoted on spot at £77. net. **Barium Chloride** remains very quiet, despite a further reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation still stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax,** granulated, is on offer at £26. 10s. per ton net, in 2 cwt. bags. **Calcium Chloride,** 70—75 per cent. solid, £5. 12s. 6d. per ton. **Citric Acid** is a declining market, though last week's reduced price is maintained at 1s. 8¼d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure af £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar,** steady, with better inquiry, and the price continues firm at £4 10s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in quieter demand; brown steady at £40. 10s. per ton, net, and white lower at £40. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid,** at 5¼d. per lb., is dull, a substantial decline in price being recorded. **Paraffin Wax** experiences a fair export trade at 2⅞d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the rather easier figure of 1s. 4d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 11s. per ton, but business is nominal. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic,** 43—44%, in fair request at 1s. 1½d. **Tartaric Acid** still shows a quieter tendency at 1s. 3¼d. per lb.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending July 14.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 70 cks.

BARYTES—
Antwerp, 160 bgs.

BITUMEN—
New Orleans, 188 brls.

CARBONATE OF LIME—
Hamburg, 100 bgs.

CASEIN—
Nantes, 22 bgs.

CAUSTIC POTASH—
Hamburg, 31 drms.

CHROME ORE—
Natal, 10 bgs.

CITRIC ACID—
Genoa, 20 brls.

COAL TAR PRODUCTS—
Naphthalene
Hamburg, 200 brls.

CREAM OF TARTAR—
Bordeaux, 20 cs., 20 brls.
Hamburg, 20 cks.

DEXTRINE—
Hamburg, 700 bgs.

GLUE—
Antwerp, 30 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 300 drms.

PARAFFIN WAX—
New Orleans, 199 sks.

POTASH ALUM—
Hamburg, 66 brls.

RED LEAD—
Genoa, 98 cks.

ROSIN—
New Orleans, 100 brls.

SALT—
Hamburg, 300 bgs.

SOAP—
Catania, 206 cs.
Melbourne, 600 cs.
New Orleans, 160 brls.

SODIUM SULPHATE—
Hamburg, 100 bgs.

STEARINE—
Antwerp, 13 bgs.

SULPHUR—
Catania, 934 pkgs.

TANNING MATERIALS—
Chestnut
Genoa, 70 brls.
Wattle
Natal, 2,550 bgs., 2,365 bls.

TARTARIC ACID—
Genoa, 24 brls.

WAX (*otherwise undescribed*)—
New Orleans, 310 brls.

WHITE LEAD—
Genoa, 98 cks.
Hamburg, 19 cks.

ZINC ASHES—
Natal, 98 bgs.

ZINC OXIDE—
Antwerp, 16 brls.

GOOLE.

Week ending July 14.

BARYTES—
Bremen, 50 bgs., 135 cks., 50 bgs.

CHEMICALS (*otherwise undescribed*)
Bremen, 35 cks.

FORMIC ACID—
Rotterdam, 130 crbys.

GLUE—
Boulogne, 53 lb., 20 bgs.
Hamburg, 60 bgs.

LITHOPONE—
Hamburg, 20 cs.

MAGNESITE—
Amsterdam, 100 bgs.

MAGNESIUM SULPHATE—
Hamburg, 110 bgs.

POTASH—
Hamburg, 10 cks.

SILICA (*otherwise undescribed*)—
Bremen, 301 bgs.
SOAP—
Hamburg, 1 cs.
SODIUM SILICATE—
Hamburg, 200 sks.
SULPHUR—
Bremen, 5 cs.
WHITE LEAD—
Bremen, 23 cks.

GRANGEMOUTH.

Week ending July 14.

CALCIUM CARBIDE—
Trondhjem, 6,050 drms.
CHEMICALS (*otherwise undescribed*)
Christiania and Drammen, 20 cks.
MAGNESITE—
Trieste and Bona, 26,053 bgs.
TALLOW—
Christiania & Drammen, 30 brls.
WHITE LEAD—
Rotterdam, 39 cs.

GRIMSBY.

Week ending July 14.

POTASSIUM BINOXALATE—
Hamburg, 3 cks.

HULL.

OFFICIAL AMENDMENTS.

To Return for week ending June 23, 1923, *Add*—

SUPERPHOSPHATE—
Antwerp, 61 t.

Week ending July 14.

BLEACHING POWDER—
Amsterdam, 2 t.
CALCIUM CARBIDE—
Antwerp, 8 t.
Christiania, 30 t.
CAUSTIC POTASH—
Rotterdam, 10 t.
CHEMICALS (*otherwise undescribed*)
Amsterdam, 30 t. 10 c.; Antwerp, 5 t.; Bari, 1 t.; Copenhagen, 10 galls.; Ghent, 2 t.; Hamburg, 9 t. 10 c.
COAL TAR PRODUCTS—
Tar Oil
Helsingfors, 840 galls.
DEXTRINE—
Harlingen, 4 t.
DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 240 lb.
FERRO CHROME—
Gothenburg, 34 t.
Trondhjem, 54 t.
FERRO SILICON—
Christiania, 55 t.
Gothenburg, 126 t.
GLUE—
Hamburg, 14 c.
GUM ARABIC—
Pt. Sudan, 25 t.
MAGNESITE—
Hamburg, 25 t.
PARAFFIN WAX—
New York, 70 t. 9 c.
POTASSIUM NITRATE—
Antwerp, 25 t.
ROSIN—
Savannah, 122 t. 10 c.
SILICO MANGANESE—
Gothenburg, 19 t.
SODA—
Rotterdam, 3 c.
STEARINE—
Antwerp, 5 t.
TANNING MATERIALS—
Sumac
Palermo, 7 t. 10 c.
Valonia
Smyrna, 175 t.
Wattle
Durban, 10 c., 1,012 t. 4 c.

LEITH.

Week ending July 14.

BARYTES—
Hamburg, 33 cks., 150 bgs.
CALCIUM CARBIDE—
Antwerp, 50 drms.
Rotterdam, 600 drms.
CHEMICALS (*otherwise undescribed*)
Hamburg, 19 drms.
COAL TAR PRODUCTS—
Naphthalene
Hamburg, 5 cks.
CREAM OF TARTAR—
Amsterdam, 648 pkgs.
KIESELGUHR—
Hamburg, 37 cks.
LITHOPONE—
Amsterdam, 180 cks.
Hamburg, 40 cs., 20 brls.
SALT—
Hamburg, 200 bgs.
SALTPETRE—
Rotterdam, 20 cks.
SOAP—
Copenhagen, 6 cs.; New York, 500 cs.; Odense, 3 cs.; Philadelphia, 600 bxs.
STEARINE—
Antwerp, 25 bgs.
New York, 99 brls.
ZINC OXIDE—
New York, 500 brls.

LIVERPOOL.

OFFICIAL AMENDMENTS.

To Return for week ending June 30, 1923, *Add*—

LITHOPONE—
Rotterdam, 80 cks.
SALTPETRE—
Rotterdam, 83 pkgs.
DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 7 cks.

Week ending July 14.

ACETIC ACID—
Rouen, 50 cks.
ACETONE—
Hamburg, 45 brls.
ARGOLS—
Bordeaux, 461 bgs.
ARSENIC—
Bordeaux, 28 cks.
Yokohama, 100 cs.
BEESWAX—
Conakry, 23 pkgs., 153 blks.
Lagos, 3 cs.
BORAX—
Los Angeles, 2,550 bgs.
CASEIN—
Buenos Ayres, 250 bgs.
Nantes, 28 bgs.
CAUSTIC SODA—
New York, 4 drms.
CHEMICALS (*otherwise undescribed*)
Fredriksstad, 16 cks.
COAL TAR PRODUCTS—
Carbolic Acid
Bordeaux, 9 drms.
Tar
Jacksonville, 50 drms.
CREAM OF TARTAR—
Amsterdam, 148 kgs.; Bordeaux 24 pkgs., 10 kgs., 105 bgs.
DYESTUFFS (NATURAL)—
Cochineal
Las Palmas, 12 bgs.
Unspecified
Philadelphia, 250 bxs.
FERTILISER (DRIED BLOOD)—
Alexandria, 100 sks.
GLUE—
Antwerp, 652 bls.
Havre, 20 bgs.
GUANO—
Alexandria, 100 sks.
LACTIC ACID—
Hamburg, 48 cks.
LITHOPONE—
Rotterdam, 40 cks.
MAGNESIUM CHLORIDE—
Hamburg, 88 drms.
MAGNESIUM SULPHATE—
Hamburg, 50 bgs.
MANGANESE ORE—
Sekondi, 4,120 t.
OCHRE—
Rouen, 116 cks.
PARAFFIN WAX—
Baltimore, 339 bgs., 1,970 brls.
POTASSIUM CHLORIDE—
Hamburg, 2,500 bgs.
POTASSIUM HYDRATE—
Hamburg, 49 brls.
POTASSIUM NITRATE—
Antwerp, 10 bgs.
Hamburg, 1,832 t.
POTASSIUM SULPHATE—
Hamburg, 2,600 bgs.
RED LEAD—
Genoa, 54 cks.
ROSIN—
Brunswick, 3,550 brls.; Jacksonville, 3,385 brls.; Pensacola, 900 brls.; Savannah, 2,333 brls.
SALT—
Hamburg, 50 bgs.
SALTPETRE—
Antwerp, 50 cks.
SIZE—
Jacksonville, 100 brls.
SODA—
New York, 5 cs., 20 kgs.
SODIUM PHOSPHATE—
Antwerp, 19 cks.
SODIUM PRUSSIATE—
New York, 43 brls.
SODIUM SILICATE—
New York, 1 brl.
STEARINE—
Buenos Ayres, 57 pkgs.
SULPHUR—
Catania, 788 pkgs.
TALLOW—
Buenos Ayres, 1,325 pkgs.; Boston, 539 brls.; Chicama, 16 brls.; Fredriksstad, 1,270 brls., 650 drms., 2 pps.
TANNING MATERIALS—
Divi Divi
Kingston, 256 bgs.
Gambier
Singapore, 303 bgs.
Myrabolans
Bombay, 2,405 bgs.
Quebracho
Buenos Ayres, 518 bgs.
Sumac
Palermo, 283 bgs.
Valonia
Smyrna, 670 bgs.
Unspecified
Bordeaux, 243 cks.; New York, 2 brls.; Norfolk, 515 bgs.
TAR (WOOD)—
Savannah, 200 brls.
TIN ORE—
Mejillones, 7,200 t.
TURPENTINE—
Bordeaux, 5 drms.; Brunswick, 200 brls.; Jacksonville, 100 cks., 700 brls.; Pensacola, 50 brls.; Savannah, 950 brls.
ULTRAMARINE BLUE—
Antwerp, 4 cks.
WAX—
New Yorks, 130 brls.
Valparaiso, 30 cs.
WHITE LEAD—
New York, 25 cks.
ZINC DUST—
New York, 560 cs.
ZINC OXIDE—
Antwerp, 80 brls.
Rotterdam, 25 cks.

LONDON.

Week ending July 14.

ACETIC ACID—
France, 50 pkgs. Brown
ALUM—
Germany, 6 pkgs. E. Friedlander
AMMONIUM CHLORIDE—
Germany, 5 t. 10 c. H. G. Harper
AMMONIUM NITRATE—
Germany, 10 t. Stott & Hotopf
ARGOLS—
Denmark, 68 pkgs.
France, 786
Italy, 58
,, 35 Fellows, Morton
Spain, 439
ARSENIOUS ACID—
Portugal, 61 pkgs.
ASBESTOS—
Canada, 48 t. 5 c. T. de La Rue
BARYTES—
Germany, 750 bgs. Pallister.
720 cks. Luck
,, 34 cks. Taylor Bros. & Cox
,, 55 B. Ulrich
BEESWAX—
B.W.I., 8 brls. Weber
Smith & Hoare
,, 1 pkg. R. G. Hall
,, 7 pkgs.
,, 1 csk.
France, 36 pkgs.
Latvia, 20 bgs. Romariz Pistacchini
Pt. E. Africa, 211 pkgs.
BISMUTH ORE—
Spain, 2 t. Porter, Hill
BORIC ACID—
France, 100 pkgs. Burton, Baker
Victoria, 61
CALCIUM CARBIDE—
Norway, 2 t. 10 c. C. J. Quick
CARBON BLACK—
Holland, 4 brls.
U.S.A., 25 cs. Lavington
,, 95
,, 75 Munzi
CANDELILLA WAX—
U.S.A., 787 bgs.
CASEIN—
France, £1,705 Brit. Xylonite
,, £1,120 Guesdon
,, £240.
Germany, £777 Cox, Fallas, & Eves
Irish F.S., £579.
CAUSTIC POTASH—
Holland, 17 pkgs. C. H. Haigh
CHEMICALS (*otherwise undescribed*)
France, £34.
Germany, £16. J. Bailey
,, £17. J. J. Griffin
,, £25. Moxon Salt Co.
,, £101. Petri
,, £43. Reitmayer, Calburn & Kindersley
,, £46. Scheuer Bros.
Holland, £82. Stancourt & Muir
U.S.A., £67.
,, £50. R. L. M. Phillips
CHLOROPHYLL—
Germany, £136. C. Zimmermann
CITRIC ACID—
Holland, 70 pkgs.
COAL TAR PRODUCTS—
Naphthalene
Belgium, £180.
,, £19. H. H. Poole
COBALT ACETATE—
Germany, £931. E. A. Kimpton
COBALT CHLORIDE—
Germany, £268. E. A. Kimpton
COBALT OXIDE—
Canada, £2,993.
CREAM OF TARTAR—
France, 84 pkgs.
Germany, £98. R. W. Greeff
Italy, 120 pkgs.
DEXTRINE—
Holland, 14 t. 10 c. R. Windmuller

DEXTRINE—
Holland, 5 t. C. Arkcoll
,, 5

DYESTUFFS (ARTIFICIAL)—
Unspecified
Belgium, £280. Lazard, Godchaux
Brit. India, 157 W. France, Fenwick
Germany, 2 pkgs. Greeff
,, £344.
Switzerland, £147.

DYESTUFFS (NATURAL)—
Annatto
Brit. India, 26 pkgs.
Denmark, 2
Cutch
Burmah, 100 pkgs. Hoare, Wilson
,, 150 Leach & Co.
,, 300
Turmeric
Brit. India, 26 pkgs.

FERTILISER (DRIED BLOOD)—
Brazil, 49 t. J. Beresford
Uruguay, 25 Hollinghurst

FERTILISERS (*otherwise undes.*)—
S.W. Africa
Prot., 64 t. J. Fixon

GELATINE—
Switzerland, a qty.
Belgium, £1,843. Cazaly, Mills
,, £798. Duche
Germany, £136. Crowe
,, £1,109. Hearne, Bell & Co.
,, £153. C. Zimmermann

GLUE—
Belgium, £82. P. Ingenlath
,, £240.
France, £17. A. J. Malicet
Germany, £128.
Holland, £322. P. Ingenlath
,, £907. W. H. Muller
Italy, £496. Lavington
,, £161. Murray
U.S.A., £85.

GLYCERINE—
Holland, £147.
France, £690. Thornett & Fehr

GUANO—
Panama, 819 t. Hollingshurst
Uruguay, 615

ISINGLASS—
Brit. India, 5 cs.
Brit. Guiana, 1 ck.
Burmah, 16 cs.

KIESELGUHR—
U.S.A., 9 t. 2 c. Mortimears

LITHOPONE—
Germany, 40 cks. Petri
Holland, 180 F. T. H. Nye
,, 8 brls.
,, 20 cks. Felton & Crepin

MAGNESITE—
Brit. India, £73. Morgan Crucible Co.
Holland, £48.

MAGNESIUM CHLORIDE—
Germany, £5. Stewart & Esplen, Ltd.

MAGNESIUM SULPHATE—
Germany, £25. Braes Halliday

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slovakia, 4 cks.
Germany, 20 W. Harrison
Spain, 23 bgs.

MOLYBDENUM ORE—
Straits Setts., 6 c. Weber, Smith & Hoare

NICKEL OXIDE—
Germany, £183. E. A. Kimpton

OZOKERITE WAX—
Germany, 200 bgs. Holroyds Oil & Ceresine

PARAFFIN WAX—
U.S.A., 45 t. 2 c. F. Chiesman
,, 17 17 Prices Pat. Candle
,, 44 13 H. Hill

PLUMBAGO—
France, 50 bgs. Hernu, Peru
Japan, 45 cks. P. H. Gillard
Ceylon, 476 cks. H. Johnson
,, 21 brls. Morgan Crucible Co.
Madagascar, 350 Litchfield & Saundy

POTASH—
Germany, 138 pkgs. Brown & Forth

POTASSIUM CHLORATE—
Sweden, 180 pkgs. J. J. Master

POTASSIUM NITRATE—
Brit. India, 449 pkgs. G. & H. Green
Germany, 200 Nobel Indus.

POTASSIUM SULPHATE—
France, 960 pkgs. J. Harrison

PRUSSIAN BLUE—
Holland, 5 cks. Stancourt & Muir

ROSIN—
France, 40 cks.
,, 100 Langley Smith
,, 25 Lowden Connell
U.S.A., 165 drms. J. W. Cook
Spain, 25 Rosin & Turp. Impt.
,, 330 Moore & Hole

SHELLAC—
Brit. India, 26 t. 10 c. J. W. Cook

SOAP—
Austria, £61.
Denmark, £232.
France, £130. E. J. Francois
,, £9. W. H. Muller
,, £120. G. T. Symons
,, £32. C. E. Wood
,, £10. Stockwell
,, £39.

SOAP—
Germany, £68. C. W. Hartrodt
,, £220. S. Kalisky
,, £20. A. Potter
Hungary, £100.
U.S.A., £1,550. Knight & Morris
,, £8. G. W. Sheldon

SODA CRYSTALS—
Belgium, 6 t. P. Winn

SODIUM NITRATE—
Germany, 2 t. Stott & Hotopf

SODIUM PHOSPHATE—
Germany, 1 t. 10 c.

TALLOW—
Falkland Is., 9 t. 5 c. Anning & Cobb
,, 5 c.
N.Z., 148 t. 13 c.
,, 5 Fairclough Dodd & Jones
Canada, 6 t.

TANNING MATERIALS—
Gambier
Straits Setts., 170 pkgs. Leach & Co.
Sumac
Switzerland, 104 pkgs.
Unspecified
France, 10 pkgs. E. A. Kimpton

TAR (*otherwise undescribed*)—
Poland, 150 brls. White Sea & Baltic

TARTARIC ACID—
Holland, 88 pkgs. J. Knill

TURPENTINE—
Poland, 22 drms.

ULTRAMARINE—
Belgium, 1 ck.
Germany, 2 cks. H. Smart

VEGETABLE WAX—
Poland, 400 pkgs. Gerhard & Hey

WHITE LEAD—
Belgium, 2 cks. Felton & Crepin

ZINC OXIDE—
Belgium, 90 cks. M. Ashby
Germany, 5 t. Germany
Holland, { 25 cks. F. T. H. / 10 t. Nye
U.S.A., 250 cks. M. Ashby

MANCHESTER.

Week ending July 14.

ACETIC ACID—
Montreal, 1,047 brls.

ACIDS (*otherwise undescribed*)—
Antwerp, 5 cks.

ALUMINA—
Gothenburg. 5 cks.

CHEMICALS (*otherwise undescribed*)
Antwerp, 8 cks.

DEXTRINE—
Danzig, 120 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 25 cks.

DYESTUFFS (NATURAL)—
Unspecified
Philadelphia, 50 brls.

FERRO SILICON—
Sarpsborg, 99 brls.

FORMALDEHYDE—
Montreal, 112 brls.

GLUCOSE—
Baltimore, 300 brls.
Newport News, 300 brls.
Norfolk, 598 brls.

GLUE—
Antwerp, 147 bls.

MAGNESIUM CHLORIDE—
Hamburg, 40 crts.

OCHRE—
Norfolk (Va.), 124 brls.

PARAFFIN WAX—
Baltimore, 650 brls.

PHOSPHATE OF LIME—
Norfolk (Va.), 79 brls.

PHOSPHORUS—
Montreal, 188 drms.

POTASSIUM CARBONATE—
Hamburg, 4 cks.

ROSIN—
Mantyuoto, 57 brls.

SOAP—
Philadelphia, 600 bxs.
Valencia, 50 cs.

SODA—
Antwerp, 23 cks.

SODIUM NITRATE—
Skien, 179 cks.

STEARINE—
Antwerp, 91 bgs.

TALLOW—
Fredriksstad, 557 brls.

ZINC DUST—
Antwerp, 66 cks.

ZINC OXIDE—
Antwerp, 81 cks.

NEWCASTLE-ON-TYNE

Week ending July 14.

CALCIUM CARBIDE—
Christiania, 240 drms.

MAGNESITE—
Christiania, 50 bgs.

POTASSIUM SULPHATE—
Bremen, 500 bgs.

SALT—
Hamburg, 260 t.

SILICA (*otherwise undescribed*)—
Ronen, 560 t.

N. & S. SHIELDS.

Week ending July 14.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending July 14.

AMMONIUM CARBONATE—
Algoa Bay, 1 c.
Cape Town, 4 c.

CHEMICALS (*otherwise undescribed*)
Algoa Bay, 24 pkgs.; Bilbao, 8 pkgs.; Bombay, 228 pkgs.; Cape Town, 60 pkgs.; Delagoa Bay, 260 pkgs.; Durban, 40 pkgs.; East London, 100 pkgs.; Melbourne, 110 pkgs.; Mauritius, 6,132 pkgs.; Montreal, 225 pkgs.; Natal, 7 pkgs.; New York, 350 pkgs.; Sydney, 208 pkgs.

CHROMIUM OXIDE—
Sydney, 11 c.

COAL TAR PRODUCTS—
Naphthalene
New York, 20 t.

COAL TAR PRODUCTS—
Tar
Bombay, 10 t. 12 c.; Calicut, 24 t.; Cochin, 31 t. 10 c.; Delagoa Bay, 10 c.; Durban, 5 t. 10 c.; Lourenco Marques, 3 t. 10 c.; Natal, 112 t. 6 c.
Unspecified
Algoa Bay, 2 t. 14 c.; Durban, 3 t. 16 c.; New York, 16 t.

MAGNESIA—
Montreal, 2 t. 3 c.

MAGNESIUM CARBONATE—
Cape Town, 1 c.
New York, 5 t.

PARAFFIN WAX—
Bilbao, 1 t.
Cape Town, 11 t. 4 c.
Gijon, 40 t.

POTASSIUM BICHROMATE—
Sydney, 3 t. 1 c.

POTASSIUM PRUSSIATE—
Adelaide, 7 c.

ROSIN—
Bombay, 1 t. 2 c.
Mauritius, 2 c.

SHEEP DIP—
Buenos Ayres, 12 t. 18 c.; Commodora Rivadavia, 5 t. 17 c.; Deseado, 5 t. 17 c.; Gallegos, 5 t. 17 c.; San Julian, 5 t. 17 c.; Santa Cruz, 5 t. 18 c.

SOAP—
Bombay, 2 c.

SODIUM BICHROMATE—
Adelaide, 18 c.
Melbourne, 4 t. 14 c.
Sydney, 1 t. 11 c.

SODIUM PHOSPHATE—
Algoa Bay, 2 c.

WAX—
East London, 2 c.

GRANGEMOUTH.

Week ending July 14.

COAL TAR PRODUCTS—
Pitch
Christiania, 15 t.

PARAFFIN WAX—
Antwerp, 10 t. 10 c.

SODIUM SULPHITE—
Rotterdam, 10 t.

HULL.

Week ending July 10.

AMMONIUM SULPHATE—
Valencia, 1,014 bgs.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 8 cs.; Antwerp, 61 cks.; Catania, 101 bgs.; Havana, 4 drms.; Malmo, 65 drms.; Messina, 626 bgs.

CHEMICALS (*otherwise undescribed*)
Rotterdam, 22 cks., 30 drms.
Vera Cruz, 19 cks.

COAL TAR PRODUCTS—
Benzol
Rotterdam, 7 drms.
Naphthalene
Rotterdam, 353 bgs.
Pitch
Bilbao, 3 cs.; Dunkirk, 180 t.

GELATINE—
Montreal, 20 bgs.

SOAP—
Amsterdam, 500 cs.; Gruz, 1 cs.

TURPENTINE—
Gibraltar, 1 drm.

LEITH.

Week ending July 14.

SOAP—
Isafjord, 15 cs.

LIVERPOOL.

Week ending July 12.

ACETIC ACID—
Lisbon, 2 t. 1 c., £45.

ALUM—
Demerara, 1 t. 1 c., £11.; Montreal, 8 t. 17 c., £92.; Puerto Alegre, 1 t., £29.; Sydney, 2 t. 1 c., £41.

ALUMINIUM SULPHATE—
Bilbao, 15 t., £140.; Buenos Ayres, 100 t., £1,280.; Calcutta, 75 t. 6 c., £530.; Copenhagen, 2 t., £20.; Drammen, 5 t., £41.; Montreal, 1 t. 13 c., £12.; Kotka, 200 t., £1,936.; Pasages, 15 t., £140.; Rosario, 49 t. 17 c., £357.

ALUMINOFERRIC—
Calcutta, 5 t., £36.

AMMONIA—
Lagos, 16 c., £30.
Opobo, 2 c., £15.

AMMONIUM CARBONATE—
Alexandria, 1 t., £46.; Bahia, 19 c., £46.; Bordeaux, 1 t. 1 c., £38.; Demerara, 17 c., £39.; Guayaquil, 19 c., £45.; Hamburg, 8 t., £232.; Karachi, 1 t., £43.; Madras, 15 c., £32.; Maranham, 9 c., £22.; Rangoon, 1 t., £50.; Sydney, 2 t., £82.

AMMONIUM CHLORIDE—
Auckland, 8 c., £13.; Algiers, 2 t. 4 c., £68.; Buenos Ayres, 1 t., £34.; Bilbao, 5 t. 11 c., £178.; Bourgas, 10 c., £21.; Constantinople, 6 t. 17 c., £290.; Durban, 1 t., £49.; Genoa, 5 t. 2 c., £175.; Karachi, 6 t. 5 c., £254.; Kobe, 30 t., £877.; Lyttleton, 19 c., £31.; Melbourne, 1 t., £50.; Montreal, 3 t. 3 c., £106.; Mersyne, 10 c., £21.; Patras, 10 c., £16.; Rouen, 5 t., £152.; Rangoon, 1 t., £40.; Sydney, 1 t. 1 c., £35.; St. Johns (N.F.), 1 t. 6 c.. £42.; Salonica, 10 c., £21.; Valparaiso, 2 t. 19 c., £99.

AMMONIUM SALTS (*otherwise undescribed*)—
Shanghai, 5 t., £157.

AMMONIUM SULPHATE—
Hong Kong, 200 t., £3,374.; Kingston, 20 t., £305.; Las Palmas, 63 t., £1,026.; Motrel, 99 t. 9 c., £1,450.; Salobrena, 99 t. 10 c., £1,450.; Teneriffe, 131 t. 10 c., £2,205.

ANTIFOULING PAINT—
Accra, 5 c., £13.; Halifax, 1 t., £65.; Valparaiso, 10 c., £62.

ANTIMONY REGULUS—
Lisbon, 2 t., £70.

ARSENIC—
Melbourne, 2 t., £161.

BLEACHING POWDER—
Alexandria, 1 t. 1 c., £14.; Alexandretta, 1 t., £12.; Bombay, 51 t., £622.; Buenos Ayres, 25 t. 2 c., £251.; Brisbane, 1 t., £15.; Karachi, 1 t., £12.; Fremantle, 1 t., £12.; Oporto, 8 t. 6 c., £96.

BOILER COMPOSITION—
Bilbao, 6 c., £18.
Christiania, 1 t. 15 c., £38.

BORAX—
Bundaberg, 5 c., £8.; Cairns, 1 t., £30.; Mackay, 3 c., £5.; Rotterdam, 6 c., £9.; Sydney, 6 t. 1 c., £171.; Townsville, 2 t. 8 c., £71.; Valparaiso, 1 t. 19 c., £56.

BORAX GLASS—
Cartagena (Col.), 4 c., £21.

BORIC ACID—
Bundaberg, 2 c., £14.; Bombay, £2.; Cairns, 2 c., £6.; Mackay, 2 c., £6.; Rockhampton, 10 c., £28.; Rotterdam, 4 c., £10.; Sydney, 5 c., £14.

CALCIUM ACID PHOSPHATE—
Alicante, 5 t., £150.

CALCIUM CHLORIDE—
Fremantle, 5 t. £29.; Melbourne, 15 t. 1 c., £86.; Riga, 26 t. 15 c., £161.; Sydney, 8 t. 1 c., £46.; Wellington, 5 t. 2 c., £31.

CHEMICALS (*otherwise undescribed*)
Algoa Bay, 10 c., £96.; Amsterdam, 120 t., £2,050.; Havana, 1 t., £28.; Hong Kong, 4 t. 3 c., £131.; Hankow, 6 t. 5 c., £194.; Karachi, 1 t. 5 c., £33.; Melbourne, 1 t., £29.; Shanghai, 5 t., £135.; Viborg, 10 t., £62.

CITRIC ACID—
Barcelona, 1 t. 10 c., £257.

COAL TAR PRODUCTS—
Aniline Oil
Amsterdam, 1 t., £95.
Carbolic Acid
Adelaide, 1 c., £10.
Fremantle, 18 c., £30.
Hamburg, 15 t. 10 c., £2,253.
Creosote
New York, 8 c., £14.
Stockholm, 1 t. 18 c., £44.
Creosote Oil
Smyrna, 93 t. 15 c., £1,606.
Naphthalene
Sydney, 2 t., £23.
Pitch
Demerara, 3 t. 7 c., £36.
Rouen, 506 t. 3 c., £3,416.
Pyridine
Hamburg, 2 t. 3 c., £250.
Tar
Bombay, 1 t., £20.
Oporto, 4 t., £46.
Porto Novo, 1 c., £10.
Unspecified
Puerto Barrios, 4 c., £14.

COBALT OXIDE—
Sydney, 7 c., £87.

COPPER SULPHATE—
Auckland, 5 c., £7.; Bordeaux, 12 t. 17 c., £312.; Buenos Ayres, 17 t. 9 c., £423.; Bombay, 3 t., £77.; Calcutta, 7 t. 10 c., £195.; Fremantle, 1 c., £2.; Monte Video, 31 t. 14 c., £825.; Melbourne, 1 t., £27.; Puerto Alegre, 22 t., £548.; Sydney, 1 t., £26.; Wellington, 1 t., £26.; Bourgas, 19 c., £24.

CREAM OF TARTAR—
Newcastle, 3 t. 15 c., £382.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 3 t. 11 c., £96.; Boston, 12 t. 1 c., £488.; Buenos Ayres, 83 t., £4,346.; Colombo, 1 t. 4 c., £47.; Demerara, 19 c., £17.; Monte Video, 4 t. 11 c., £229.; Madras, 1 t. 1 c., £37.; Montreal, 2 t., £83.; New York, 12 c., £29.; Pt. Harcourt, 1 t. 13 c., £83.; St. Johns (N.F.), 4 t. 10 c., £50.; Singapore, 1 t. 14 c., £30.; Villagarcia, 6 t. 10 c., £38.

DYESTUFFS (**ARTIFICIAL**)—
Alizarine
New York, 12 c., £254.
Santos, 4 c., £218.
Unspecified
Alexandria, 2 t., £353.; Barcelona, 3 c., £71.; Lyttleton, 1 t. 10 c., £471.; Melbourne, 17 c., £234.; Montreal, 2 c., £25.; Oporto, 2 c., £60.; Penang, 1 c., £35.; Rio de Janeiro, 8 c., £132.; Sydney, 3 c., £81.; Singapore, 1 c., £28.

DYESTUFFS (NATURAL)—
Orchil
New York, 1 t. 7 c., £121.

ESSENTIAL OILS (SYNTHETIC)—
Kobe, 1 t. 7 c., £728.

GLYCERINE—
Acajutla, 3 c., £16.; Copenhagen, 3 t., £214.; Cape Town, 100 t., £5,050.; Salvador, 3 c., £14.; Stockholm, 2 t., £158.; Yokohama, 34 t. 5 c., £2,694.

IODOFORM—
Sekondi, 1 qr., £13.

LEAD ARSENATE—
Paita, 9 c., £56.

LEAD NITRATE—
Sydney, 1 t., £4.

MAGNESIA—
Melbourne, 1 t. 7 c., £22.

MAGNESIUM CARBONATE—
Calcutta, 3 c., £16.

MAGNESIUM SULPHATE—
Bermuda, 56 lb., £2.; Bombay, 1 c., £2.; Curacao, 2 c., £3.; Duala, 56 lb., £1; Grand Bassam, 1 c., £1.; Lagos, 10½ c., £16.; Valparaiso, 4 c., £4.; Warri, 1 c., £1.; Winnebah, 56 lb., £1.

NICKEL SALTS (*otherwise undes.*)—
Karachi, 6 c., £12.

NICKEL SULPHATE—
Melbourne, 5 c., £11.

PITCH (*otherwise undescribed*)—
Genoa, 24 t. 5 c., £482.

PLATING SALTS (*otherwise undes.*)
Barcelona, 2 c., £36.

POTASSIUM BICHROMATE—
Constantinople, 12 c., £30.; Norrkoping, 1 t. 9 c., £74.; Pasages, 1 t. 15 c., £83.; Santos, 1 t. 18 c., £99.

POTASSIUM IODIDE—
Opobo, 1 c., £117.
Pt. Harcourt, 560 lb., £537.

SALAMMONIAC—
Marseilles, 15 c., £41.

SALTCAKE—
Antwerp, 175 t., £1,050.
Helsingfors, 250 t. 17 c., £1,068.

SHEEP DIP—
Algoa Bay, 9 t., £526.; Adelaide, 6 t., £206.; Buenos Ayres, 56 t. 4 c., £2,100.; Barranquilla, 2 t. 10 c., £130.; Brisbane, 2 t. 10 c., £141.; Lyttleton, 7 t. 14 c., £262.; Mombasa, 10 c., £41.; Napier, 7 t. 14 c., £262.; Panama, 1 t. 1 c., £80.; Puerto Colombia, 7 c., £42.

SULPHURIC ACID—
Maranhao, 15 c., £25.

SUPERPHOSPHATE—
Las Palmas, 15 t. 8 c., £82.

TANNING MATERIALS—
Unspecified
Antwerp, 17 c., £24.; Christiania, 16 t. 9 c., £358.; Helsingfors, 5 t. 10 c., £71.; Montreal, 2 t. 4 c., £40.

TARTARIC ACID—
Newcastle, 12 c., £79.
Rockhampton, 1 t. 5 c., £175.
Sydney, 4 t., £546.

TIN OXIDE—
Lisbon, 1 c., £18.
Sydney, 10 c., £299.

TRICHLORETHYLENE—
Hsin Ho Wharf, 6 c., £17.

VANADIC ACID—
Dunkirk, 2 t. 1 c., £1,598.

WOOD PRESERVATIVE—
Accra, 14 c., £24.; Kobe, 1 t., £60.

ZINC CHLORIDE—
Bombay, 4 t. 6 c., £106.; Calcutta, 2 t. 2 c., £54.; Madras, 6 t. 8 c., £163.; Rio de Janeiro, 1 t., £42.; Rangoon, 18 c., £23.

ZINC OXIDE—
Helsingfors, 4 t. 18 c., £210.
Melbourne, 1 t., £50.

Week ending July 13.

CALCIUM CHLORATE—
Madras, 20 pkgs.

CAUSTIC SODA—
Adelaide, 30 drms.; Algoa Bay, 112 drms.; Auckland, 33 drms.; Bari, 17 drms.; Barranquilla, 25 drms.; Antwerp, 10 drms.; Brisbane, 15 drms.; Callao, 30 drms.; Cape Town, 20 drms.; Cartagena, 50 drms.; Cheribon, 75 pkgs.; Durban, 20 drms.; Copenhagen, 48 drms.; East London, 30 drms.; Freetown, 20 drms.; Frontera, 50 drms.; Haifa, 18 drms.; Funchal, 34 drms.; Hobart, 20 pkgs.; Launceston, 52 pkgs.; Lyttleton, 20 pkgs.; Madras, 200 drms.; Melbourne, 355 drms.; New Plymouth, 52 drms.; Penang, 70 drms.; Pernambuco, 180 drms.; Piraeus, 20 drms.; Pt. Swettenham, 60 drms.; Rotterdam, 109 drms.; Rosario, 50 tins; Samarang, 25 drms.; Santos, 1,000 cs., 400 drms.; San Antonio, 166 drms.; Singapore, 5 drms.; Sourabaya, 45 drms.; Stockholm, 30 drms.; Sydney, 41 drms., 136 cs.; Talcahuano, 50 drms.; Tampico, 594 drms.; Timaru, 15 cs.; Vera Cruz, 747 drms.; Valparaiso, 66 drms.; Yokohama, 217 drms.; Wellington, 95 drms.

CHINA CLAY—
San Francisco, 189 t.
Vera Cruz, 25 t.

DEXTRINE—
Calcutta, 40 cks.
Pernambuco, 20 bgs.

FERRO CHROME—
Moji, 1 t.

FERRO MANGANESE—
Danzig, 80 t.; New Orleans, 425 t.; Philadelphia, 968 t.

GLUE, SIZE, AND GELATINE—
Auckland, 20 pkgs.; Mollendo, 12 pkgs.; Rangoon, 1 pkg.; Rotterdam, 100 sks.; Shanghai, 25 cks.

IRON OXIDE (RED OXIDE)—
New York, 6 cks.

LEAD ASHES—
Antwerp, 15 t.

LITHARGE—
Famagusta, 3 kgs., Genoa, 2 cks.

SALT—
Antwerp, 350 t.; Calabar, 397 t.; Calcutta, 1 t.; Cape Coast Castle, 6 pkgs.; Cape Town, 198 t.; Christiania, 250 pkgs.; Fernando Po, 2 t.; Gibraltar, 3 t.; Grand Bassam, 10 t.; Karachi, 7 t.; Horsens, 83 t.; Kingston (Ja.), 43 t.; Lagos, 210 t.; Koko, 18 t.; Livingston, 50 t.; N. Plymouth, 922 t.; New York, 175 t.; Opobo, 20 t.; Puerto Barrios, 20 t.; Pt. Harcourt, 57 t.; Pt. Louis, 50 t.; Puerto Novo, 18 t.; Rangoon, 962 t.; Sekondi, 27 t.; Shanghai, 1 t.; Sierra Leone, 153 t.; Sydney, 20 t.

SOAP—
Abonema, 270 pkgs.; Accra, 610 bxs.; Addah, 90 pkgs.; Alexandria, 3 cs., 532 pkgs.; Antwerp, 6 bxs.; Appam, 6 pkgs.; Assinee, 100 pkgs.; Auckland, 1,680 bxs.; Axim, 150 pkgs.; Bangkok, 565 pkgs.; Barbados, 261 pkgs.; Batavia, 2,486 pkgs.; Belawan, 206 pkgs.; Bilbao, 156 pkgs.; Bombay, 3,323 pkgs.; Buenos Ayres, 681 pkgs.; Calcutta, 91 pkgs.; Cape Coast Castle, 70 pkgs.; Calabar, 529 pkgs.; Calicut, 142 pkgs.; Ceuta, 550 pkgs.; Christiania, 6 pkgs.; Christchurch, 320 bxs.; Colombo, 983 bxs.; Colon, 175 pkgs.; Callao, 690 bxs.; Columbia (S.A.), 3 pkgs.; Constantinople, 50 bxs.; Copenhagen, 11 pkgs.; Corinto, 20 bxs.; Curacao, 110 bxs.; Duala, 100 bxs.; Demerara, 1,214 pkgs.; Dunedin, 48 bxs.; Durban, 150 bxs.; Falmouth, 18 bdls.; Gothenburg, 943 bxs.; Guayaquil, 224 bxs.; Half Assinee, 200 bxs.; Iddo, 285 bxs.; Iquique, 100 bxs.; Karachi, 353 bxs. Kingston (Ja.) 1,129 bxs.; Lagos 1,964 bxs.; Las Palmas, 155 bxs.

SOAP—
Larnaca, 12 bxs.; Larache, 25 bxs.; Livorno, 520 bxs.; Maccio, 15 cks.; Macassar, 617 pkgs.; Madras, 14 cs.; Malta, 75 cs., 6 bxs.; Manta, 224 bxs.; Mauritius, 9 cs.; Melilla, 375 bxs.; Menado, 560 bxs.; Montego Bay, 165 bxs.; Monte Video, 58 bxs.; Morant Bay, 50 pkgs.; Nantes, 25 bxs.; New York, 4 bxs., 4 pkgs.; Oporto, 4 cs.; Paita, 100 bxs.; Paramaribo, 103 pkgs.; Pasages, 29 cs.; Puerto Antonio, 14 bdls.; Penang, 1 drm., 1,492 cs.; Pt. Harcourt, 873 pkgs.; Pernambuco, 1 bx.; Pt. Said, 181 pkgs.; Piraeus, 55 bxs.; Pt. Dickson, 3 cs.; Rangoon, 3,402 pkgs.; Pt. Louis, 3 cs.; Pt. Swettenham, 27 cs.; Quittah, 5 cs.; Rouen, 5 bxs.; Rio de Janeiro, 1 cs.; Samarang, 100 cs.; San Antonio, 20 cs.; San Jose, 10 cs.; Santiago, 23 cs.; Sapele, 50 cs.; Sarawak, 20 cs.; Sekondi, 346 pkgs.; Sierra Leone, 2 cs.; Singapore, 5,663 bxs.; Shanghai, 1,600 pkgs.; Seltpond, 500 bxs.; St. Kitts, 100 bxs.; Sourabaya, 44 cs.; Sydney, 4 cs.; Talcahuano, 20 cs.; Tangiers, 8 pkgs.; Teneriffe, 179 pkgs.; Trieste, 41 bxs.; Trinidad, 1,558 pkgs.; Tumaco, 175 bxs.; Tuticorin, 4 cs.; Valparaiso, 188 cs.; Warri, 355 cs.; Wellington, 225 cs.; Winnebah, 337 bxs.; Yokohama, 3 bxs.

SODA ASH—
Adelaide, 12 pkgs.; Auckland, 195 pkgs.; Brisbane, 295 pkgs.; Buenos Ayres, 10,290 bgs.; Calcutta, 3,736 pkgs., 1,000 bgs.; Callao, 60 pkgs.; Durban, 146 pkgs.; Geelong, 133 pkgs.; Gefle, 300 pkgs.; Gothenburg, 250 pkgs.; Hamburg, 2,568 pkgs.; Helsingfors, 100 pkgs.; Hong Kong, 659 pkgs.; Kobe, 23,075 pkgs.; Maccio, 11 cks.; Melbourne, 685 bgs.; Moji, 3,246 bgs.; New Orleans, 300 pkgs.; Penang, 50 cs.; Pernambuco, 10 pkgs.; Puerto Alegre, 68 cks.; Riga, 150 bgs.; Rio de Janeiro, 258 pkgs.; Rotterdam, 1,100 bgs.; San Antonio (Brazil), 78 cks.; Sekondi, 1 ck.; Shanghai, 1,400 bgs.; Singapore, 60 cks.; Sydney, 62 cks.; Tampico, 200 pkgs., 700 bgs.; Yokohama, 6,545 pkgs.

SODA CRYSTALS—
Algoa Bay, 50 pkgs.; Bangkok, 40 kgs.; Cape Town, 50 pkgs.; Kingston (Ja.), 32 pkgs.; Madras, 100 drms.; Penang, 20 pkgs.; Singapore, 7 brls.

SODIUM BICARBONATE—
Aarhus, 8 pkgs.; Adelaide, 47 pkgs.; Antofagasta, 50 pkgs.; Antwerp, 1,016 pkgs.; Auckland, 717 pkgs.; Brisbane, 132 pkgs.; Buenos Ayres, 200 cks.; Calcutta, 1,003 pkgs.; Christiania, 95 pkgs.; Copenhagen, 149 pkgs.; Durban, 60 pkgs.; Geelong, 34 pkgs.; Gefle, 4 cks.; Helsingfors, 40 pkgs.; Hamburg, 200 pkgs.; Haifa, 15 kgs.; Karachi, 1,000 pkgs.; Jaffa, 20 kgs.; Kingston (Ja.), 25 pkgs.; Malmo, 10 bgs.; Melbourne, 624 pkgs.; Moji, 431 bgs.; Norrkoping, 50 bgs.; Odense, 4 cks.; Penang, 10 pkgs.; Rangoon, 50 pkgs.; Salonica, 200 pkgs.; Smyrna, 35 kgs.; St. Lucia, 10 bgs.; Sydney, 33 drms.; Tampico, 100 kgs.; Teneriffe, 20 pkgs.; Vera Cruz, 600 pkgs.

SODIUM BISULPHITE—
Pernambuco, 4 drms.
Singapore, 65 drms.
Sourabaya, 41 pkgs.

SODIUM PRUSSIATE—
Hong Kong, 200 pkgs.

SODIUM SILICATE—
Acapulco, 200 bgs.; Beauty Point, 10 cks.; Brisbane, 5 drms.; Boston, 40 cks.; Kobe, 16 pkgs.; Melbourne, 67 pkgs.; New Plymouth, 20 cs.; Oporto, 16 cks.; Paris, 12 cks.; Pt. Said, 104 pkgs.; Vera Cruz, 60 pkgs.

SODIUM SILICOFLUORIDE—
Shanghai, 27 cks.

SODIUM SULPHATE—
Durban, 20 pkgs.

SODIUM SULPHIDE—
Algoa Bay, 5 pkgs.
Cape Town, 5 pkgs.

STEARINE—
Shanghai, 307 dble. bgs.

TALLOW—
Calcutta, 56 cks.
Hamburg, 6 pkgs.
Helsingfors, 30 brls.

ZINC DUST—
Hobart, 800 pkgs.

LONDON.

OFFICIAL AMENDMENT.

From Return for week ending April 11, 1923.

Deduct—

AMMONIUM CARBONATE—
Madras, 1 t. 7 c., £213.

Week ending July 11.

ACETIC ACID—
Bombay, 7 cs., £22.
Christchurch, 3 cs., £9.
Malta (F.), 1 ck., £9.
Melbourne, 10 cs., £27.
Wellington, 10 cs., £35.

ACETONE—
Rangoon, 4 drms., £28.

ACETYL SALICYLIC ACID—
Bangkok, 17 cs. (pt.), £21.
Shanghai, 3 cs. (pt.), £14.
Singapore, 1 cs. (pt.), £9.

ALUM—
Singapore, 1 t., £23.

ALUMINIUM SULPHATE—
Rangoon, 2 cs., £6.

AMMONIA—
Antwerp, 20 cs., £105.; Bombay, 27 cs., £48.; C. T'n, 12 cs., £24.; Durban, 13 cs., £32.; E. London 11 cs., £19.; H. Kong, 3 cs., £5.; I. F. State, 2 cs., £36.; Karachi, 19 cs., £33.; Madras, 3 cs., £9.; M.Bay, 2 cs., £5.; Pt. Elizabeth, 13 cs., £31.; Pt. Said, 4 cs., £7.; Rangoon, 1 cs., £6.; Rosario, 20 cs., £56.; Shanghai, 5 cs., £9.

AMMONIA (ANHYDROUS)—
Belawan, 400 cylds., £2,833.
Durban, 35 cylds., £262.
Irish Free State, 6 cylds., £30.

AMMONIUM ACETATE—
Bombay, 4 cs. (pt.), £8.
Cape Town, 4 jars, £5.

AMMONIUM BROMIDE—
Melbourne, 1 cs., £5.

AMMONIUM CARBONATE—
Brussels, 2 t., £77.; Calcutta, 10 c., £83.; Demerara, 1 t., £33.; Galatz, 10 t., £295.; Melbourne, 1 c., £6.; Monte Video, 1 t. 8 c., £84.; Rangoon, 1 t. 16 c., £118.

AMMONIUM CHLORIDE—
Bombay, 4 cs. (pt.), £10.

AMMONIUM NITRATE—
Hong Kong, 4 c., £7.

AMMONIUM SULPHATE—
Barbados, 6 t., £93.; Beira, 5 t. 10 c., £85.; Canton, 5 t., £90.; Demerara, 55 t., £1,223.; Hong Kong, 50 t., £819.; Mauritius, 175 t., £2,713.; Las Palmas, 37 t., £624.; Naples, 79 t., £1,225.

ANTIMONY SULPHIDE—
Bombay, 7 cks., £77.

ARSENIC—
Colombo, 2 brls., £17.; Durban, 100 drms., £290.; Genoa, 16 cks., £265.; Irish Free State, 1 kg., £5.; Kano, 2 t., £28.; Leghorn, 10 cks., £150.

ARSENIC SULPHIDE—
New York, 20 kgs., £112.

BARIUM HYDRATE—
Paris, 50 cks., £221.

BARIUM NITRATE—
Colombo, 1 ck., £10.

BARIUM PEROXIDE—
Genoa, 10 drms., £118.
Sydney, 43 drms., £336.

BARIUM SULPHATE—
Auckland, 1 cs. (pt.), £5.

BARIUM SULPHIDE—
Bombay, 4 cs. (pt.), £9.

BISMUTH CARBONATE—
Bangkok, 17 cs. (pt.), £38.; Christchurch, 1 cs. (pt.), £11.; Melbourne, 2 cs., £144.; Pt. Elizabeth, 1 cs., £64.

BISMUTH SALICYLATE—
Sydney, 11 pkgs. (pt.), £30.

BISMUTH SALTS (*otherwise undes.*)
Auckland, 1 cs. (pt.), £16.
Melbourne, 1 cs. (pt.), £51.
Rangoon, 1 cs., £63.

BISMUTH SUBCARBONATE—
Bangkok, 17 cs. (pt.), £13.

BISMUTH SUBNITRATE—
Montreal, 1 cs., £125.

BITUMEN—
Monte Video, 11 cks., £41.
Rouen, 39 brls., £98.
Singapore, 20 pkgs., £60.

BONE FERTILISER—
Dunkirk, 8 t., £75.
Hamburg, 5 t. 12 c., £13.

BORAX—
Bermuda, 2 c., £6.
Shanghai, 5 c., £8.
Sydney, 1 c., £5.

BORIC ACID—
Auckland, 2 c., £8.

CALCIUM CARBIDE—
Bangkok, 3 c., £5.; Basra, 2 t. 9 c., £71.; Levuka (F.), 10 c., £8.; Sekondi, 4 c., £6.

CALCIUM CHLORIDE—
Las Palmas, 10 drms., £19.

CALCIUM LACTATE—
Sydney, 11 pkgs. (pt.), £6.

CAUSTIC SODA—
Beira, 3 c., £6.
Shanghai, 1 c., £7.

CERIUM OXALATE—
Rangoon, 1 cs. (pt.), £6.

CHEMICALS (*otherwise undescribed*)
Alexandria, 5 cs., £63.; Antwerp, 50 pkgs., £143.; Bangkok, 17 cs. (pt.), £12.; Barbados, 1 cs., £7.; Barranquilla, 5 cks., £7.; Bombay, 6 cs., £13.; Brisbane, 72 pkgs., £124.; Bucharest, 4 pkgs. (F.), £20.; Calcutta, 1 cs., £12.; Canton, 9 cs., £36.; Cape Coast, 3 pkgs. (pt.), £6.; Cape Town, 8 pkgs., £13.; Cartagena (Col.), 11 pkgs., £19.; Colombo, 2 cs., £13.; Dunedin, 12 pkgs., £33.; Fremantle, 20 pkgs., £28.; Italy (*via* Ghent), 2 cs. (pt.), £18.; Hamburg, 193 pkgs., £1,182.; Helsingborg, 3 pkgs., £8.; Helsingborg (F.), 1 pkg., £5.; Irish Free State, 3 pkgs., £5.; Jamaica, 12 pkgs. (pt.), £12.; Karachi, 13 cs., £19.; Lyttleton, 40 pkgs., £68.; Madras, 2 cs. (pt.), £28.; Malta, 2 cks., £6.; Medellin, 3 cks., £7.; Melbourne, 30 pkgs. (pt.), £145.; Otago, 20 pkgs., £40.; Port Alma, 10 pkgs., £26.; Puerto Cabello, 7 pkgs. (pt.), £19.; Rangoon, 3 cs., £22.; Rockhampton, 20 pkgs., £28.; Rotterdam, 255 pkgs., £745.; Shanghai, 7 cs. (pt.), £39.; Singapore, 2 cs., £9.; Swatow, 2 pkgs., £5.; Sydney, 42 pkgs. (pt.), £130.; Tokio, 16 cks., £72.; Townsville, 10 pkgs., £28.

CHRYSOPHANIC ACID—
Calcutta, 1 cs. (pt.), £6.

CITRIC ACID—
Cartagena (Col.), 1 c., £13.; Cape Town (F.), 15 c., £136.; Cape Town, 4 c., £38.; Channel Islands, 1 c., £10.; Durban, 2 c., £21.; Rotterdam, 3 c., £30.

COAL TAR PRODUCTS—
Carbolic Acid
Bombay, 1 cs., £24.; Canton, 2 cs., £12.; Melbourne, 5 drms., £6.; Shanghai, 2 cs., £10.; Sydney, 50 drms., £44.
Creosote
San Francisco, 5 drms., £60.

COAL TAR PRODUCTS—
Creosote Oil
Delagoa Bay, 75 drms., £468.
Naphthalene
Canton, 5 kgs., £8.; Durban, 5 cs., £7.; Sydney, 16 cks., £45.
Pitch
Melbourne, 3 kgs., £5.
Suva, 10 cs., £12.
Pyridine
Durban, 40 drms., £191.
Tar
Durban, 590 drms., £67.

COBALT OXIDE—
Melbourne, 1 cs., £50.
Paris, 9 cs., £574.

COPPER CARBONATE—
Colombo, 1 cs., £11.

COPPER CHLORIDE—
Melbourne, 1 pkg., £12.

COPPER SULPHATE—
Delagoa Bay, 3 c., £20.
Tientsin, 1 cs., £40.

CREAM OF TARTAR—
Barbados, 1 c., £5.; Barranquilla, 1 c., £6.; Calcutta, 2 cs., £5.; Karachi (F.), 1 c., £6.; Pt. Elizabeth, 5 c., £23.; Puerto Cabello, 1 c., £6.

DISINFECTANTS (*otherwise undes.*)
Aden, 1 t., £11.; Alexandria, 1 t. 3 c., £55.; Auckland, 11 c., £112.; Boulogne, 3 c., £9.; Calcutta, 2 t. 6 c., £110.; Christchurch, 2 c., £12.; Durban, 17 c., £59.; East London, 2 t. 6 c., £180.; Invercargill, 3 c., £40.; Jamaica, 2 t. 15 c., £74.; La Union, 1 t. 4 c., £41.; Penang, 9 c., £19.; Pt. Elizabeth, 6 t. 9 c., £154.; Pt. Swettenham, 3 c., £7.; Shanghai, 5 t., £250.; Singapore, 1 t. 12 c., £58.; Toronto, 1 c., £6.

DYESTUFFS (ARTIFICIAL)—
Nigrosine
Delagoa Bay, 2 kgs., £15.
Unspecified
Bombay, 1 cs. (pt.), £6.; Boulogne, 35 kgs., £442.; Brisbane, 2 cs. (pt.), £85.; Melbourne, 1 kg., 3 cs. (pt.), £19.; New York, 1 cs., £8.; Sydney, 1 cs., £11.

ETHER—
Jamaica, 10 cs., 4 cs. (pt.), £23.
Toronto, qnty.
Winnipeg, 2 cs., £19.

ETHYL CHLORIDE—
Rangoon, 1 cs. (pt.), £6.

FERTILISERS (*otherwise undes.*)—
Gothenburg, 1 t., £25.
New York (F.), 10 t., £80.

FORMALDEHYDE—
Madras, 2 crts., £16.

GALLIC ACID—
Sydney, 1 cs., £38.

GLYCERINE—
Amoy, 1 c., £6.; Cartagena (Col.), 3 c., £18.; La Guaira, 2 c., £11.

HEXAMINE—
Melbourne, 1 cs. (pt.), £6.
Sydney (F.), 1 cs., £23.

HYDROBROMIC ACID—
Sydney, 7 pkgs. (pt.), £16.

HYDROCHLORIC ACID—
Alexandria, 3 c., £14.
Pt. Elizabeth, 4 c., £12.

HYROFLUORIC ACID—
Hong Kong, 4 cs., £27.
Pt. Elizabeth, 3 cs., £18.

HYDROGEN PEROXIDE—
Alexandria, 5 cs., £32.
Gibraltar, 2 cs., £13.
Melbourne, 2 cs., £7.

HYPOPHOSPHOROUS ACID—
Sydney, 2 cs., £16.

IODIDES (*otherwise undescribed*)—
Yokohama, 9 cs., £783.

IODINE—
Auckland, 1 cs. (pt.), £26.
Melbourne, 2 cs. (pt.), £88.

IODINE (RESUBLIMED)—
Canton, 1 cs. (pt.), £14.

IRON AMMONIUM CITRATE—
Amsterdam, 5 cs. (pt.), £96.
Buenos Ayres, 2 cs., £16.
Sydney, 11 pkgs. (pt.), £7.

IRON IODIDE—
Shanghai, 1 cs. (pt.), €5.

KIESELGUHR—
Rio de Janeiro (F.), 1 t. 1 c., £19.
Santos (F.), 12 c., €10.

LACTIC ACID—
Mossel Bay (F.), 10 cks., £76.

LEAD CHROMATE—
Malmo, 3 cks., £65.

LEAD NITRATE—
Calcutta, 2 cks., £25.

MAGNESIA—
Antwerp, 20 cs., £48.; Bombay, 4 cs., €10.; Irish Free State, 4 cs., €15.; Napier, 6 cs., €14.; Rio de Janeiro, 2 cs., €13.; Stockholm, 2 cs. (pt.), €17.; Sydney, 8 cs., £20.

MAGNESIA (CALCINED)—
Buenos Ayres, 6 cks.,. £21.
Puerto Cabello, 1 cs., £10.

MAGNESIUM CARBONATE—
Buenos Ayres, 2 cs., £9.
Calcutta, 1 cs., £6.
La Guaira, 2 cs., £9.
Melbourne, 5 cs., £18.
Rio de Janeiro, 4 cs., £16.

MAGNESIUM CITRATE—
Rangoon, 2 cs., £14.

MAGNESIUM SULPHATE—
Bermuda, 4 c., £5.; Bombay, 3 c., £5.; Durban, 10 c., £11.; Irish Free State, 2 c., £5.; Jamaica, 10 c., £7.; Karachi, 2 c., £6.; La Guaira, 10 c., £8.; Melbourne, 2 c., £5.; Newcastle, 2 t. 10 c., £59.; New York, 5 c., £8.; Panama, 5 c., £7.; Sydney, 5 t. 2 c., £121.; Toronto, 10 c., £8.

MERCURIALS (*otherwise undes.*)—
Calcutta, 1 cs. (pt.), €6.
Melbourne, 2 cs. (pt.), £15.

MERCURY IODIDE—
Montreal, 1 cs., £69.

METHYL SALICYLATE—
Sydney, 19 pkgs. (pt.), €17.

NITRIC ACID—
Alexandria, 1 c., €7.

OXALIC ACID—
Auckland, 1 ck., £11.

PHOSPHORIC ACID—
Melbourne, 5 cs., £19.

PHOSPHORUS—
Havana, 50 cs., £237.

PHOSPHORUS (AMORPHOUS)—
Havana, 8 cs., £94.

POTASSIUM BROMIDE—
Sydney, 5 cs., £23.

POTASSIUM CARBONATE—
Hong Kong, 5 cs., £18.

POTASSIUM CHLORATE—
Barranquilla, 2 cks., £5.
Cartagena, 3 cks., £8.

POTASSIUM CITRATE—
Auckland, 1 cs. (pt.), £5.
Bangkok, 17 cs. (pt.), £15.
Melbourne, 1 cs. (pt.), 2 cs., £34.
Sydney, 19 pkgs. (pt.), £61.

POTASSIUM CYANIDE—
Swatow, 1 cs., £9.

POTASSIUM FERRICYANIDE—
Amsterdam, 5 cs. (pt.), £22.

POTASSIUM IODIDE—
Antwerp, 1 cs., £86.; Auckland, 2 cs. (pt.), £63.; Accra, 1 cs., £15.; Bangkok, 17 cs. (pt.), £254.; Brussels, 3 cs., £258.; Calcutta, 3 cs., £263.; Melbourne, 1 cs., £88.; Montreal, 4 cs., £313.; Naples, 4 cs., £173.; Puerto Colombia, 1 cs. (pt.), £14.; Rangoon, 4 cs., £183.; Sydney, 30 pkgs. (pt.), 1 cs., £198.

POTASSIUM PERMANGANATE—
Melbourne (F.), 1 cs., £9.
Pt. Elizabeth, 1 kg., £5.
Sydney, 30 pkgs. (pt.), £183.

POTASSIUM AND SODIUM NITRATE—
Trinidad, 50 t., £750.

PRUSSIAN BLUE—
Shanghai, 1 cs., £8.

ROCHELLE SALTS—
Hong Kong, 3 cs. (pt.), £16.

SALAMMONIAC—
Auckland, 3 cks., £5.; Barranquilla, 1 ck., £5.; Melbourne, 2 cks., £29.; Rio de Janeiro, 4 cks., £39.

SALICYLIC ACID—
Durban, 1 kg., £13.

SALTCAKE—
Kotka, 520 t., £2,600.
Moss, 420 t., £2,100.

SALTPETRE—
Barranquilla, 2 c. £7.; Cartagena (Col.), 5 c., £17.; East London, 5 c., £10.; Invercargill, 10 c., £20.; Sydney, 6 t., £245.

SILVER NITRATE—
East London, 1 cs. (pt.), £12.
Hong Kong, 2 cs. (pt.), £72.

SODA CRYSTALS—
Irish Free State, 5 c., £6.

SODIUM ARSENATE—
Barcelona, 8 cks., £51.
Melbourne, 1 t., £50.

SODIUM BICARBONATE—
Cartagena (Col.), 1 t., £20.; Corinto, 4 c., £7.; Managna, 3 c. €5.; Melbourne, 5 c., £10.; Nassau, 3 c., £5.; Panama, 5 c., £9.; Rangoon, 1 c., £6.

SODIUM BISULPHITE—
Paris, 1 t., £26.; Penang, 2 t., £40.; Sourabaya, 2 t. 10 c., £50.

SODIUM BROMIDE—
Melbourne, 2 cs., £10.

SODIUM CARBONATE—
Calcutta, 1 c., £5.
Sydney, 7 pkgs. (pt.), €7.

SODIUM CITRATE—
Calcutta, 1 ck., £6.
Melbourne, 1 cs. (pt.), £6.

SODIUM CYANIDE—
Channel Islands, 4 pkgs., £17.

SODIUM GLYCEROPHOSPHATE—
Christiania, 6 pkgs., £33.

SODIUM HYPOSULPHITE—
Durban, 4 c., £5.
Hong Kong, 2 t. 6 c., €78.
Singapore, 2 cs., £16.

SODIUM IODIDE—
Calcutta, 1 cs. (pt.), £19.
Naples, 4 cs., £197.

SODIUM NITRATE—
Trinidad (F.), 100 t., £1,515.

SODIUM OXALATE—
Colombo, 1 c., £8.

SODIUM PRUSSIATE—
Rio de Janeiro, 1 t., £74.

SODIUM SALICYLATE—
Auckland, 2 cs. (pt.), £16.
Melbourne, 3 cs., £44.
Sydney, 1 cs., 19 pkgs. (pt.), £27.

SODIUM SALTS (*otherwise undes.*)
Calcutta, 2 cks. (pt.), £17.

SODIUM SILICATE—
Huatsuka, 8 c., £7.
Pt. Elizabeth, 12 c., £18.

SODIUM SULPHATE—
Cartagena, 1 t. 10 c., £21.
Shanghai, 15 c., £17.
Swatow, 1 c., £6.

SODIUM SULPHITE—
Antwerp, 10 c., £15.

SODIUM TARTRATE—
Calcutta, 3 cs., £15.
Melbourne, 5 cs., £27.
Montreal, 1 t., £75.

STRONTIUM CARBONATE—
Colombo, 1 ck., £11.

SULPHUR (FLOWERS)—
Cape Town, 9 t. 19 c., £142.

SULPHURIC ACID—
Alexandria, 2 c., £5.; Accra, 14 c., £33.; Dar-es-Salaam, 11 c., £14.; Pt. Elizabeth, 5 c., £12.; Sekondi, 2 t. 6 c., £57.; Singapore, 10 t. 5 c., £170.

TARTARIC ACID—
Barranquilla, 1 c., £9.; Christiania (F.), 10 c., £69.; Irish Free State, 1 c., £8.; Medellin, 1 c., £8.; Melbourne, 5 c., £35.; New York (F.), 10 t., £1,300.; Pt. Elizabeth, 1 c., £8.; Puerto Cabello, 1 c., £9.; Rangoon, 3 c., £34.

TITANIUM POTASSIUM OXALATE—
Cape Town (F.), 1 kg., £8.

TURPENTINE—
Singapore, 2 drms., £7.

ZINC OXIDE—
Brussels, 1 ck., £6.; Copenhagen, 80 cks., £308.; Malmo, 30 cks., £127.; New York, 10 cs., £55.; Melbourne, 1 ck., £6.; Punta Arenas, 1 ck., £5.

Week ending July 14.

BEESWAX—
Brisbane, 1 t.
Melbourne, 10 c.
Sydney, 2 c.

CARNAUBA WAX—
Trieste, 1 t.

FULLER'S EARTH—
Alexandria, 28 t.
Antwerp, 6 t.
Christiania, 25 t.
Los Angeles, 20 t.
New York, 55 t.
Rotterdam, 106 t.

GLUE, SIZE, AND GELATINE—
Delagoa Bay, 3 c.; Drammen, 10 c.; Durban, 2 c.; East London, 3 c.; Fremantle, 13 c.; Hong Kong, 6 t. 14 c.; Lyttleton, 2 t.; Montreal, 1 c.; Paris, 12 t. 1 c.; Pt. Elizabeth, 2 c.; Pt. Swettenham, 1 c.; Rangoon, 10 c.; Shanghai, 2 c.; Singapore, 1 c.; Sourabaya, 1 t. 10 c.; Stockholm, 6 c.; Wiborg, 19 c.; Yokohama, 2 c.

MINERAL WAX—
Delagoa Bay, 6 t.
Sydney, 1 t.

PARAFFIN WAX—
Antwerp, 4 t. 10 c.

PLUMBAGO—
Alexandria, 12 c.; Bilbao, 10 t. 17 c.; Boulogne, 1 t. 15 c.; Brussels, 5 c.; Delagoa Bay, 9 c.; Kilindini, 2 c.; Lisbon, 10 c.; Pt. Said, 1 t.; Rio de Janeiro, 2 c.; Valparaiso, 1 t. 16 c.

QUININE—
Bombay, 2,036 oz.; Calcutta, 5,012 oz.; Fremantle, 1,000 oz.; Madras, 100 oz.; Melbourne, 2,400 oz.; Piraeus, 1,456 oz.; Pt. Elizabeth, 7,730 oz.; Sydney, 1,000 oz.; Wellington, 74 oz.

ROSIN—
Sekondi, 4 c.

SALT—
Amsterdam, 6 c.; Durban, 2 c.; Fiji Islands, 1 t. 5 c.; Fremantle, 16 c.; Helsingborg, 12 c.; Invercargill, 4 t. 1 c.; Iquique, 3 c.; Kilia, 10 c.; Labrador, 2 c.; Malmo, 6 c.; Melbourne, 1 c.; Pt. Elizabeth, 9 c.; Pt. Sudan, 16 c.; St. Lucia, 7 c.; St. Helena, 10 c.; Stockholm, 4 c.; Suez, 13 c.; Shanghai, 2 c.; Trinidad, 15 c.

SHELLAC—
Melbourne, 6 c.

SOAP—
Antwerp, 14 c.; Bangkok, 2 t. 7 c.; Bermuda, 1 c.; Bombay, 1 t. 6 c.; Boulogne, 2 c.; Brussels, 4 c.; Buenos Ayres, 9 c.; Calcutta, 5 c.; Christchurch, 8 c.; Colombo, 13 c.; Demerara, 2 c.; Durban, 1 c.; Fiji Islands, 1 c.; Grand Bassam, 1 t.; Half Assinie, 2 t.; Harlingen, 1 c.; Hong Kong, 2 c.; Irish Free State, 12 c.; Iquique, 8 c., Jamaica, 30 t. 11 c.; Karachi, 2 c.; Kilindini, 2 c.; Lagos, 4 t. 5 c.; Lome, 10 c.; Malta, 5 c.; Manilla, 1 c.; Melbourne, 8 c.; Monte Video, 9 c.; Opobo, 19 t. 12 c.; Penang, 7 c.; Pt. Elizabeth, 1 c.; Pt. Harcourt, 7 t. 4 c.; Pt. Said, 5 c.; Pt. Sudan, 2 c.; Punta Arenas, 2 c.; Rangoon, 2 c.; Rio de Janeiro, 3 c.; Rotterdam, 2 c.; Sierra Leone, 1 t.; St. Helena, 2 c.; Sekondi, 3 t. 14 c.; Shanghai, 2 c. Singapore, 1 c.; Tientsin, 1 c.; Tokio, 3 c.; Toronto, 3 t. 16 c.; Trinidad, 5 t. 18 c.

SOAP—
Valparaiso, 1 t.
Warri, 7 c.
Wellington, 1 t. 5 c.

SPERMACETTI WAX—
Paris, 1 t.

STEARINE—
Irish Free State, 1 t.

TALLOW—
Dusseldorf, 20 t. 4 c.; Ghent, 13 t. 4 c.; Hamburg, 20 t. 7 c.; Harlingen, 2 t. 10 c.; Sekondi, 2 c.

WHITE LEAD—
Auckland, £680.; Bluff, £50.; Brisbane, £95.; Calcutta, £165.; Christchurch, £121.; Dominica, £16.; Dunedin, £9.; Durban, £180.; East London, £32.; Fiji Islands, £98.; Hong Kong, £22.; Invercargill, £143.; Irish Free State, £70.; Melbourne, £1,051.; Napier, £246.; Oamaru, £25.; Piraeus, £50.; Rangoon, £20.; Shanghai, £80.; Sydney, £1,133.; Trinidad, £84.; Wellington, £158.

ZINC ASHES—
Antwerp, 6 t.

MANCHESTER.

Week ending July 12.

ALUM—
Canada, 125 pkgs.
Holland, 35 cks.

CARBON BLACK—
Belgium, 10 cs.

CHEMICALS (*otherwise undescribed*)
Antwerp, 4 cks., 12 kgs.; Belgium, 3 pkgs.; Basle, 12 cks.; Copenhagen, 15 cks.; France, 5 bgs.; Hamburg, 25 cks.

COAL TAR PRODUCTS—
Aniline Oil
Basle, 12 drms.
Naphthalene
New York, 207 bgs.
Tar
Germany, 4 t. 16 c.
Unspecified
France, 432 t. 17 c.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 289 kgs.
Unspecified
Melbourne, 2 drms.
Tuticorin, 1 drm.

FERRO MANGANESE—
Antwerp, 95 t.; Baltimore, 800 t.; Hamburg, 50 t.

GELATINE—
Belgium, 16 bgs.
Canada, 10 bgs.

GLUE—
Canada, 20 bgs.
Montreal, 40 bgs.

GLYCERINE—
Holland, 4 drms.

LEAD ACETATE—
France, 15 cks.

MAGNESIUM CHLORIDE—
Bombay, 78 drms.

SALAMMONIAC—
France, 24 cks.

SALT—
Cairo, 1 cs.
Montreal, 1,600 bgs., 1,000 sks.
St. John, 20 t.

SALTCAKE—
Christiania, 500 t.

SOAP—
Bombay, 3 cs., 17 brls.
Cairo, 12 cs.

ZINC SULPHATE—
France, 100 bgs.

NEWCASTLE-ON-TYNE

Week ending July 14.

NIL.

N. & S. SHIELDS.

Week ending July 14.

NIL.

PRICES CURRENT.

WEDNESDAY, JULY 18, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & Co., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. *at makers' works, but it must be understood that the prices in different localities may vary.*

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	24/-	&	48/-
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	50	0	0
Citric	lb.	0	1	8¼
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 30/32 Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6¼
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	2	3
Tartaric (crystals)	lb.	0	1	3
COAL TAR PRODUCTS.				
Aniline Oil and Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	7
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	3
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	6	15	0
Pyridin	gallon	9	18	0
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	2	0
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	120	0	0
Alum, loose lump (delivered)	*ton	12	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	70	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	15	0	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	10½
Bleaching Powder, 35%	*†ton	11	7	6
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	10	0
Carbon Bisulphide	*ton	28	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in Bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	26	0	0
Formaldehyde, 40%	ton	94	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in Bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	40	0	0
Lead Acetate (brown)	ton	42	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	0	0
Lime Acetate (grey), 80%	*ton	21	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	37	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	50	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	18	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	32	0	0
Potassium Permanganate (commercial)	lb.	0	0	9¾
Potassium Prussiate (yellow)	lb.	0	1	2¾
Potassium Prussiate (red)	lb.	0	4	0
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	60/-	&	57/-
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d.	to	9d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	21	10	0
Sodium Hydrate (70% C. Soda)	†ton	20	0	0
Sodium Hydrate (60% C. Soda)	†ton	19	0	0
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	10	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	26	0	0
Sodium Hyposulphite (commercial)	†ton	10	0	0
Sodium Hyposulphite (photographic)	ton	14	0	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	7	6
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	6¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	15	0	0
Sodium Sulphide Crystals (casks)	†ton	8	10	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	5	0
Sulphur (Roll Brimstone)	ton	8	5	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	64	12	6
Lead (Chemical Sheet), delivered	cwt.	1	13	0
Lead (Foreign Pig)	ton	24	0	0
Nickel	ton	130	0	0
Silver	oz.	0	2	6⅞
Tin, English Ingots	ton	178	0	0
Zinc (Spelter)	ton	28	17	6
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	44	10	0
Linseed, Raw	*ton	45	15	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	40	0	0
Turpentine	cwt	3	18	0

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
The Smoke Abatement Bill..	91
Colour Users and the Dye Agents	92
The Trade Position	92
The Fuller's Earth Industry	93
Sulphur in Portland Cement	95
Canadian Bentonites	96
Concrete in Chemical Engineering	97
Activated Carbon	99
The British Dyestuffs Industry	101
Zinc and Lead Compounds in America	102
Our Bookshelf	102
Legal Intelligence	102
Publications Received	102
Items of Interest	103
Imports of Chemicals and Allied Products in June	105
Exports of Chemical and Allied Products in June	106
Gazette News	106
Reports of Companies	108
New Companies	108
Fertiliser News	109
Cumberland Coking and By-product Industries	109
Parliamentary News	110
South Wales Notes	110
Correspondence	110
Trade Inquiries	110
The Patent List:—	
Applications for British Letters Patent	111
Complete Specifications Accepted	111
Complete Specifications Open to Public Inspection before Acceptance	111
Abstracts of Latest Complete Specifications	111
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	112
Thirty-five Years Ago	113
Market Reports:	
London "Open Market" Report	113
London Metal Market	115
Manchester Chemical Market	115
Swansea Market Report	115
Liverpool Chemical Market	115
West of Scotland Chemicals	116
Imports of Chemical Products	116
Exports of Chemical Products	118
Prices Current	122

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CURRENT TOPICS.

THE SMOKE ABATEMENT BILL.

ACTING on behalf of the Minister of Health, the Earl of Onslow, on Thursday of last week, introduced into the House of Lords, the long-awaited measure dealing with the abatement of smoke nuisances. It will be remembered that the attempt last year to pass a Bill on similar lines did not meet with success, the second reading proving too great an obstacle. The present Bill is largely the embodiment of the recommendations made by Lord Newton's Committee on smoke abatement. As Parliament is to adjourn on August 2 until November 13 next, it does not appear that there is much hope of getting the Bill through before the end of the year. In many respects, this measure is much more workmanlike than its predecessor of last year, and should command the support of those who are interested in making a more effective attempt to lessen the smoke evil. Among the main features of the Bill as at present constituted are the subsections in Clause I. relating to the amendment of the Public Health Act of 1875. Under these amendments, it is proposed that smoke emitted from factory chimneys in such quantity as to be a nuisance shall be deemed to be a nuisance, whatever its colour; while the expression "smoke" is to include soot, ash, grit, and gritty particles. Added to the list of exempted processes are those of re-heating and annealing, hardening, forging, converting and carburising iron and other metals. To appease public opinion on this latter point, however, provision is made whereby the inclusion of any or all of these processes can be annulled, after five years from the passing of the Bill. A clause of definite interest to the chemical industry is the power proposed to be given to the Minister of Health to extend the list of noxious or offensive gases mentioned in section 27 of the Alkali Works Regulation Act, and to increase the list of works mentioned in the first schedule to that Act. Another important proposal is that which increases the maximum penalty which may be imposed in regard to smoke nuisances from £5. to £50. It has frequently been urged that the fines under the existing law should be increased, and it certainly appears to be necessary to allow more power to those responsible for the administration of the law in this respect. One point which is bound to meet with considerable criticism is that if a person charged can show that he has used the best practicable means for

preventing the nuisance, it will be counted as a defence. There is no mention of bringing private dwelling-houses, which are probably the worst offenders in the matter of atmospheric pollution, inside the scope of the Bill, while the immunity of Government works from proceedings under the present Act is to continue. It is almost certain that amendments on many of these points will be suggested.

COLOUR USERS AND THE DYE AGENTS.

The discussion which took place in the House of Commons last week on the Board of Trade estimates furnished an opportunity for further ventilating the position of the dyeing industry in this country. Primed with facts from interested parties, Lieut.-Commander Kenworthy and Mr. J. Hope-Simpson made an attack on the Government's policy of assisting the dyestuff-manufacturing industry. The former member's remarks were mainly confined to extracts from speeches and quotations from reports, by which he endeavoured to show that the high cost of dyes was responsible for the bad state of the British textile trade. Mr. Hope-Simpson, on the other hand, said that the chief opposition probably came from the dyestuff merchants. In this, he was merely quoting Dr. Clayton, who preceded him in the discussion, with this difference, that whereas Dr. Clayton contended that British interests were vastly more important than the interests of the dealers in German dyes, Mr. Simpson believed the dealers played a very important part in the dyeing industry. The smaller users, he said, resort to the larger merchants and rely on their skill and experience for advice with regard to the dyes they shall use. With the merchant gradually being squeezed out, what, then, was to become of the small user? The fact that the larger concerns in the colour-using industries have been able to present such satisfactory reports during the past few years, even under the handicap of higher-priced dyestuffs, while the small dyers and printers have found it difficult to make ends meet is in a great measure attributable to the lack of scientific control in the works of the latter. The smaller firms had previously been relying on the importers of German dyestuffs for advice and technical assistance, under the impression that he received it gratis. Merchants, however, as a class are not business philanthropists, and it may be assumed that such assistance was paid for in the cost of dyestuffs. But there is no need for the small firm, which cannot afford to employ a works' chemist to suffer for the lack of this indirectly German-subsidised assistance. Efficient organisation in the factory and close attention to detail will greatly help towards economical working, while it is now substantiated that the quality and range of British dyestuffs is increasingly good. There are several ways of replacing the technical assistance previously obtained from the dyestuff merchant, and, considering that the smaller users constitute a large proportion of the dye-using industries, it is rather disastrous if they depend for their very existence upon the advice of a handful of agents for German products.

THE TRADE POSITION.

The general impression created by the trade figures for June, as published in the Board of Trade returns, is not a very favourable one. Comparison with last year is not very satisfactory in view of the rapidly changing conditions at home and abroad, the difficult situation in the Ruhr, the exclusion of the Irish Free State from the returns, and the unsteadiness in price quotations. Exports of British goods in June amounted in value to £62,884,000., comparing very favourably with the total for June, 1922, of £52,146,000. It would, however, be fairer under the circumstances, to make comparison with the previous month, when conditions were very similar to those now prevailing. This reveals a drop in exports amounting to £8,671,000., which is accounted for partly by a reduction in coal exports, but principally in manufactured articles, chiefly textiles. The latter fact is of direct interest to the chemical trade, particularly as imports of raw cotton are again lower by £1,315,000. in June, compared with May. The boom in the exports of chemicals in May largely represented activity on the part of purchasers some two or three months previously, when the indications seemed to point towards an increase in prices of chemical products due to general scarcity. June figures reveal a falling off in many lines, and it remains to be seen whether this depression will continue. The figures for the current month will probably be considerably affected by the strike of dock labourers, so that a general shrinkage both in imports and exports is to be expected. The President of the Board of Trade, Sir P. Lloyd-Greame, speaking in the House of Commons last week, warned the country that he did not anticipate that the present volume of trade as revealed in the recent official statistics would be maintained in the coming months. From information derived from all sources, he was led to believe that orders are not coming in owing to the general uncertainty caused by the failure to obtain settled and stable conditions in Europe. In fact, in all the greater industries of this country, the prospects are nothing like as good as they were last January. If this be the considered opinion of the head of the department directly concerned with British trade, it seems to us that the Government is bound to outline and pursue some definite policy with regard to our defaulting late enemy.

New Stainless Alloy.—It is stated that there has just been produced in Sheffield a new alloy, which has far more valuable properties than any of the existing stainless steels or iron. Further details are not yet available, but it is understood that the new material is going to be applied almost immediately to the manufacture of cutlery, and that it has extremely valuable mechanical properties in the sense that it can be forged whether hot or cold, and rolled very thin.

THE FULLER'S EARTH INDUSTRY.

A MINERAL OF GROWING IMPORTANCE.

By A. Brittain, M.Sc., A.I.C.

FULLER'S earth derives its name from the fact that in earlier days it was used extensively by "fullers" for the cleaning or "fulling" of woollen goods, a purpose for which the material was particularly suitable owing to its property of absorbing grease. At that time the mineral was considered so valuable that its export was prohibited under severe penalties, but owing to the introduction of more effective and cheaper cleansing agents it is now used only to a small extent for this purpose. On the other hand, a new and important demand has been created by its use for bleaching purposes in the constantly expanding mineral and vegetable oil industries.

Sources and Scale of Production.

At the present time the two main producers of fuller's earth are Great Britain and the United States. With the extraordinary development of the petroleum industry in America there has arisen an ever-increasing demand for the earth for bleaching purposes, and as the American earth is specially suitable, it is not surprising that the production in the States has risen from 34,459 tons in 1913 to more than twice that figure in 1922. In 1920 Great Britain produced 28,906 tons, a figure which is slightly less than the total for 1913, but with the introduction of oil refining on the large scale into the country, it is expected that the demand for the earth will be considerably increased. Practically the whole of the fuller's earth produced in this country comes from Reigate and Nutfield, in Surrey, and also from Somerset, deposits being worked at a number of localities in the vicinity of Bath. Deposits of the earth are also found at other places throughout the country, but these are small and of little or no commercial importance.

Characteristics of Fuller's Earth.

Fuller's earths are clay-like materials, usually non-plastic, and of a greyish, yellowish, greenish, or bluish colour, although in the trade only two main qualities are recognised —viz., yellow earth and blue earth. The mineral has a specific gravity varying from 1.7 to 2.4, is greasy to the touch, and adheres but slightly to the tongue. When fused it gives a porous slag which melts eventually to a white glass. The properties that make fuller's earth commercially valuable are its power of absorbing grease, and its affinity for the colouring matter contained in oils, fats, and waxes, and it is by these two properties that the earths have been characterised, rather than by their chemical composition, which, as will be shown, is very indefinite and differs widely from one deposit to another. The earths have been described as consisting essentially of hydrated silicates of aluminium, with varying amounts of impurities such as oxide of iron, lime, magnesia, and alkalies. The following analyses show the composition of typical earths found in Great Britain :—

Analyses of British Fuller's Earths.

	Nutfield Earth.	Midford Blue Earth.	Midford Yellow Earth.	Woburn Blue Earth.	Woburn Yellowish Earth.	Frongoch Earth	Reigate Earth.
Silica	58·66	54·0	59·3	60·00	56·9	63·25	53·00
Alumina	17·33	18·6	20·8	15·2	15·7	19·25	10·00
Ferric oxide	7·21	3·9	4·2	7·8	9·5	9·14	9·75
Ferrous oxide	—	0·8	—	1·7	0·1		
Lime	3·17	7·0	2·5	2·7	2·1	0·82	0·5
Magnesia	3·26	2·3	1·9	3·3	2·7	1·65	1·25
Soda	—	0·7	0·6	0·2	0·3	2·02	Not determined
Potash	1·63	1·8	1·7	0·6	0·7		
Carbonic oxide	—	3·4	0·3	—	—	—	—
Loss on ignition	8·74	7·2	8·6	8·4	11·9	3·56	24·00
Sulphur trioxide	—	—	—	—	—	0.31	—
Total	100·00	99·7	99·9	99·9	99·9	100·00	100·00

A study of the chemical composition of these earths shows that although they consist mainly of a series of hydrated aluminium silicates, yet the various samples contain different members of the series, or the same members in different proportions. This variation is seen in the varying ratios of silica, alumina, and water. The combined water in fuller's earth varies from 24 per cent. to 3.6 per cent., whilst an earth with excellent bleaching and grease absorption properties has been reported carrying as little as 0.6 per cent.

The Origin of Fuller's Earth.

The origin of fuller's earth and its relation to the clays is still very much a matter of speculation. It is well known that the decomposition of felspar results in the formation of crystalline aluminium silicates such as are found in ordinary clays, whilst it is believed, although definite proof is still wanting, that the decomposition of hornblendes and augites results in the production of the amorphous aluminium silicates such as are found in fuller's earth. This view is supported by the fact that the amount of magnesia present in the earth is always pronounced and averages much higher than in ordinary clays.

Practically all workable deposits of the earth are of secondary origin, having been redeposited in sedimentary series, and the suggestion has been put forward that fuller's earth represents a true chemical precipitate. If this is so, it would account for its occurrence as an extremely uniform and fine-grained deposit, interbedded with coarse sands, sandy limestones, and highly calcareous limestones. When examined under the microscope, it is seen to be composed partly of amorphous and partly of crystalline matter. The amorphous constituent is probably closely similar to ordinary rock clay in composition, consisting of hydrated aluminium silicates, with mineral matter containing alkalies, iron, and other oxides. The crystalline bodies present include free silica and silicates and various mineral substances, some of which are detrital. The grey-blue colour of fresh fuller's earth is due to the presence of a series of hydrated silicates of aluminium, iron, and potassium. The oxidation of such compounds by weathering, and by the action of percolating water, accounts for the fact that the upper layers of deposits are usually brownish yellow, whereas the unoxidised lower layers are greyish blue.

Preparation of Fuller's Earth.

Fuller's earth is either mined or quarried, the procedure depending on the depth and nature of the overburden. The actual depth of overburden that can profitably be removed depends on its nature and the thickness and quality of the mineral underneath. In Surrey the deposit is both mined and quarried, while in Somerset, where the deposit carries about 40ft. of overburden, the entire production is mined. The earth itself, which usually has a hard smooth surface, although occasionally it is found as a soft friable deposit, is easily dug with pick and shovel. After removal from the quarry or mine, the material is conveyed to the mill for treatment, which is very simple and consists in drying to remove the hygroscopic moisture only, grinding the dried earth, and finally sieving the ground material to the desired sizes. The raw earth is first passed through a crusher, where the lumps are broken down into small pieces to facilitate drying. In some instances the raw earth is stored in large bins, and air-dried, but it is more usual to pass the material direct to the crusher. The crushed earth is then dried, care being taken not to drive off any of the combined water, as for some purpose this would have a deleterious effect. The driers vary somewhat from works to works, but they usually take the form of large rotating cylinders 40-60ft. long and about 6ft. in diameter. These cylinders are set at a slight angle and rotate slowly, the material being lifted up continuously and cascaded down again by horizontal plates attached to the inside of the cylinder and parallel to the axis of rotation. The heating, which is external, is applied either at the end where the wet earth enters, or at the opposite end where the dry material is discharged.

If the fuller's earth is intended to be used for the clarifying of mineral oils, close attention to temperature regulation is not necessary, since in this case the elimination of part of the combined water is not harmful In an oil refinery the earth is usually heated to 250-300° C., or even higher, in order to drive off the combined water, but it must be then used immediately, as otherwise, on exposure to the atmosphere, the earth rapidly reabsorbs its combined water again. When intended for the treatment of edible oils, however, the earth should not be overheated, as the removal of the combined water is supposed to be detrimental, this being especially the case with the English earths, although American earths are not so affected. To prevent any overheating during drying, the earth is sometimes passed through tunnel driers through which hot air is circulated, or it may be treated in special rotary driers capable of close temperature regulation

After drying, the earth is sieved or bolted into sizes depending on the use for which it is intended. If for use in the petroleum industry, the material is placed on the market as 15 to 30 mesh, 30 to 60 mesh, and 60 to 90 mesh, the coarse sizes being mostly in demand. In some of the American mills, where the entire production is applied to the refining of petroleum oils, the very fine material has to be dumped

for lack of a market. In these cases the mills are adjusted to suit the particular class of earth being treated, in order to give a maximum yield of the coarse particles. For edible oils, however, a greater degree of fineness is necessary—usually 100-120 mesh,—although there should not be an excess of very fine material, as this would cause caking and make filtration difficult and unsatisfactory. The English earth can be ground to pass 120 mesh, but the average American material cannot be produced finer than about 100 mesh without introducing an excess of very fine particles.

Applications of Fuller's Earth.

As already stated, the demand for fuller's earth for removing the natural grease from wool has declined to quite small proportions, but many other new uses have been found for it, so that the amount produced is greater than it has ever been previously. Amongst its minor applications might be mentioned its use as a carrier for certain pigments, as a filler for paper, for medicinal and toilet purposes, and, as an ingredient of some soaps; in India, where the mineral is obtained in small quantities in many localities, it is used for the washing of clothes. It also constitutes the principle part of the various edible earths which are sold in the bazaars, the earth-eating habit being prevalent throughout India, Burma, and the Shan States. It is used in small quantities for many other purposes, but the bulk of the earth produced to-day is used for the clarification and decolourisation of many kinds of oils and waxes.

In the petroleum industry large quantities of the earth are used for the final bleaching of paraffin wax for the production of the snow-white article of commerce, and it is also employed for the treatment of various kinds of lubricating oils, in order to improve the colour, by removing the asphaltic colouring matter present. Provided that the bleaching qualities of fuller's earth are good for use in the petroleum industry, its other properties are of minor importance, but an earth intended for the refining of edible oils has to be carefully selected, and should comply with the following requirements:—

(1) It shall bleach well, and the oil shall not revert to its original colour.
(2) It shall filter well and not cake badly.
(3) It shall leave no permanent disagreeable "earthy" taste or odour.
(4) The amount of oil retained in the earth shall be small.
(5) It shall not cause spontaneous ignition of the oil either in the filter press or on the waste heaps.

Superiority of the English Earths for Refining Edible Oils.

The English earth has the reputation of fulfilling these requirements more completely than that produced elsewhere, and many American refiners prefer them to the earths produced in their own country. The undesirable "earthy" taste or odour which some earths impart to edible oils is not now regarded as a serious objection to its use for refining these oils, since it has been found that the odour and taste can be easily removed by blowing dry steam through the refined oil which has been heated to a temperature of somewhat above 100° C. On the other hand, the oxidising action of the earth has proved a serious drawback when thus employed. During the filtration of the oil after treatment with the earth, the refiner naturally endeavours to recover as much as possible of the oil from the cake of earth in the press, and to accomplish this it is usual to blow with air. Owing, however, to the rapid rate at which some fuller's earths promote oxidation, the oil remaining in the earth is liable to, and often does, take fire by spontaneous ignition, which results in no small inconvenience and loss. In this respect, again, English earths are better than American, and it is interesting to note that the United States Government authorised the removal of all restrictions on the importation of the mineral at the beginning of 1919.

The Nature of Fuller's Earth.

The properties possessed by a fuller's earth depend on the particular member or members of the series of hydrated aluminium silicates which compose it, and the proportions in which they are present. Examples of these silicates, which vary widely in composition, are quoted below:—

Mineral.	Formula.	Composition		
		Silica.	Alumina.	Water.
Pyrophyllite	Al_2O_3, $4SiO_2.H_2O$ ..	64.2 ..	30.3 ..	5.0
Rectorite	Al_2O_3, $2SiO_2.H_2O$ ..	50.0 ..	42.5 ..	7.5
Montmorillonite....	Al_2O_3, $3SiO_2.3H_2O$ ..	53.7 ..	30.3 ..	16.0
Smectite	Al_2O_3, $7SiO_2.12H_2O$ ..	57.0 ..	13.8 ..	29.2

Since fuller's earth consists of a mixture of different members of such a series, it is obvious that no definite chemical composition can be assigned to it, but that this will, apart from its impurities, vary from earth to earth. These silicates, however, have one particular property in common—they are all amorphous or non-crystalline bodies which possess a colloidal structure, a colloid being defined as a substance which, when taken up with water, goes into solution, but which will not pass through a parchment membrane as a substance in true solution would do. It is to the presence of of this colloidal material, which has the power of absorbing organic colouring matter present in oils and fats, that the bleaching properties of fuller's earth are attributed.

Colloid-content and Colour-absorbing Powers.

It is well established that many clays, artificial aluminas and silicas, and a considerable number of finely powdered minerals possess decolourising properties to a more or less pronounced extent. The cause of this colour-absorbing property of powdered minerals, and especially of fuller's earth, presents a problem which has yet to be solved, almost every writer having advanced a different explanation to account for it. In view of the known facts, however, it is improbable that the action is a chemical one, and it appears more likely that it is due to the mechanical entanglement of the colouring matters in the "colloidal" portion of the earth. Colloids possess the property of being rapidly stained by organic colouring matters, which they firmly hold in an insoluble form known in the dyeing industry as a "lake." A very familiar example of this is the use of alumina as a mordant in cotton printing. Thus the well-known dyestuff, Turkey Red, is fixed on cloth as a complex lake in which alizarin—the colouring matter—is associated with alumina and calcium.

The Variations in the Bleaching Powers of the Earths.

Fuller's earths differ widely in their action on the colouring matters present in oils and fats, and an earth which will bleach one kind of material will be ineffective towards another. All colouring matters are not absorbed by an earth to the same degree, while different earths vary in their power of absorbing the same colouring matters. A possible explanation of the variation in the bleaching powers of various earths is as follows: Colloidal materials can absorb certain salts, or at least the basic or metallic portions of these salts. This property is also possessed by certain amorphous substances having a fine porous structure, such as charcoal and bone black. These absorbent materials have a selective action upon salts, those portions of an unlike chemical nature only being attracted and absorbed. In view of the partial colloidal nature of fuller's earth, it seems reasonable to expect that the same selective absorbing action would be exerted, and this would vary according to whether the earth is more or less acidic in nature. This latter property is dependent on the composition, the earths carrying the greatest proportion of the acidic oxide of silica, SiO_2 naturally possessing the greatest acidity. Moreover, substances usually submitted to bleaching by fuller's earth contain several colouring matters having different chemical properties, and consequently showing a difference in acidity or basicity. Such being the case, the earth used in bleaching extracts them in proportion to their acidic or basic properties. This would account for the variation in bleaching powers, since the minerals comprising the earths have a preference for different classes of organic colours. Thus, earths which efficiently decolourise vegetable oils containing one type of organic colouring matter, are quite useless for mineral oils, which would contain colouring matters of quite a different nature.

Effects of Heat Treatment.

The bleaching properties of fuller's earth are dependent to some extent on the treatment that it has received before use. Thus, earths which have been heated to moderately high temperatures show a falling-off in their colour-absorbing properties, due to the fact that the earth tends to lose its colloidal structure when heated above 150° C. It is customary, however, when bleaching with the earth, to heat-up the material, by which means it is claimed that an increased bleaching action is obtained. This effect is not due to a stimulation of the inherent bleaching properties of the earth, but to the reduction in the viscosity of the material, and also to the expulsion of air from the surfaces and pores of the absorbing particles, whereby a more intimate contact of the earth and the material to be bleached is obtained.

Although information regarding the relationship between the composition of fuller's earth and the class of colouring matters which it removes most efficiently is at present very meagre, once a well-defined relationship is established it ought to be possible to predict from an analysis the value of an earth and the class of work for which it is best suited. Further, such a thought suggests the possibility of producing a bleaching agent capable of doing the work of fuller's earth, possibly either by chemically treating certain clays and minerals which already possess a certain bleaching power, or by impregnating them with some colloidal matter such as is found in fuller's earth.

SULPHUR IN PORTLAND CEMENT.*

HARMFUL ONLY IN HIGH PERCENTAGES.

SPECIFICATIONS for cement limit the allowable proportion of sulphur (as SO_3), and the question not infrequently arises as to whether cement should be condemned on account of the quantity of SO_3 present. The British Standard specification states that it shall not exceed 2.75 per cent. Manufacturers of cement add gypsum during the process of manufacture, the amount so added depending to a certain extent upon the season of the year and the setting-time required.

The object of the present experiments was to determine the effect, on the strength and soundness of cement, of varying the sulphur-content by the addition of gypsum; also its effect on steel embedded in the cement. The experiments have been carried out in the University of Birmingham, with cements specially made for the purpose. No attempt was made to produce a commercial cement that would satisfy the British Standard specification in all details. Starting with a clinker containing about 2.5 per cent. sulphur (as SO_3), other cements were made by the addition of proportions of gypsum, ranging from 1 to 10 per cent. Thus the percentage of sulphur was approximately as follows:—

Cement Sample No.	Gypsum Added.	SO_3.	Cement Sample No.	Gypsum Added.	SO_3.
	Per Cent.	Per Cent.		Per Cent.	Per Cent.
1	0	2.5	7	6	5.0
2	1	2.9	8	7	5.4
3	2	3.4	9	8	5.8
4	3	3.8	10	9	6.1
5	4	4.2	11	10	6.5
6	5	4.6			

With these special cements five types of specimens were made, and the following tests and observations were carried out:—(*a*) Le Chatelier tests for soundness; (*b*) Tensile strength: neat cement; (*c*) Tensile strength: cement and sand (1 to 3); (*d*) Compression strength tests on 4-in. concrete cubes; (*e*) The effect of sulphur on steel embedded in concrete cylinders. The details of these experiments and the results so far obtained are as follows:—

The Le Chatelier tests for soundness were carried out as specified by the British Standard specification for Portland cement. No appreciable expansion was obtained in any case; yet, some of the concretes were undoubtedly unsound, expanding and cracking badly with time.

Tensile Strength Tests.

These briquettes were of the type specified by the British Standard specification, and required about 26 per cent. of water to obtain a suitable consistency for the neat cement, and 9 per cent. of water for cement and sand mixture (1 part cement, 3 parts Leighton Buzzard sand). They were made and stored as required by the British Standard specification. It was found that the strength begins to diminish only when the addition of gypsum has reached a total of 5-6 per cent., corresponding with 4½-5 per cent. of SO_3. There appears to be a slight increase in strength up to about 4 per cent. added gypsum (corresponding with just over 4 per cent. SO_3).

Compression Tests in Ordinary and Reinforced Concrete.

Blocks were made of cements numbered 1 to 5, 7, 9, and 11. Eight cubes of concrete were cast with each of these cements, giving a total of 64 cubes. The concrete consisted of 1 part cement, 2 parts sand (from Cannock Chase), 4 parts quartzite (from Nuneaton), and was cast into 4-in. cubes and 4½-in. dia. cylinders. Half of these cubes were stored in air in a dry room, and the other half in water. At the end of 11 months the blocks of the first set were broken. The results are given in the following table:—

Cement Sample No.	Compressive Strength.		Remarks.
	Stored in Air.	Stored in Water.	
	Ton per sq. in.	Ton per sq. in.	
1	1.14	1.89	
2	1.04	1.73	
3	1.23	1.60	
4	1.06	1.60	
5	1.15	1.54	
7	0.99	1.80	
9	0.74	1.44	Shows distinct cracks.
11	0.71	0.297	Badly split and cracked.

The specimens from samples 9 and 11 were cracked at the end of 1 month. At the age of 11 months no appreciable increase in the disintegration was apparent over that found at 1 month. The blocks made from sample 11 were very badly cracked and broken, whilst those made from sample 9 had only cracks just appearing. These again were visible at 1 month, and did not appear to have increased on further ageing. Decrease in compressive strength takes place when 6-7 per cent. of gypsum is added (5-5½ per cent. SO_3).

Eight cylinders of each of the mixtures used for the cubes were also cast and were stored under the same conditions as the compression cubes. Forty-eight of these are still unbroken, 24 of which are stored in water and 24 in air. Two pieces of steel were embedded in each cylinder. One was brightly polished and the other one was rusted. After an interval of 11 months a cylinder of each sample was broken open, and the steel bars were examined. In no case was it possible to say that definite rusting had taken place due to the action of the concrete, or due to water and air getting into the concrete. Slight brownish-yellow skins and occasionally rust-markings were found on some of the bright bars.

Summary and Conclusions.

(i) High percentages of gypsum reduce the strength of cement, cement mortar, and concrete.

(ii) At the end of 1 month concretes with cement containing over 6 per cent. SO_3 were cracked, and with 6½ per cent. SO_3 were badly cracked.

(iii) No obvious disintegration during a period of 11 months was observable on any samples of cement or concrete with a cement having a lower percentage of SO_3 than 6 per cent.

(iv) The Le Chatelier test for soundness fails to detect probable unsoundness due to high gypsum-content.

(v) In none of the samples used was it possible to detect any effect on steel, either bright or rusted, which could be directly attributed to the gypsum content.

The conclusion as to soundness is clearly of the greatest importance, and when analyses of the cements are not directly made, or supplied by the makers, it is suggested that blocks should be kept under observation for at least 1 month. If these do not show signs of cracking after that period, there will probably be little fear of cracks developing later.

* Abstract of paper read by Professor F. G. Lea and Dr. R. E. Stradling before the Institution of Civil Engineers.

THE COATING OF METALS.—When metal is applied to a thoroughly clean surface by the Schoop process, the metal coating is extremely tenacious, says the *Revue de Métallurgie*. The strength of this adhesion was thoroughly proved during the war, when metallic coatings were applied to shells and other projectiles; after firing, the coating was found still adhering perfectly to the fragments of shell. Further experiments have proved that the applied metal will resist vibration, bending and even twisting without flaking off. Since the strength of adhesion on a given surface is not the same for all deposited metals, it cannot be assumed that adhesion results entirely from the interlocking of the projected particles with the minute inequalities of the surface. Of the metals most commonly used for deposition the following is their order in strength of adhesion on an iron surface:—Zinc, aluminium, lead, tin, copper and bronze. Aluminium and zinc adhere strongly to copper, as does also tin.—*Engineering*.

CANADIAN BENTONITES.

CHEMICAL AND PHYSICAL CHARACTERS.

A DETAILED account of the occurrence, properties and uses of the valuable new clay "bentonite" was given in the *Chemical Trade Journal and Chemical Engineer* for December 15, 1922 (page 731). The chemical and physical characteristics of the substance have been studied by the Mines Branch of the Canadian Department of Mines, and in the report of the Department for 1921 the results of these investigations carried out by E. A. Thompson and A. Sadler are given:—

The variety of clay known as bentonite occurs at several localities in western Canada. It differs in several respects from ordinary clay, and possesses properties which it is believed will make it of considerable economic importance. When freshly exposed it varies from a light yellow to light olive green, with waxy lustre. The clay is exceedingly fine-grained, and has a soapy feeling when wet. It swells and forms a jelly-like mass in an excess of water.

Its chief use, hitherto, has been as a filler in paper manufacture, but it has been suggested that it might be employed for any of the following purposes: (1) soap making, in which process it can actually replace a portion of the soap substance; (2) as a filler in rubber, textiles, leather, phonograph records, cordage, pressed and moulded insulations; (3) as an ingredient in gypsum and lime plasters; (4) in ceramics; (5) for replacing in part, the bonding clay in abrasive wheels, graphite crucibles, chemical and electrical porcelain; (6) as an adhesive paste; (7) for dehydrating crude petroleum; (8) as a water softener, and base for massage creams; (9) in printer's ink; (10) as a substitute for fuller's earth.

Analyses of Canadian Bentonites.

Eight air-dried samples from five widely-separated localities have been analysed by Mr. A. Sadler as follows:—

—	British Columbia Top.	British Columbia Middle.	British Columbia Bottom.	Princeton.	Camrose.	Rosedale.	Wyoming (I.)	Wilkinite.
H_2O at 105° C.	3.92	6.64	6.09	7.71	5.94	8.10	5.80	11.91
H_2O over 105° C.	4.28	4.92	4.73	3.24	3.70	4.28	3.67	3.24
SiO_2	69.70	67.04	69.60	68.60	60.78	54.88	66.90	53.90
FeO	0.23	0.23	0.22	0.32	0.43	0.22	0.12	0.18
Fe_2O_3	2.88	2.79	1.79	2.00	3.67	4.10	2.80	3.21
Al_2O_3	14.00	13.46	11.84	12.10	17.08	19.92	15.26	18.00
CaO	1.56	1.78	2.28	1.84	2.84	2.22	0.46	1.00
MgO	1.81	1.93	1.75	1.84	2.16	2.83	2.26	3.61
TiO_2	0.23	0.25	0.20	0.14	0.22	0.25	0.11	0.65
P_2O_5	0.014	0.09	0.09	0.17	0.033	0.09	0.04	0.10
Na_2	1.09	0.53	0.48	0.50	1.54	1.75	2.12	2.72
K_2O	0.29	0.22	0.14	0.23	0.46	0.26	0.42	0.21
SO_3	none	none	none	0.61	0.005	0.16	0.08	0.19
S	0.016	0.008	none	none	0.04	none	0.018	none
CO_2	0.04	0.02	0.73	0.17	0.11	0.37	0.05	0.21
Cl	trace	trace	trace	trace	trace	trace	trace	trace
C	0.09	0.10	0.07	0.08	0.13	0.07	0.03	0.53
N	—	—	—	—	—	—	—	none
	100.150	100.008	100.01	99.55	100.138	99.50	100.138	99.66

The foregoing analyses were undertaken with four objectives in view:—(*a*) To ascertain if any definite chemical relationship existed between the several samples; (*b*) to calculate, if possible, a definite (mineralogical) formula for bentonite; (*c*) to discover its origin; (*d*) to have an accurate and complete record of its composition.

Comments on the Analytical Results.

Comments on the results are:—(*a*) The silica content in these clays varies widely from 53.90 per cent in the wilkinite to 69.70 per cent. in the British Columbia (top) sample. The alumina varies from 11.84 per cent. in No. 3 to 19.92 per cent. in No. 6. These variations of the alumina and silica do not indicate a very definite relationship between the materials of the different deposits. Apart from these the amounts of the other constituents agree quite closely. It was noticed that a high silica content is attended by a low alumina. The converse is also true. (*b*) The calculation of a formula does not appear to be possible at present. This may be accomplished after a microscopic examination has been made. (*c*) Analysis does not give any definite information as to the probable origin of these clays as it does in the case of kaolin. The probability is that these were derived from highly siliceous rocks, possibly volcanic, which have undergone subsequent alteration. (*d*) These analyses, it is believed, constitute the most complete record of composition of Canadian bentonite at present available.

Analyses of certain American bentonite clays are given in the issue of the *Chemical Trade Journal and Chemical Engineer* referred to above.

Water Absorption, Specific Gravity, and Fusion Points.

One gramme from each of the undermentioned samples was found to absorb the indicated number of grammes of water. Clay and water in contact for 24 hours:—

British Columbia	1.53
Camrose	4.15
Rosedale	4.71
Wyoming	4.93
Wilkinite	4.95

Crude material, ground to 100 mesh, dried at 105° C. for 2 hours. Determination by pyknometer, gave the following results:—

British Columbia (composite)	2.44
Rosedale	2.72
Camrose	2.73
Wyoming	2.77
Wilkinite	2.78

The fusion points were determined as follows:—

	Cone No.	Temp.
British Columbia	15	1430° C.
Rosedale	14	1410° C.
Camrose	1	1150° C.
Wyoming	11	1350° C.
Wilkinite	10	1330° C.

Effect of Heat on Colloidal Properties.

Determinations were made of the water remaining in the clay after it has been heated to the indicated temperatures for a period of one hour. It was also found that after heating to a certain temperature, which differed in the different samples, that the swelling property was destroyed, and that the other colloidal properties were diminished as the temperature increased. The results obtained are indicated below:

Percentage Amount of Water Remaining in the Clay.

—	Before Heating.	450° C.	500° C.	550° C.	600° C.	700° C.
B.C. Composite	4.64	*4.04	3.94	—	2.53	1.50
Camrose	3.70	—	*3.60	—	2.09	1.14
Rosedale	4.28	—	—	*4.17	—	—
Wyoming	3.67	—	3.49	—	*3.43	0.77

* Swelling property completely destroyed.

The foregoing results show that there is no fixed relation between swelling properties and the quantity of combined water present. In the B.C. sample, swelling was destroyed at 450° C., and in the Wyoming sample at 600° C., and yet they both retained the greater quantity of their combined water. It was also found that after heating from 400° C. to 600° C., there remained only a very small quantity in suspension after standing in water for 24 hours. Heating to 700° C. destroyed the colloidal property altogether. Even at 700° C. combined water still remained in the clay.

CONCRETE IN CHEMICAL ENGINEERING.*

METHODS OF INCREASING IMPERVIOUSNESS TO CHEMICALS.

THE use of concrete in chemical-manufacturing plants may be divided into the following general headings: buildings proper, and tanks, containers, etc.

Concrete in Building Design.

The methods of design of ordinary concrete buildings are matters of more or less common knowledge to structural engineers. There are, however, some qualities which seem to pertain with especial importance to buildings used for chemical-manufacturing purposes. Among these may be mentioned fireproofness, inherent sanitary qualities, and resistance to wear or attack from chemicals. Floors should be able to resist wear from foot and truck traffic, be easy to clean, and not be disintegrated by chemicals which may come into contact with them. A well-made and cured concrete floor will leave little to be desired in its ability to resist wear and fire and the ease with which it may be cleaned, but the question of the action of chemicals on it may need separate attention. Reinforced concrete girder spans of over 125ft. have been used in buildings. Floor loads as high as 2,000lb. per sq. ft. have been carried by concrete floors. Exhaustive fire tests on building columns conducted at the Underwriter's Laboratories, Chicago, showed that the columns having the highest rating consist of reinforced concrete columns with 2in. covering over the steel reinforcement and structural steel columns with 4in. covering of concrete over the steel. It is also worthy of note that the aggregate used in making the concrete has a decided effect on its fire-resistive ability. Thus, quartz aggregate has a tendency to spall off and expose fresh concrete or the reinforcement to the heat. Limestone or calcareous aggregate, on the other hand, calcines on the surface exposed to the heat, but the process of calcination is retarded or wholly inhibited by the protection to the underlying concrete afforded by the surface calcination. This protective coating has a counterpart in the case of many chemicals in contact with concrete. Certain acids form chemical compounds with the cement, which act as protective coatings and inhibit or greatly decrease further chemical action.

Chemicals that have been Stored in Concrete Tanks.

While no hard and fast law can be stated as to the chemicals which do not injure well-made concrete, it is fairly well established that the chlorides may be regarded as harmless, and some of the silicates as beneficial. A partial list of substances for which concrete tanks have been used is given in the following list:—

MATERIAL CONTAINED.	TREATMENT OF CONTAINER.
Crude oil, Light oil, Petroleum oil, Road oil	No treatment in many cases. Sodium silicate, neat cement wash, cement mortar coat, smudging oil, oil-proofing enamel, special varnish and proprietary surface coatings, gunite lining
Menhaden oil, Linseed oil, Rosin oil	No treatment
Sulphite liquor and cider vinegar	Surface coating of 1 part gilsonite, 2.5 parts turpentine, and 5 parts neutral petroleum oil by weight
Benzine	Surface coating of gelatin and glycerine applied hot
Salt brine	No treatment
Molasses	Mostly untreated. Some given inside coating of coal-tar pitch, Portland cement, and kerosene.
Coconut oil	Bakelite varnish
Glycerine	Bakelite varnish
Cottonseed oil	No treatment.
Soya-bean oil, Fish oil, Peanut oil	Sodium silicate
Ammonia (solution)	Coated with tar on inside
Bisulphite of lime	No treatment
Chloride of lime	No treatment if in dry state
Calcium chloride	No treatment
Electrolyte	Depends on liquid. Asphalt coating given to tanks used in electrolytic refining of lead and zinc
Hydrochloric acid	Acid-proof lining
Silicate of soda	No treatment
Sulphuric acid	Fire-brick or acid-proof lining, vitrified tile laid in litharge and glycerine
Wood pulp, Stock chests, Zinc chloride	No treatment
Hemlock liquors, Leaching-bark solution, Tanning liquors, Quebracho extract	Brush-coat neat cement or plastered coat cement mortar
Buttermilk	Coats of neat cement grout
Log boiling	Coated with cement mortar
Slime settling	No treatment
Gas purifying boxes	No special treatment
Caustic soda	No treatment
Corn syrup, Glucose	Acid-proof lining

* Abstract of paper by A. C. Irwin and F. W. Ashton, of the Portland Cement Association, Chicago, presented before the American Chemical Society, in April. From complete paper in *Industrial and Engineering Chemistry*, June, 1923.

The Two Classes of Protective Methods.

Methods of protecting concrete against chemical action may be divided into two general classes—viz., admixtures to the concrete through the cement or water or both; and surface coatings—either as a coating only or as a combined coating and surface-void filler. The question of the value of integral waterproofing compounds in concrete is a very persistent one. The number of these compounds is already so great as to bewilder the ordinary practising architect or engineer in trying to decide which to use. The arguments advanced to explain the beneficial effect of these compounds seem reasonable, but the practical experience had with them is not wholly convincing. Tests are needed—conclusive tests so conducted that each factor influencing the result is carefully segregated so that a proper weight may be assigned to each before accepting the theories of and successful field experience with integral waterproofing compounds. Imperviousness to the passage of ordinary liquids can be obtained by proper attention to the manufacture of concrete. The admixtures so far developed and used may be divided into two general classes—viz., powders, such as hydrated lime, clays, silicates, feldspars, etc., usually mixed with the dry cement; and liquids and pastes, such as insoluble stearate of lime, sodium and potassium oleate in the form of soluble soap, aluminium stearate, calcium chloride, and oil compounds. These are usually added to the mixing water.

Use of Powder as Void Fillers.

Most of the powders are inert, and are supposed to act as void fillers, thus increasing the imperviousness of the concrete. If, however, the admixture is merely an inert material, it is reasonable to suppose that by replacing an equal quantity of cement with inert material the strength of the product is reduced. Where a combined mechanical and chemical action is to be resisted, as when the chemical permeates the concrete and crystallises into larger volume, any decrease in strength is undesirable. Inert material cannot be held in the pores except through the confining action of the hardened cement, and at the surface at least the finely powdered inerts may contribute to weakness where strength is needed to resist mechanical action. The addition of cement instead of these inerts, or, better still, attention to grading of aggregates throughout the mass, thorough mixing, and the use of just enough water to permit thorough compacting in the forms will result in dense concrete of great strength, and at the same time afford a suitable bonding surface for protective coatings if these are required by the nature of the contained chemical. While not a rule of universal and unvarying accuracy, it has been demonstrated that, in general, the properties of concrete, such as imperviousness, wear resistance, resistance to acids and alkalies, etc., increase or decrease with the strength of the concrete. Integral compounds, if used at all, should be selected with a knowledge of the probable chemical reactions involved. With a view to assisting those who may bear the responsibility of deciding just what, if any, admixture to use, a brief outline of the principal ingredients and the action of some of them is presented here.

Quicklime was formerly used with concrete as a densifier, but has been discarded. The use of patented compounds, such as insoluble stearates and resinates, was followed by hydrated lime. Most of the secrets and patented powders are sold on the basis of their "water-repellent" quality. This property is obtained by adding to the powder some metallic stearate, such as lime soap, which is supposed to act as a distributor of the water repellent and as a void filler. Many proprietary compounds are composed mainly of finely ground sand or clay, with or without the addition of hydrated lime or insoluble soaps. Some proprietary cements are mixtures of Portland cement and stearates of lime, or soda and potash with sand and other materials, treated to produce a water-repellent cement. Again, some waterproof cements are made by mixing about 5 per cent.

(by weight) of a lime-oil compound in clinker form, with Portland cement clinker. Fish oil, boiled with hydrochloric acid and mixed with burnt lime while slaking, is also used. The resulting product is a paste which hardens as clinker. Another compound in the form of mortar consists of 1 part by weight of copal gum, 1 part hydrated lime and fine clay, and 1 part Portland cement. The lime-oil cement compounds depend for their impervious tendencies upon the formation of insoluble stearates of lime in the mass and surface of the concrete which act as barricades, and on hydrated lime as an inert void filler. The stearates of soda and potash (ordinary soap) are readily soluble in water, but when in solution in the presence of cement, less soluble lime soaps are formed and precipitated. When used as a surface coating, it is doubtful whether sufficient lime soap is formed and precipitated to act as a protective coating before the soluble soaps are dissolved and washed off. Experience indicates that, in general, surface coatings of soap solutions do not produce lasting results.

Liquids and Pastes as Fillers.

The liquids are mainly composed of metallic salts, such as chloride of lime; they also consist of oil emulsions and soap solutions, and solutions of paraffin in benzine or benzene. The paraffin solutions are applied to masonry surfaces. The waterproofing properties of these liquids depend upon the formation of gelatinous coatings around the smallest particles of the constituents of the masonry. Of course, this would tend to decrease the strength of the concrete, and often does. There is also a coal-tar product used as an integral waterproofing, from which the volatile oils have been almost entirely removed, and the remaining materials tend to bind together the particles of cement and fill the voids in the concrete. Some other compounds are composed of fish oil and water glass (sodium silicate). The fish oil, which is semi-drying, is slowly saponified by the lime of the cement, and the water glass forms a lime silicate, both actions, however, being incomplete, due to the insufficiency of lime present in the cement for such action.

Most pastes are soluble mixtures of secret ingredients which depend for their waterproofing qualities upon precipitation of insoluble materials in the voids of the concrete. Sometimes pastes are made by mixing a powder, such as alum, to the cement, and a soap solution to the tempering water. In making the concrete this paste is added, and the two constituents combine to form a stearate of aluminium, which is a stable, water-insoluble, void-filling compound. Before specifying integral pastes or any integral compounds, it is advisable first to investigate the results accomplished on previous work.

Use of Surface Coatings.

Concrete tanks and containers for liquid chemicals that will attack well-made concrete can be protected with greater certainty of success by the use of impregnative and surface coatings or by membranes than by the use of integral compounds designed to change the action of the liquid on the concrete. The absorptive property of concrete, held in common with practically all non-rusting materials used for the construction of tanks, renders it well adapted to forming a bond with surface coatings. Some of these coatings have already been mentioned, but there are scores of patented and secret compounds of paraffin, tar, elaterite, gilsonite and asphalts, mixtures of alkalies with soap and alum, paints containing suet, asphalts dissolved in naphtha or benzine or mixed with oil and other hydrocarbons, oil-tar pitch, graphite, and several cold-water paints which have Portland cement as an ingredient.

There are so-called, but not true, enamels, consisting of linseed oil and rosin, solutions of Bakelite, etc. There are the iron oxide coatings consisting of pulverised iron mixed with an active oxidising agent such as sal-ammoniac. The silicates and fluosilicates are used both as integral compounds and as surface coatings or "hardeners." Combinations of Portland cement with stearates, calcium chloride, and hydrated lime, combinations of oils partially "rubberised" and dissolved in a mixture of volatile hydrocarbons and turpentine distillates are all used. Lime has been used with cement both as quicklime and in its hydrated condition. At present hydrated lime is used exclusively, either alone or in combination with other materials. Tests indicate a reduction in strength of concrete due to addition of hydrated lime, and the presence of excess lime in concrete used in connection with chemical processes may be highly objectionable. High-magnesium or high-calcium lime is used practically without distinction for waterproofing purposes. Casein mixtures with quicklime, borax, or strong solutions of sodium silicate are also used. Their beneficial effects are supposed to result from insoluble precipitates filling the pores of the concrete. They are used both in surface coatings and integrally. Caustic potash is used with alum as a surface coating, and with various chemicals in secret waterproofing compounds.

The Sylvester process, in which soap and alum are used as a surface coating, consists in the application of a hot solution of about ¾lb. of Castile soap in 1 gal. of water to a dry, clean masonry surface, followed one day later by a coating of ½lb. of common alum dissolved in 4 gal. of lukewarm water. Both coatings are applied with a flat brush and repeated alternately, if necessary. Aluminium soaps are used in many proprietary integral-waterproofing compounds as void fillers and water repellents.

Powdered iron in combination with sulphur, sal-ammoniac, and even with cement is sold under a number of trade names for both integral mixtures and surface coatings. The theory of the beneficial effect of powdered iron is based on the increase in volume occurring on oxidation of the iron, thus filling the pores and forming barricades to the passage of liquids. Resin, or rosin, in combination with various gums is used in a great number of surface-coating compounds. The resin is dissolved in ether, alcohol, or a solvent oil, and used as surface filler. The elastic properties are supposed to be given to the coating by the inclusion of gums in the compound with a suitable solvent such as benzine or benzene. Calcium compounds, as sulphate or carbonate, combined with cement and aluminium compounds, are used in many secret "waterproofers."

Stearin and its derivatives in the form of stearic acid, stearates, and stearin pitch, are included in a multitude of commercially exploited surface-coating and integral compounds. The integral compounds usually employ ammonia or lime. Ammonium stearate, formed by adding stearic acid to excess of dilute ammonia, in the presence of cement forms an insoluble lime or aluminium stearate which is water-repellent. Stearate and asphalt are used as a joint-filling compound, and chemically treated suet as an integral waterproofer for mass concrete. The hydrocarbons and derivatives are so numerous and the method of their use so well known that they need not be discussed here. Specifications for tests and use of various asphaltic and coal-tar coatings have been published by the Bureau of Standards. Asphalts, such as elaterite combined with petroleum oils, linseed oil, gilsonite, and even castor oil, have been given trade names, such as "mineral rubber," and sold as surface coatings.

A simple and yet very effective waterproofing surface coating consists of paraffin dissolved in a suitable volatile solvent. The solvent carries the paraffin into the concrete, where it remains as a complete seal against the passage of moisture. Paraffin is also applied to a concrete surface by melting it and heating the surface to which the paraffin is applied. By skilful use of a blow torch the paraffin may be caused to penetrate some distance into the concrete.

General Conclusions.

In closing the paper the authors emphasise the importance of following implicitly those methods and practices in the manufacture of concrete which have been found in both laboratory and field to result in a product of the highest quality. Integral compounds, surface hardeners, and surface coatings will not in general compensate for careless manipulation of materials. In any investigation, therefore, having for its object the protection of concrete from the action of a chemical which will be in contact with it, the first step should be the preparation of experimental samples of concrete to determine whether or not the particular substance in question will really be detrimental to concrete of the highest quality. If the result of this investigation indicates the need of protection, the most promising procedure will be to study the efficacy of surface coatings for the purpose in hand, rather than the inclusion of compounds in the body of the concrete.

Therapeutics Regulation Bill.—For the regulation of the manufacture, sale, and the importation of therapeutic substances a bill has been introduced by Lord Onslow. The substances to which the bill applies are vaccines, sera, toxins, anti-toxins, antigens, salvarsan and analogous substances, and insulin. The bill provides that only persons licensed shall manufacture these substances, while a similar restriction is placed on importation.

ACTIVATED CARBON.*

GENERAL PROPERTIES, STRUCTURE, AND MANUFACTURE.

ACTIVATED carbon is a comparatively new product. A number of so-called decolourising carbons, which are carbons activated to some extent, have been on the market for several years, but the new and very different product now being produced and used commercially for gas and vapour adsorption was developed during the war, in answer to the demand for a material of great adsorptive capacity for use in gas masks. The discovery of the fundamental factors involved in its production is, without doubt, one of the outstanding scientific achievements of recent years. Gas-mask carbon, however, although more highly active than any carbon produced before its development, does not effectively decolourise and purify many liquids. The fundamental reasons for this, and the essential characteristics of highly activated carbon which will most effectively decolourise and purify various types of liquids, were discovered later, however, by the writer.

One distinction should be clearly made at the outset, to avoid possible confusion. *Active* carbon is regarded as a fairly definite physical entity of well-defined properties. The so-called *activated* carbons of commerce are not pure active carbon, and may vary enormously in porosity or density, strength, hardness, etc., by reason of the associated inactive carbon structure. Yet upon these secondary and incidental properties may depend the commercial usefulness of the carbon for a given industrial purpose. It is now known that the carbon must not only be active, but must also possess special physical and structural characteristics to make it effective for special purposes. There is no one type of activated carbon that can be universally effective for all purposes. Two activated carbons may contain the same percentage of active carbon, but one may be extremely valuable as a commercial vapour adsorbent, while the other, because of its low density, softness, etc., may be practically worthless for this purpose, though very valuable for decolourising sugar solutions.

Chaney's Theory of the Formation of Activated Carbon.

The only theory of the nature and formation of activated carbon which satisfies the known facts is that given by Dr. N. K. Chaney. According to this theory, active carbon exists as a distinctive physical modification, differing from other known inactive forms of carbon by some characteristic peculiarity of molecular structure or arrangement. To this characteristic structure are attributed its special properties —namely, its unique adsorptive power for gases and vapours, and, for certain substances in solution, its unusual chemical activity, and the limited temperature range of its formation. It has been demonstrated experimentally that the elementary carbon formed by the decomposition of carbon-containing compounds may exist in two forms—one of which is active and the other inactive. The temperature of carbon deposition appears to be the controlling factor—the carbon deposited below 500-600° C. being active and that deposited above this temperature range being inactive. Carbon deposited by the catalytic decomposition of carbon monoxide by ferric oxide at 300° C. is highly active. Also carbon deposited by the reaction between carbon tetrachloride and mercury or sodium amalgam at relatively low temperatures is active. On the other hand, the carbon deposited by cracking methane, for example, at high temperatures is inactive.

Applying this theory to the commercial preparation of activated carbon, it will be seen that the low-temperature carbonisation of vegetable materials, such as wood, nut shells, etc., would be expected to give a certain amount of active carbon. Why, then, does not ordinary charcoal exhibit the properties of activated carbon? The answer is that during the ordinary process of carbonisation the active carbon formed adsorbs certain hydrocarbons and stabilises them, so that they are retained under conditions of temperature and pressure which would ordinarily decompose or eliminate them. This has been experimentally shown. The active carbon, being already saturated, cannot, therefore, exhibit any further adsorptive power. The term *primary carbon* has been applied to this complex of stabilised hydrocarbons adsorbed on an active carbon base. Ordinary vegetable chars, low-temperature carbonisation cokes, blacks, and coals belong to the class of primary carbons, and from all these products activated carbons suitable for commercial uses can be prepared. On the other hand, cokes and other forms of carbon that are formed at high temperatures invariably consist largely of the inactive variety of carbon and cannot be activated.

Structure of Activated Carbon.

To be effective as an adsorbent the active carbon must be exposed and accessible. All highly adsorptive activated carbons are therefore either highly dispersed or are traversed by innumerable canals or capillaries, whose chief function is to permit free access to the particles of active carbon. The diameter of the submicroscopic capillaries in a highly activated coconut charcoal has been calculated from vapour-pressure measurements to be of the order of 10^{-6}cm. The surface thus rendered available per cubic centimetre of this carbon has been variously calculated to be from 120 to 1,000 sq. m. When such a carbon is exposed to a high concentration of condensible vapour, a certain amount is adsorbed on the immense surface of active carbon exposed, and a further amount is condensed in the capillaries of varying sizes. However, if such a carbon is exposed to a very low concentration of vapour, a considerable amount will still be adsorbed by the active carbon, but none will be condensed in the larger capillaries. This ability of activated carbon to take up vapours that are present in extremely low concentrations is one of its characteristics which distinguish it from other absorbents that are merely porous, and whose adsorptive capacity under these conditions is very small.

The desideratum for a gas-adsorbing carbon is that it shall have the maximum adsorptive capacity per unit of volume, rather than per unit of weight. This means that the largest *mass* of active carbon must be contained in unit space consistent with maintaining free access or passageway to all the particles in such mass. In other words, the carbon must not be too dense or its permeability is destroyed, and it must not be porous to the extent of needlessly sacrificing adsorbent material. If the density of the carbon falls below a critical minimum value, adsorptive capacity per unit of space begins to be lost. The best gas-adsorbent carbon is relatively dense. Activated coconut charcoal of maximum adsorptive capacity per unit of volume has a block density of approximately 0.66. Carbons that are to be used for industrial gas and vapour adsorption must also be mechanically strong in order to resist the crushing and abrading action to which they are usually subjected. Fortunately, the materials, such as activated coconut charcoal and certain activated synthetic products which have maximum adsorptive capacity per unit volume, are also mechanically strong and eminently suited to resist crushing and abrading action.

Considering now activated carbons for use in adsorbing substances from liquids, we find that again the extent of the available active carbon determines the decolourising or purifying value of the carbon. In the case of gas-adsorbing carbon, capillaries of almost molecular dimensions are desired to open up the active carbon, because the smaller the capillaries and the more numerous they are, the greater the adsorptive capacity per unit volume of carbon; but in the case of adsorbing substances from liquids, in many instances the small capillaries which satisfactorily make available or open the active carbon for gases and vapours do not make it available for adsorbing colloidal materials or larger molecular aggregates. The type of activated carbon that is most effective under these conditions is a highly porous material traversed by pores of relatively large size. Such a carbon has a low apparent density and is more readily crushed than the dense gas-adsorbing type of carbon. Since this type of carbon is generally used in a finely divided form, its relative softness is not an undesirable property. Such a carbon, however, should not powder or "slime," because in this condition it cannot be readily filtered from the liquid. A finely divided "grainy" or fibrous carbon, such as the carbon produced by the Chaney activation process from wood, is not only a most effective adsorbent but an excellent filtering medium.

Proposed Manufacturing Processes.

The raw materials available for the manufacture of activated carbon are, as previously indicated, various vegetable substances or chars prepared from these substances, coals or low-temperature cokes, and many other organic substances, such as oils, gases, etc., which can be decomposed to give carbon. No matter what material is employed,

* Abstracted from paper by Mr. Arthur B. Ray, of the Union Carbide and Carbon Research Laboratories, Inc., of Long Island City, N.Y., U.S.A., in *Chemical and Metallurgical Engineering*, June 4, 1923.

it is essential that the carbon be deposited at temperatures below 600-700° C., and that the adsorption of hydrocarbons by the active carbon be prevented, or that the adsorbed hydrocarbons be eliminated in such a manner as to leave the active carbon base free. The processes by which various types of activated carbon can be made may be classified as follows: (1) Processes depending on the action of inorganic chemical compounds either naturally present or added to prevent the formation of the adsorption complex during carbonisation, or to cause the breaking down and elimination of the adsorbed hydrocarbons during the succeeding calcination. (2) Processes depending on solvents to eliminate the hydrocarbons. (3) Processes depending solely on long-continued calcination to eliminate the hydrocarbons. (4) Processes depending on selective oxidation to break down and remove the adsorbed hydrocarbons and to alter the porosity of the carbon.

By far the greater number of processes for producing decolourising carbons that have been disclosed or patented belong to the first group. The raw materials employed in these processes are practically all of such a character as to give soft, highly porous products which contain some active carbon. The carbons produced, though valuable for decolourising liquids, are practically worthless for adsorbing gases and vapours. In most cases the raw material is admixed or impregnated with various chemicals. The number of compounds that may be used more or less successfully in producing decolourising carbons is large. The following may be mentioned: Alkali hydroxides, carbonates, and sulphates; alkaline earth oxides, carbonates, chlorides, sulphates, phosphates, and acetates; zinc chloride; manganese oxides; and phosphoric and sulphuric acids. Various proportions and mixtures of these chemicals are employed, and to be most effective they must be mixed with the vegetable materials prior to their carbonisation. The final calcination is in general carried out at temperatures around 900° C. The residual chemicals must be removed before the carbon can be used, and in those cases where acid is required the extraction is costly.

Since the formulation of the activation theory previously discussed, suggestions have been made from time to time that the hydrocarbons with which the active carbon base of primary carbons is saturated be removed by suitable solvents. All the various well-known solvents for resins, tars, and pitches have been suggested. The use of selenium oxychloride for this purpose has been patented. Even assuming that all the objectionable hydrocarbons are soluble in the special solvent, the trouble with these schemes is that no provision is made for removing the solvent which is readily adsorbed or for controlling the porosity of the carbon, both of which steps are necessary before the carbon can have any special value as an adsorbent.

It is claimed that certain carbonisation products or primary carbon materials may be partly activated by long-continued heating in a neutral atmosphere at temperatures around 850° C. Our experience and the experience of others indicate that any activation obtained by such treatment is fortuitous, in that it is largely due to the oxidising action of air originally held in the pores of the primary carbons, or which enters the apparatus during the calcination. Activation by heat-treatment alone cannot be successfully accomplished because the hydrocarbons present are cracked at the high temperatures employed and inactive carbon is deposited upon the active carbon base. The resulting product has little or no activity. Active carbon is actually deactivated by a very slight deposition of inactive carbon upon it by the cracking of such a hydrocarbon as methane at 1,000° C.

Principles of the Chaney Process.

Processes in which a selective oxidation is employed to render available active carbon initially present in the material treated are far superior to any other as yet developed for the preparation of highly activated carbons possessing particular structural characteristics. It is only by the use of such processes that it is possible, at the present time, to manufacture in quantity a carbon which meets the requirements of a commercial gas and vapour adsorbent. It was this method of activation that was employed exclusively by the U.S. Chemical Warfare Service during the war. The process was developed under the stress of urgent war-time necessity by Dr. Chaney.

Dr. Chaney's contribution consisted essentially in an apprehension of the following fundamentals: (1) Certain varieties of carbon are inherently inactive, and selective oxidation can be effective in causing activation only when applied to materials sufficiently free from the less easily oxidisable inactive carbon. (2) A material amenable to activation by selective oxidation and free from inactive carbon can be prepared only if the carbon is liberated below certain critical temperature limits. (3) A material containing active carbon is ordinarily useless as an adsorbent until this active carbon is freed from the hydrocarbons saturating it, and maximum adsorbing efficiency can be attained only when the maximum proportion of the active carbon present has been rendered available.

The principles enunciated by Chaney, and the process which he based on them, are the foundation on which has been built the National Carbon Company's output of activated carbon. Despite the limitations imposed by the first principle, it was early demonstrated that the raw materials in which a sufficient amount of active carbon, sufficiently free from inactive carbon, was present or could be produced were more numerous than the materials that theretofore had been regarded as promising sources of gas-adsorbent carbon. It has further been found possible to produce superior decolourising carbons from a variety of raw materials by employing the selective and limited oxidation processes which enable the dispersion or porosity of the activated product to be controlled. In fact, all types of primary carbons may be activated by this general process to give many new and different types of activated carbons suitable for different purposes.

The primary carbons as defined by Chaney include all chars, cokes, and carbon materials formed at low temperatures—below 600-700° C. Vegetable chars, carbon blacks, lamp-blacks, low-temperature cokes, and coals containing a small amount of volatile matter, come under this definition. Some of these materials may be heated to temperatures above 700° C. without becoming seriously contaminated by inactive carbon deposition as a result of "gas-treating." Other materials will become self-gas-treated if heated at a high temperature, and then cannot be activated because selective oxidation will destroy the active carbon rather than the inactive carbon thus deposited.

When a gaseous oxidising agent is employed, such gases as air, carbon dioxide, and steam may be used. The process employing air as the activating agent has the advantage of relatively low-temperature operation—around 350° C.,—but the rise in oxidation potential with temperature is very rapid and the process is extremely difficult to control. As previously explained, a *selective oxidation* of the residual hydrocarbons is desired. The oxidation by air, however, has been shown to be less highly selective; and, consequently, while a considerable amount of carbon is oxidised, the remaining carbon is only moderately activated. While the highest quality active carbon has not been produced by the air activation process, an appreciable percentage of the carbon made by the U.S. Chemical Warfare Service for gas masks during the war was so activated.

Processes employing carbon dioxide or steam have the disadvantage of high-temperature operation—around 900° C.,—but these reagents exercise a selective oxidising effect, and the reaction, being endothermic, is readily controlled. Flue gas containing carbon dioxide has been used to produce some fairly well activated carbon; but, after a very extended investigation, it has been concluded that more highly activated carbon can be produced by steam activation. It appears also that the removal of the hydrocarbons with a minimum of "cracking," and consequent deposition of inactive carbon, can be accomplished only when the concentration of the oxidising agent is high. This means that the steam, for instance, must be introduced in excess, and that the reaction products must be effectively led away. The operating difficulties are further increased by the fact that all primary carbon materials are very poor conductors of heat.

The great advantage of the Chaney process is that by employing proper steam rates for different periods, at selected temperatures, the characteristics of the activated product may be widely varied within limits depending upon the character of the primary carbon employed. This may be strikingly shown by data concerning the relative variations in properties of coconut charcoal activated under one set of conditions for various lengths of time. The data show that the activation process proceeds in two distinct stages—viz., a stage in which the percentage hydrogen content is being rapidly reduced, and a stage in which the percentage hydrogen content is being reduced very little or not at all. Approximately 20 per cent.

of the charcoal is gasified during the first stage. The material removed has an average percentage hydrogen content of 11.6 and is quite evidently hydrocarbons. Until the bulk of these hydrocarbons are removed the material has no appreciable saturation or retentivity value. As the activation proceeds into the second stage, however, the material removed by selective oxidation has an average percentage hydrogen content of 0.78, and must, therefore, comprise a comparatively very large proportion of uncombined carbon and a comparatively small proportion of hydrocarbon. During this stage both the saturation and retentivity increase, the saturation increasing at an approximately constant rate to the limit to which the tests were carried, and the retentivity increasing at a diminishing rate to a maximum when about 60 per cent. of the charcoal has been oxidised.

From these considerations it is obvious that to produce a carbon for use as a gas or vapour adsorbent having maximum adsorptive capacity per unit of volume a dense primary carbon must be used, and the activation process continued only long enough to obtain a maximum of active carbon exposed. If, however, a highly porous carbon is desired for storing gases, or for removing colouring matters and impurities from certain liquids, a highly porous primary carbon may be used and the activation continued only until maximum active carbon is exposed; or a dense primary carbon may be subjected to selective oxidation until it possesses the necessary porosity.

THE BRITISH DYESTUFFS INDUSTRY.

HOUSE OF COMMONS DISCUSSION.

On Wednesday of last week, in the course of the debate on the Board of Trade Estimates, Lieut.-Commander Kenworthy raised the question of the Department's policy in regard to the dyeing and dyestuffs-making industries of this country. The opening up of the subject gave the opportunity to Dr. G. C. Clayton, the member for Widnes, to speak authoritatively as follows:—

It is extremely satisfactory to me that the President of the Board of Trade is so interested in the development of the industries of this country. If in the past the Board of Trade had taken the same interest in the manufacture of dyes we should never have lost that industry in this country. We started it here, and we had the raw materials and the knowledge, but at that time there were a great many restrictions put upon the industry by the then Board of Trade, and it drifted away and went to Germany, where they gained the advantages that we could not obtain in this country.

The Industry a School for Chemists.

We have all the raw materials for the dye industry. Prior to the war a great deal of that raw material was sent to Germany, worked up there with their labour and consuming their raw materials, coal, etc., and it was returned to this country in the form of dyes and used by us. There is no reason why those dyes cannot be made here. I am pleased to say, from what I know of the industry, that enormous progress has already been made. Great satisfaction has been given to the dye users. There may have been some who had some difficulties in obtaining the dyes they wanted, but generally there has been great satisfaction. They agree that very great progress has been made, and I feel sure that under the help and guidance of the present Board of Trade we shall have established in this country a dye industry that can hold its own with any other dye makers. Apart from the fact that we have all the raw materials to make the dyes in this country, the dye industry requires a very great deal of labour, not only in actually making the dyes, but in preparing the raw materials for those dyes. I want that labour to be found in this country, and not in Germany. We have also to consider the safety of the textile trade in this country. We must have an adequate supply of dyes on which we can rely as being made in this country. There are times, such as the present time on the Ruhr, when it is impossible to get dyes. Other occasions might easily occur when it will be impossible to get foreign dyes, and we must maintain our textile trade. I feel that it is very important for that reason also that we should have a dye industry here.

Further than that, the dye industry is a most valuable school for chemists. A very large number of chemists are required both in the manufacture of the intermediates and of the dyes, and as a school for chemists it is of great value. These chemists are used in every other industry, and we could draw on the dye industry for these men when required. If we have no such school we fall behind in very many of our industries. I maintain that the chief objections to this subsidy to the dye industry come from the merchants who supply the German dyes. I do not believe that the objections really emanate from the users, but from these traders in foreign dyes. I think our British interests are vastly more important than the interests of these dealers in German dyes.

The Position of the Merchant.

Mr. J. Hope Simpson: The trouble under which the dyeing industry is now labouring has been represented in this House on more occasions than one. The effect on the merchants is probably the greatest of all. The chief opposition probably comes from that quarter. The hon. member for Widnes (Dr. Clayton) seemed to suggest that it did not matter very much what happened to the dye merchant, but, as a fact, the dye merchant plays a very important part in the organisation of the dyeing industry. He deals with the small men, and he has opportunities for scientific investigation, and he also has experience on a far more important scale than any of these small men can have, and, as a fact, the smaller dye users resort to the larger merchants and rely on their skill and experience for advice with regard to the dyes they shall use. Again, the merchant has machinery for importing and for dealing with large quantities of dye, whereas the small man would find great difficulty in obtaining small amounts of dye at all if it were not for the merchant. The merchant, under the present administration, is being systematically squeezed out of the trade. The greatest evil of all is the compulsion on the merchant to reveal the name of his customer. I have no doubt there is some good reason for that which the right hon. gentleman will explain. The merchant himself feels it very seriously, because that is one of the trade secrets which he naturally wishes to keep to himself. On the Committee there are members whom he regards as trade rivals, and to them least of all he would desire to expose the list of his customers.

Mr. Simpson then gave, at considerable length, several instances of dissatisfaction in the colour-using industries, and amongst merchants.

The Reply of the Government.

Sir P. Lloyd-Greame, the President of the Board of Trade, replying to the criticism of the Government's dyestuffs policy, said: It has been said that it is unfair for the merchants to have to give particulars. But it is most necessary that merchants should be made to give these particulars. After all, what is this Licensing Committee? Remember that on it the makers of the dyes are in the minority and the users in the majority. They want to be satisfied about the price; they want to be satisfied that the dye is necessary because the applicant who is going to use it cannot get a suitable British substitute. It is necessary to get some further particulars from the merchant, as otherwise he may propose to bring in tons of German dyes and sell them wholesale in this country. The merchant is required to prove two things. One is the price which will be charged to the consumer; the price to the merchant may be one thing and the price at which the merchant passes the article on to the buyer may be a totally different thing. Therefore this Licensing Committee requires to be satisfied, and quite rightly, as to the price to be charged to the man who is going to use the dye. They also want to know from the man who uses it and who has to sell his product what is the suitability of the dye for the purposes he requires it for. It is utterly unreasonable we should be asked to deprive the user or the maker of these very necessary safeguards.

Foreign Manufacture of Textiles Increasing.

I want to come to the broad question of policy, because on that so much depends. I have no hesitation in saying that the value of the dye industry to the textile industry of this country is greater to-day than it ever was before. Just look at what has happened in the course of the last six months. We have had the occupation of the Ruhr, which has lessened the facilities for exports of dyes from the Con-

tinent, and it has been of the greatest advantage to have a dye industry in this country. The textile trade, whether in Lancashire or Yorkshire, would have been in a very anxious position in the last six months if it had had to rely entirely on dyes coming from the Continent. Let the hon. member note another fact. The position of the textile trade to-day is wholly different from what it was before the war. Before the war the textile trade enjoyed a predominance which was unique. Look at the exports of one industry in this country—an industry which, whether in times of trade boom or slump, has gone on steadily producing textile machinery, and that textile machinery has been going out of this country to be erected in competing markets. The trade of this industry has gone on increasing when every other trade has been bad. The increase has been constant, and the manufacturers of textile machinery have been unable to keep up with the demand. The hon. member will not suggest that the competition of the number of mills growing up all over the world—a number which is steadily increasing—is not an increasingly dangerous position which Lancashire has to face. It would be unwise to leave Lancashire at the mercy of a possible combination of foreign dye-makers and foreign mill-owners..

Finally, there is the question of price. The hon. member quoted prices for this and for that, but he quite forgot to tell the House what has been the common experience in case after case. It is this: that it was only when we made the dyes in this country that the German prices came down. If you give up making dyes here, do you suppose the German dyes will stay at their present low level? Of course, they will not. As soon as the Germans again get the market, up will go their prices, and then what have you got for your own industry? You have no guarantee of any dyes at all. You have no guarantee that you will get them at reasonable prices. I do not think that that is likely to appeal to the common sense of the textile world.

ZINC AND LEAD COMPOUNDS IN AMERICA.

INCREASE IN PRODUCTION IN 1922.

FROM figures compiled by the Geological Survey, it is evident that substantial increases in production were made in the cases of lead and zinc pigments in 1922. The figures as issued give totals marketed rather than produced, but are relatively true in either case as an index of larger supplies.

Notable increases were made in the sales of all zinc pigments and salts except zinc chloride, but there was a falling off in the average price per ton. The largest output of zinc oxide made in the history of the industry was recorded, the gain amounting to 73 per cent. over the output in 1921. The amounts marketed were as follows:

—	1921.		1922.	
	Short Tons.	Value Per Ton.	Short Tons.	Value Per Ton.
		Dols.		Dols.
Sublimed lead*				
White	11,568	122·61	13,765	132·94
Blue	463	126·55	972	132·95
Red lead	21,814	156·36	30,509	167·30
Orange mineral	379	240·59	370	224·38
Litharge	41,953	136·84	58,261	152·63
White lead:				
Dry	26,695	140·47	41,598	139·07
In oil	143,634	192·94	153,393	193·80
Zinc oxide	74,329	151·11	128,465	140·07
Leaded zinc oxide	16,103	129·93	19,613	114·80
Lithopone	55,016	121·45	83,360	110·53
Zinc chloride	59,457	59·75	41,627	48·27
Zinc sulphate	3,295	57·47	5,078	49·53

* Includes basic sulphate lead.

OUR BOOKSHELF.

American Petroleum Refining. By H. S. Bell, C.E. London: Messrs. Constable and Co.; price, 24s. net.

A volume definitely designed and compiled for owner, manager, and engineer, so that it is essentially industrial and practical in character. Although secret or semi-secret plant and processes cannot be described in text books of this kind, there is much in this volume which is not generally known. Passing the opening chapters, dealing in a lucid way with the chemical and the physical sides of petroleum, we arrive at the manufacturing sections which comprise the mass of the work. Very clear diagrams showing modern lay-out lead on to carefully expounded detail concerning refining site and general arrangement of the works. Stills, which play such an important part in this industry, are dealt with at length, and as one would naturally expect, there are various of the latest and best stills fully described under this heading, amongst them being the Trumble System installed at the Martinez refinery of the Shell Company and the Foster Tube Still. Condensers and heat exchangers are other sections which chemical engineers in all branches of industry will undoubtedly study with interest and advantage. The Cracking Process contains more definite information than is usually the case, and with the exception of the use of aluminium chloride it is noteworthy that cracking has developed along mechanical rather than catalytic lines—pressure and temperature being the chief factors. Acid recovery involving modern and very effective plant is discussed and illustrated clearly. A very good book which must attract a large number of readers.

LEGAL INTELLIGENCE.

SUPPLY OF PYRITES DURING THE WAR.

Rio Tinto Company, Ltd. *v.* The Crown.

Judgment was given on Friday, July 20, by Sir Edward Pollock, one of the High Court Official Referees, in the claim by the Rio Tinto Company, Ltd., against the Crown for some £900,000. in respect of an arrangement for the supply of cupreous pyrites during the war. It was alleged that the Government in consideration of being supplied with pyrites for the Allies at pre-war rates agreed to facilitate the supply of coal to the Rio Tinto Company, which they failed to do, and the company claimed £188,811. to cover the extra expense to which they had been put in procuring coal. They also claimed £266,700. for loss of copper production owing to the lack of fuel, and £500,000. for the loss of prospective American business. The case was originally heard by Mr. Justice Avory, who gave judgment on April 11, 1922, holding that the suppliants were entitled to a reasonable price for all pyrites delivered after January 1, 1918, and in regard to that matter his Lordship referred the question of the amount due, to the Official Referee.

Sir Edward Pollock, after a lengthy hearing, found that 25s. a ton for pyrites in 1918 was a reasonable price, and to that amount, he said, the suppliants were entitled. The quantity of pyrites in question was, he said, 146,000 tons, to which had to be added £37,652. for extra freight, making the amount due to the Rio Tinto Company on their pyrites claim £220,152.

The Official Referee at the request of Sir Edward Pollock, K.C., appearing for the Crown, did not enter judgment for the suppliants, but left the matter open to be mentioned at a later date.

PUBLICATIONS RECEIVED.

A Treatise on Chemistry.—By Sir H. E. Roscoe and C. Schorlemmer. Vol. II., the Metals, Part I. and Part II. New (sixth) edition, completely revised, by B. Monat Jones and others. London: Macmillan and Co., Ltd.; price, 50s. net.

Annuaire Officiel des Adresses Telegraphiques, the French equivalent of the British "Sells'."—Sole agents in Great Britain and Ireland, Business Directories, Ltd., London, E.C. 4. Price 25s. net.

Czechoslovakia.—Department of Overseas Trade report, dated March, 1923; by Mr. S. P. Elliott, of Prague. Price 1s. 6d. net.

"Proctor's Useful Tables."—Messrs. Edward le Bas and Co. have just published their (1923) booklet of useful tables, which contains a large mass of figures and data of interest to engineers, chemists, and works-managers, in compact and attractive form.

CATALOGUES.

Prospectus.—Issued by the Technical College, Bradford. Diploma and special day courses for the session 1923-24.

Illustration Sheet No. 5569.—Received from Messrs. Manlove, Alliott and Co., Ltd., dealing with various forms of plant supplied by them to the chemical industry.

ITEMS OF INTEREST.

Permitted Explosives in Mines.—A Government order permits the use of the explosive, "Penrhyn Powder," in coal mines.

Aluminium Coins for Germany.—The Reichsrat has adopted the proposal to issue shortly aluminium coins in one denomination only—viz., 1,000 marks, to a total of 240 milliard marks.

Cheaper Benzol.—The National Benzol Company announce a reduction in the price of National Benzol mixture to 1s. 8½d. per gallon, which brings it into line with the present price of petrol.

Obituary.—We regret to announce the death of Mr. William Smith, which took place on Saturday last (July 21) in his 54th year. Mr Smith was for 20 years laboratory steward of the Institute of Chemistry.

Ozokerite Output in Poland.—Production in ozokerite, or mineral wax, in Poland during 1922 amounted to 430 metric tons, of which more than 400 tons was exported, chiefly to Germany, Austria, and Czechoslovakia.

Coconut Factories in Jamaica.—Plans are under way for the formation of a company to erect and operate a number of factories in Jamaica for the production of desiccated coconut, and also to prepare by-products of coconut for the market.

Chemical Society's Library.—Owing to the work of redecorating the rooms of the Society, the Library will be closed during the entire month of August, and in accordance with the usual practice will close at 5 p.m. daily from September 1 to 17.

Imperial College Research Fellowships.—The following awards tenable at the Imperial College during the year 1923-24 are announced:—Mr. F. R. Weston to the Gas, Light, and Coke Company's Research Fellowship, value £175, with allowances, and Mr. H. W. Buston to a Beit Fellowship, value £250.

New Oil Refining Mill at Greenock.—The construction of the new mill of the British Oil and Cake Mills Limited at the James Watt Dock, Greenock, is almost completed, and work will be started shortly. The building occupies 3¾ acres, but the firm have an option to enable large extensions to be carried out if found necessary.

Business Notice.—Messrs. Mantz and Reid, Ltd., state that they have amalgamated the businesses carried on respectively at 1, Leadenhall Street, and 18, Cullum Street, and the combined business will be carried on at:—1, Leadenhall Street, London, E.C. 3. Telephone number: Avenue 8458; and telegraphic address: Imreidex, Stock, London.

National Metal and Chemical Bank.—In the Chancery Division on Wednesday, July 25, Mr. Justice Russell had before him the action of the Tavoy Concessions against the National Metal and Chemical Bank, Ltd., on a summons to vary the certificate of the Master in Chambers, who found that there was a sum of over £27,000. due from the Bank to the plaintiffs. Mr. C. A. Bennett, K.C., stated that the parties had come to terms, and by consent the certificate would be varied by finding that there was £21,628. due to the plaintiffs, and there would be judgment for that amount and the taxed costs. His lordship entered judgment accordingly.

Tariff Notes.—The following articles are added to the list of goods which are imported into South Africa duty-free when produced or manufactured in the United Kingdom or reciprocating British Possessions, and which are dutiable at 3 per cent. *ad valorem* when produced or manufactured in other countries:—Oxalic acid; ammonium oxalate; fuller's earth; red and white lead; lithopone, dry; manganese resinate; naphthalene; nickel sulphate; certain metallic oxides; perchloride of iron, potassium and sodium metabisulphite; gums, shellac and resin size; saltpetre. The Governor-General is empowered to allow under certain conditions a rebate of the Customs duties that would otherwise be payable on the articles enumerated hereunder, on first importation, or when taken out of bond—viz., salt; turpentine, vegetable or mineral; eucalyptus, pine and other oils; soya bean, citronella, and mirbane oils; waxes, linseed oil, raw. The importation into South Africa of carbide of calcium which, when treated with water, yields less than 250 litres of gas from one kilogramme, is prohibited.

The Price of Insulin.—The Minister of Health stated on Wednesday that the prices of insulin had been reduced very materially, and he had good hopes they would be still further reduced.

British Coal Output.—The coal output for the week ended July 14 was 5,041,900 tons, compared with 5,305,800 tons in the previous week, and 4,626,700 tons in the corresponding week last year.

Pyrites Agreement Signed.—The agreement, referred to in last week's issue, between the principal pyrites producers, with a view to developing the consumption of pyrites, has now been signed.

Egyptian Soda Exports.—Exports of caustic soda from Egypt amounted to 1,428 metric tons in 1922 compared with 1,224 tons in 1921, 278 tons in 1920, and 960 tons in 1913. Most of the exportation was taken by Greece and Palestine.

Radium Ore Mines.—The Radium Ore Mines, Ltd., is about to expend £50,000. on augmenting the plant and equipment at its mine, formerly the Tolgarrick Pitchblende Mine, and in further opening up their properties in Cornwall.

Literary Intelligence.—Messrs. Longmans, Green and Co. announce that the new edition of Sir Edward Thorpe's "Dictionary of Applied Chemistry" will extend to seven volumes, a great part of the last volume being devoted to a complete index to the work.

Companies' Winding Up.—The Lord Chancellor has made an order, transferring the jurisdiction of the High Court to wind up companies from Mr. Justice Astbury and Mr. Justice Lawrence to Mr. Justice Eve and Mr. Justice Romer. The order will come into effect on October 12, 1923.

Dispute over Alleged Guarantee.—The appeal of the London City and Midland Bank from the refusal of Mr. Justice Coleridge to enter judgment in the action against James Gibson and others to recover £25,000., with interest, alleged to be due from the defendants (*C.T.J. and C.E.*, May 4, 1923, page 550), was dismissed on Tuesday in the Court of Appeal. It was decided that the case should follow the ordinary course, and be retried.

Ethylene and Acetylene as Anæsthetics.—Recent clinical research has demonstrated the value of both ethylene and acetylene as anæsthetics when mixed with oxygen. Luchhardt and Carter (*J. Amer. Med. Ass.*) May, 1923, state that the opinion is gaining ground that ethylene has some of the advantages of ether without many of its troublesome after-effects. With regard to acetylene, C. J .Gauss and H. Wieland (*Klinische Wochenschrift*, p. 113, 1923) say they have used in 515 major operations a mixture of 40 parts of acetylene and 60 parts of oxygen, with a little oil of pine to mask the odour.—*Chemist and Druggist.*

Salt Manufacture in China.—A Japanese company has obtained permission from the Japanese Government to purchase an area of land in Tingshaho, Dairen, to be used for the establishment of a salt works. Construction work will soon be started, and is expected to be completed in the course of two years. The annual value of the salt output for the first three years is estimated by this company at yen 50,000,000.—The merchants of Fengjun Chihli are organising a salt refining company, under the name of Fu Ho Refined Salt Co., Ltd., with a capital of $100,000. The company is to be located in Tangkiatun, Fengjun, with branches or agencies in other business centres. The temporary office of this company is in Tientsin.

Utilisation of Tin-plate Scrap.—Experiments have been conducted in an electrical furnace by the Department of the Interior at the Bureau of Mines experiment station at Seattle, Wash., states *Engineering*, in which tin-plate scrap was melted with various additional agents. Sodium chloride, iron sulphide and an oxidising slag were tried, but the conclusions reached were that in the electric furnace complete detinning is impossible and any detinning impractical. Melting tests conducted in the cupola showed that the amount of detinning was dependant upon the amount of surface of metallic tin exposed to the oxidising gases, and will be somewhere between the limits of 0 per cent. and 50 per cent. Test bars, prepared by melting pig-iron with various quantities of tin, were subjected to physical tests. The results showed that a tin content of 1 per cent. or less did not seriously affect the properties of grey iron. Cast-iron made from tin-plate scrap was used successfully in making commercial castings of good quality.

University News.—In connection with the resignation of Sir Michael Sadler from the Vice Chancellorship of the University of Leeds an appeal for the establishment of a memorial has been issued. The appeal is signed on behalf of the "Sadler Fund Committee" by the Duke of Devonshire (Chancellor), Mr. E. George Arnold (Pro-Chancellor), Sir Ernest Bain (treasurer of the fund), and others.

American Dyestuffs Industry in 1922.—According to a report published by the U.S. Tariff- Commission, the domestic output of dyestuffs in 1922 by 87 firms was 64,632,187lb., an increase of 66 per cent. over 1921. The increase was largely due to an increase in general business activity, says the report, the textile and other dye-consuming industries becoming more active in the latter half of the year. The average sales price for 1922 was 60 cents per lb. compared with 83 per cent. in 1921.

Fires.—A large building used for the storage of oil, varnish, and waste rubber in Hythe Road, Willesden, and situated near the railway line at Willesden Junction, was partly destroyed by fire on Saturday, July 21. A considerable amount of damage was done before the flames were subdued.—The official report concerning the fire on Friday last at the premises of Messrs. Dussek Brothers and Co., Limited, tar importers, Deptford, states that the part of the premises used as boiling and distilling rooms and stores was severely damaged, and the greater part of the roof was destroyed.

Nitrostarch in Explosives.—The use of nitrostarch in the manufacture of safety explosives is increasing,, and this substance is now important in the explosive industry, state C. A. Taylor and W. H. Rinkenbach, of the Pittsburgh experiment station of the United States Bureau of Mines. Nitrostarch is made by nitrating starches with a mixture of sulphuric acid and nitric acid, and the commercial product is in reality a mixture of compounds of various degrees of nitration, being comparable in this respect with nitro-cellulose.

Swedish Pyrites Deposits.—As the result of vigorous search by the Swedish Geological Research Bureau, a deposit of copper, sulphur, and magnetic pyrites of exceptional richness has been discovered at Malanäs, near Skelleftea. The district is easy of access, and it is estimated that more than half the field contains ore yielding from 5.5 to 7 per cent. of copper and 34 to 38 per cent. of sulphur. These figures compare favourably with those of the Rio Tinto mines. The ore body extends over 2,000 square metres, and should render Sweden quite independent of supplies of Norwegian pyrites.

The Toxicity of Hydrogen Sulphide.—An investigation of the toxicity of hydrogen sulphide has been completed by the Department of the Interior, at the experiment station of the United States Bureau of Mines, Pittsburgh, Pa. According to the *Colliery Guardian* the experiments show that this gas is exceedingly poisonous, as acute poisoning can be caused by breathing air containing as little as seven-hundredths of one per cent. Dangers from the possible presence of this gas in mines and around industrial plants have not been fully appreciated, there being a relatively large number of poisoning cases which might have been avoided if the proper precautions had been taken. The gas is frequently present in small but dangerous quantities in places where sulphur may be present and exposed to chemical action, as in mines, sewers, in sulphuric acid plants, refineries, gas plants and smelters.

Etching Reagents for Alloy Steels.—According to the *Iron Age* (New York), considerable attention was paid recently to the problem of finding an etching reagent by which chromium carbide could be distinguished from vanadium carbide in a positive and satisfactory manner. Only one out of about twenty reagents tried seemed lively to be of much use in this connection. This is a hot solution of potassium permanganate and sodium hydroxide, etching in which for one minute darkens chromium carbide to a strong brown-red or brown colour, or rather, the carbon is eaten out, giving the walls of the cavity thus formed a dark brown-red colour, while vanadium carbide remains uncoloured and apparently unattacked. Another and less positive means of distinction is that obtained by electrolytic etching with a weak current in a dilute aqueous solution of ammonio or sodium hydroxide. The chromium carbide is eaten out, leaving a dark-brown red or brown cavity, while the vanadium carbide is eaten out, apparently at a slower rate, leaving cavities which appear light and not at all darkened.—*Engineering.*

Examination of the Sodium Borates.—According to A. Gawalowski (*Pharm. Monatsh.*, 1922, No. 3, p. 87), sodium metaborate $NaBO_2{\cdot}4H_2O$ dissolved in water and treated with a solution of potassium dichromate gives an intense blue colour. Ordinary borax under similar conditions gives no colour reaction.

Artificial Leather.—Oliver Kemp, in *Export* (New York), states that the breaking and other defects of the old-time artificial leather of canvas have been remedied only after experiments with hundreds of fabrics. The base of substitute leather at last selected is moleskin, a closely woven cotton fabric with a considerable pile. This is given the non-cracking and other qualities of genuine leather by dyeing, passing through a napping machine to give even greater pile, and then giving a series of coatings with a jelly-like mixture of castor oil and a solution of nitrated cotton. The product is then passed through embossing machines. The well-made substitute resists sun heat, rain, snow, and wear from wind-blown sand, as well as the best real leather, and is now in demand for hundreds of purposes.

Water Clarification by Means of Alum.—Messrs. E. J. Theriault and W. Mansfield Clark, of the United States Public Health Service (*Public Health Reports*, February 2, 1923), have carried out a detailed experimental study on the relation of hydrogen ion concentrations to the formation of flock in alum solutions. It has been found that when other possible factors are left out of consideration, optimum conditions for flock formation will be found with a narrow zone of *p*H centred for dilute solutions at *p*H 5.5. The more dilute the water in total salt content and the less the alum added, the narrower becomes the *p*H zone with which optimum flock formation is to be found. Consequently, precise *p*H control should, in favourable cases, permit a great economy in alum dosage.

Distinguishing Test Between Sodium and Potassium.—Solutions of sodium oleate of higher concentration than 5 per cent. form a gel on cooling to normal temperature. Solutions of potassium oleate, on the other hand, state C. W. L. Bourlet and W. Thomas (*Chem. News*, March 29), may be poured from one vessel to another till the concentration reaches about 40 per cent. In the case of the potassium soaps the change of concentration *gradually* increases the viscosity till the mass becomes very viscous, and finally plastic. In the case of sodium soaps, however, the change from solution to gel is sudden; slight variations in concentration or temperature induce enormous variations in viscosity. The addition of phenol or cresol to a potassium-soap solution thickens it; with sodium soap, however, the effect is reversed. To distinguish between a potash and a soda "soft" soap, it is only necessary to prepare a 15 per cent aqueous solution, measure the efflux time at constant temperature from a pipette; then add, say, 4 per cent. of phenol. In the case of a potash soap the efflux time will be increased; in the case of a soda soap decreased.—*Pharmaceutical Journal.*

Separation of the Xylenes.—Contrary to statements in much of the literature on the subject, state H. T. Clarke and E. R. Taylor (*J. Amer. Chem. Soc.*, 1923, 45, 830-835), the three xylenes cannot be obtained in a state of purity from a mixture by distillation only. It is necessary to carry out four operations, fractional distillation, selective sulphonation, fractional crystallisation of the sulphonic acids, and hydrolysis of the acids. *m*-xylene can be obtained in a crude state by simple distillation; to purify it, it may be treated with dilute nitric acid, which only oxidises the *o*- and *p*-xylenes. Technical *m*-xylene may be purified by sulphonating it at 95° C. for four hours, neutralising the product with 40 per cent. sodium hydroxide solution, separating the crystals, and recrystallising the sodium salt of the *o*-xylene sulphonic acid; the salt is then hydrolysed by steam-distillation with dilute sulphuric acid. For the purification of the *p*-xylene, the technical product is sulphonated with sulphuric acid in the cold, the undissolved portion being re-treated in the same way; the undissolved residue contains the *p*-xylene, and is separated and sulphonated at 95° C., and the product slowly mixed with concentrated hydrochloric acid; the *p*-xylene sulphonic acid, which crystallises out, is separated and hydrolysed by steam-distillation with dilute sulphuric acid. The first runnings contain some *m*-xylene, but the fraction distilling above 145° contains pure *p*-xylene, which is again fractionated, and then yields a product boiling between 136.5° and 137° C.—The *Analyst* (May, 1923).

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JUNE

(Concluded from page 76.)

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of June, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the Returns.

ARTICLES.	QUANTITIES. Month ended June 30.			VALUE. Month ended June 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
GUMS and RESINS:						
Arabic and Tragacanth ..... cwts.	2,074	11,133	14,057	15,731	29,712	52,136
Kauri ..... ,,	1,888	1,253	7,227	7,200	8,000	28,119
Rosin..... ,,	49,560	101,545	118,413	36,015	66,562	78,021
Shellac, Seedlac, and Sticklac ... ,,	5,006	8,838	9,406	80,215	151,101	136,486
OILS, FATS and GREASES: Animal (except Marine Animal): Not Refined Tallow:						
From France.... tons	—	—	—	—	—	—
,, China..... ,,	—	—	—	—	—	—
,, U.S.A. ... ,,	—	462	395	—	19,143	16,621
,, Uruguay ,,	—	411	1,282	—	15,115	49,063
,, Argentine Republic ,,	491	1,530	1,437	15,079	56,682	57,470
,, Australia.. ,,	424	1,211	908	16,121	46,320	34,786
,, New Zealand ,,	1,825	2,509	3,681	61,263	88,157	103,661
,, Other Countries ,,	72	134	1,235	2,499	4,625	47,714
Total ..... ,,	2,812	6,260	7,938	94,962	230,042	309,315
Fish (and Marine Animal)..... ,,	2,998	2,425	2,030	95,278	83,798	76,543
Mineral, Crude Petroleum..... galls.	7,137,546	8,210,641	25,589,804	121,954	123,479	482,785
Vegetable, other than Essential:						
Castor Oil ..... tons	13	94	533	1,038	4,704	25,473
Coconut Oil, Unrefined ..... ,,	265	4,857	524	11,757	190,383	22,980
Cotton-seed Oil, Unrefined ..... ,,	—	14	702	—	818	27,353
Linseed Oil ..... ,,	3	135	114	248	6,042	4,771
Olive Oil, Unrefined ..... ,,	6	182	366	526	11,582	21,591
Palm Oil, Unrefined ..... ,,	3,159	9,959	6,060	97,447	306,804	213,069
Palm Kernel Oil, Unrefined ..... ,,	100	—	—	3,150	—	—
Rape-seed Oil ... ,,	45	231	6	2,928	10,507	337
Soya Bean Oil .. ,,	1,373	4,582	2,626	46,741	177,802	95,806
All other Sorts .. ,,	347	197	425	16,245	13,350	30,108
SOAP STOCK ..... ,,	15	6	38	372	300	1,240
STEARINE:						
From Belgium .. ,,	15	19	39	962	957	2,003
,, Other Countries ,,	98	316	180	5,715	15,822	9,521
Total ..... ,,	113	335	219	6,677	16,779	11,524
BONES for Manure tons	950	573	679	6,226	6,648	5,210
TANNING SUBSTANCES, not elsewhere specified:						
Barks for Tanning cwts.	21,959	64,968	117,337	9,862	31,444	51,021
Sumach ..... ,,	3,481	12,807	9,086	2,731	8,530	8,286
Gambier ..... ,,	745	9,753	4,619	1,324	16,668	9,679
Myrobalans ..... ,,	34,155	63,586	32,371	11,087	25,650	12,655
Valonia ..... ,,	344	10,486	3,090	120	4,215	1,823
Other Sorts ..... ,,	120	617	7,187	220	582	5,169
BORON MINERALS (including Borate of Lime, Borate of Magnesium, and Boracite) ... tons	1,638	677	1,824	34,725	13,637	29,155
FERTILISERS:						
Guano, Raw .... ,,	—	—	—	—	—	—
Phosphate of Lime and Rock Phosphate ..... ,,	13,875	40,517	23,731	85,347	113,790	52,371
SULPHUR, CRUDE . ,,	5	3,946	17,670	27	16,972	70,265
FERTILISERS, not elsewhere specified:						
Basic Slag..... tons	1,772	7,580	5,752	12,351	23,893	14,382
GELATINE, GLUE, and SIZE..... cwts.	6,119	9,329	13,012	51,140	54,673	55,464

ARTICLES.	QUANTITIES. Month ended June 30.			VALUE. Month ended June 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
STARCH, DEXTRINE, FARINA, and POTATO FLOUR:						
Rice Starch ..... cwts.	5,997	8,739	6,506	9,623	12,309	9,570
Other kinds of Starch ..... ,,	84,008	99,300	144,506	65,350	66,495	108,998
Dextrine, and Farina or Potato Flour cwts.	41,597	71,243	93,872	41,367	87,247	65,601
Total ..... ,,	131,602	179,282	244,884	116,340	166,051	184,169
COPPER ORE (including Regulus, Matte, Precipitate, Cement, Copper, and Scale):						
From Portugal . tons	—	—	5	—	—	311
,, Spain .... ,,	503	2,353	2,942	33,183	133,009	172,247
,, Mexico ... ,,	—	—	—	—	—	—
,, Peru ..... ,,	5	—	—	1,123	—	—
,, Chile ..... ,,	807	—	20	21,930	—	800
,, Cape of Good Hope ... ,,	—	45	—	—	905	—
,, Australia.. ,,	—	—	—	—	—	—
,, Other Countries ,,	58	4	4,464	2,354	70	221,966
Total ..... ,,	1,373	2,402	7,431	58,590	133,984	395,324
IRON PYRITES (including Cupreous Pyrites) tons	3,881	22,840	11,743	9,649	49,351	23,135
MANGANESE ORE ,,	8,334	18,798	39,467	40,856	71,878	137,164
SILVER ORE, including the value of the Silver contained in Argentiferous Ores and Metals .....val. £	—	—	—	50,314	38,362	42,421
TIN ORE and CONCENTRATES:						
From S. America tons	1,808	3,319	4,356	165,195	254,280	465,024
,, Brit. South Africa ... ,,	—	10	20	—	900	2,573
,, Other Countries ,,	366	873	1,098	34,853	66,333	114,586
Total ..... ,,	2,174	4,202	5,654	200,048	321,513	582,183
LEAD, PIG and SHEET:						
From Spain .... tons	9,858	3,871	3,968	217,750	93,943	101,735
,, U.S.A. ... ,,	49	480	2,003	1,010	11,810	55,340
,, Mexico ... ,,	—	800	500	—	19,463	12,850
,, Australia.. ,,	550	2,452	8,226	10,800	59,740	206,971
,, Other Countries ,,	1,646	2,834	4,299	37,868	68,462	111,447
Total ..... ,,	12,103	10,437	19,086	267,428	253,418	488,343
MERCURY ..... lbs.	385,528	63,428	150,899	56,477	8,707	17,325
TIN: Blocks, Ingots, Bars and Slabs:						
From Straits Settlements and Federated Malay States ... tons	530	1,245	975	90,392	189,192	193,397
From Australia.. ,,	60	—	70	10,600	—	13,398
,, Other Countries ,,	375	257	468	59,513	39,521	92,125
Total ..... ,,	965	1,502	1,513	160,505	228,713	298,920
ZINC, CRUDE (*i.e.*, Cakes, Slabs, Blocks, etc.) tons	2,593	6,088	7,412	63,497	162,971	239,599
Manufactures, not elsewhere specified (including Rolled Sheets, Plates, and Discs) tons	1,165	822	758	46,670	32,681	30,883

CARBIDE PRODUCTION IN SOUTH AFRICA.—Judging by the progress made in the domestic manufacture of calcium carbide in South Africa, there is no longer a market in that country for imported material. The present sole manufacturer, Rand Carbide, Ltd., formed in 1922, has an output of 250 tons per month. In 1920, 4,000 tons of carbide was imported. Requirements are 350 tons per month, of which Rand Carbide, Ltd., supplied 313 tons last February. Preparations are now in hand to enlarge the factory.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JUNE.

(Concluded from page 77.)

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during June, 1923, compared with 1921 and 1922. As from April 1, 1923, export trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended June 30.			Value. Month ended June 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
Oils, Fats and Greases:				£	£	£
Animal (except Marine Animal), not refined ..... tons	1,041	1,404	1,263	29,004	43,341	34,011
Vegetable, other than essential:						
Castor Oil ..... ,,	362	258	346	18,015	14,547	20,346
Coconut Oil, unrefined ..... ,,	30	—	41	1,082	15	1,356
Cotton-seed Oil, unrefined ..... ,,	61	124	61	2,691	5,414	2,794
Linseed Oil ..... ,,	4,213	6,617	7,200	153,879	287,408	334,510
Olive Oil, unrefined ,,	1	—	—	92	38	69
Palm Oil, unrefined ,,	10	6	51	422	237	2,047
Palm Kernel Oil ,, ,,	318	111	978	15,785	4,281	39,751
Rape Seed Oil .. ,,	282	545	297	17,244	23,660	13,716
Soya Bean Oil .. ,,	715	443	540	46,431	22,359	31,971
Other Seed Oils . ,,	141	33	696	5,934	1,199	31,504
Other Vegetable Oils, not elsewhere specified . ,,	56	152	166	2,961	5,452	5,607
Tar, Coal Tar .... tons	128	238	256	1,331	2,131	2,675
Pitch, Coal Tar Pitch ,,	18,246	21,041	18,499	78,458	74,857	120,383
Cement, Calcareous, for Building and Engineering purposes:						
To Netherlands ... tons	61	569	6,914	360	1,313	11,248
,, France..... ,,	14	—	83	258	—	237
,, Brazil ..... ,,	1,419	669	58	8,314	1,932	158
,, Argentine Rep. ,,	651	84	622	4,167	225	1,627
,, British S. Africa ,,	43	1,346	2,407	208	3,650	5,808
,, British E. Indies ,,	8,865	12,166	9,127	53,350	39,415	24,347
,, Australia..... ,,	1,007	3,928	1,343	5,271	11,969	3,718
,, New Zealand .. ,,	1	258	6	44	1,406	56
,, Other C'tries .. ,,	6,907	13,660	37,069	35,417	46,747	104,877
Total ..... ,,	18,968	32,680	57,629	107,389	106,657	152,076
Fertilisers not elsewhere specified:						
Basic Slag ..... tons	99	107	1,265	850	509	3,868
Superphosphates ,,	96	219	1,308	1,043	1,932	6,622
Guano, Manufactured, and Compound Manures (including Bone Meal, and other Manufactured Fertilisers) ..... tons	337	1,322	3,321	5,595	14,789	26,547
Gelatine ..... cwts.	278	699	1,204	5,347	8,393	10,380
Glue and Size ... ,,	4,806	9,646	15,222	14,292	22,508	31,193
Lead:						
To Russia ..... tons	—	8	—	—	232	—
,, Sweden ..... ,,	8	64	144	242	1,965	4,372
,, Germany..... ,,	—	2	33	—	111	953
,, France..... ,,	4	53	54	235	1,564	1,651
,, China (including Hong Kong) ,,	8	16	12	338	513	466
,, Japan ..... ,,	35	—	—	706	—	—
,, U.S.A. ..... ,,	—	579	1	—	10,420	50
,, British S. Africa ,,	42	44	36	1,174	1,943	1,351
,, British E. Indies ...	54	180	146	1,833	6,173	5,864
,, Canada ..... ,,	77	313	16	1,724	6,272	775
,, Other C'tries ,, ,,	372	441	611	12,689	16,462	21,274
Total (Pig ..... ,,)	308	1,206	395	7,278	24,238	10,908
(Sheet .... ,,)	212	323	436	7,751	12,871	16,348
(Pipes .... ,,)	28	94	134	1,120	3,767	4,846
(Foil ..... ,,)	4	11	4	270	770	364
(Manufactures not elsewhere specified ,,)	48	66	84	2,522	4,009	4,293
Total ... ,,	600	1,700	1,053	18,941	45,655	36,759
Tin: Blocks, Ingots, Bars and Slabs:						
To Russia ..... tons	—	2	31	—	319	6,021
,, Sweden ..... ,,	36	63	74	7,358	9,686	15,125
,, Germany..... ,,	20	32	10	3,675	4,816	2,000
,, France..... ,,	217	133	257	37,439	20,367	49,246
,, Turkey ..... ,,	2	6	22	438	846	4,598
,, U.S.A. ..... ,,	75	296	585	13,347	44,170	118,236
,, Canada ..... ,,	5	18	118	850	2,838	23,551
,, Other C'tries . ,,	227	446	538	40,255	69,166	106,928
Total .... ,,	582	996	1,635	103,362	152,208	325,705
Zinc, Crude and Manufactures thereof . tons	316	217	408	9,584	8,263	17,507

GAZETTE NEWS.

MORTGAGES AND CHARGES.

British Cellulose and Chemical Manufacturing Co., Ltd., London, S.W.—Reg. July 6, trust deed dated June 28, 1923 (supplemental to trust deed dated Aug. 4, 1922), securing £1,000,000. (including £500.000. secured by original deed and £200,000. re-issued by this deed) and redemption premium £100,000.

Bute Lime Works Co., Ltd., Pontyclun.—Reg. July 5, £3,000. debs.

Canning Town Glass Works, Ltd.—Reg. July 5, £320,000. 1st debs. and £380,000. 2nd debs. (secured by two trust deeds dated June 28, 1923).

Cross Bone Manure and Lime Co., Ltd., Bridlington.—Reg. July 4, charge, to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank.

Davis and Son, Dyers, London, Ltd., London, W.—Reg. July 4, mort. and a land registry charge, securing £6,000. to Col. W. N. Davis, Salt-hill, Slough.

Devon and Cornwall Paint Co., Ltd., Poole.—Reg. July 3, two charges, to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank.

Flinn and Son, Ltd., Fishergate, dyers.—Reg. July 4, £1,400. mort., to Sir B. S. Johnson, Abbots Lea, Woolton, Liverpool.

Vicley and Co., Ltd., Long Eaton, dyers and finishers.—Reg. July 3, £2,000. deb., to E. Hooley, Cleve-lodge, Long Eaton.

SATISFACTIONS.

Aspley Colour Printing Co., Ltd., Nottingham.—Satisfaction reg. July 10, £2,500., reg. Sept. 19, 1903, and Dec. 1, 1904.

Reparo, Ltd., London, S.E., cement manufacturers.—Satisfaction reg. July 10, £700., reg. Feb. 22, 1922.

Stella Gill Coke and By-products Co., Ltd., London, E.C.—Satisfaction reg. July 9, £30,000., reg. Oct. 3, 1922.

BANKRUPTCY INFORMATION.

Wheatly, Albt. Edwd., 170, Lord Street, Southport, late trading as a dealer in essences and bakers' sundries as Confectioners' Colour and Essence Co., 20, Wood Street, Liverpool; trav. 1st meeting, O.R.'s Liverpool, July 25. Examination, C.C. Liverpool, Aug. 21.

Hunter, Archibald Duncan, 28, Vereker Road, West Kensington, analytical chemist. Receiving Order rescinded and Petition dismissed, June 27, it appearing to the Court that all debts have been paid in full.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Cardiff Alkali Co., Ltd.—Resolved May 31, confirmed June 27: That the Company be voluntarily wound up. G. A. Knowles, liquidator.

Graham and Cope, Ltd., Dewsbury, chemical manufacturers.—H. Brooke, Market Place, Dewsbury, appointed receiver. Dec. 27, 1922.

London Hygienic Chemical Co. (1922), Ltd., London, E.C.—E. C. Gardner, Woodridings, Cumnor Road, Sutton, appointed receiver. June 28.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Magic Wash Co. (Jno. M'Nichol), 25, Rodney Street, Glasgow, washing powder manufacturer and merchant. Business sold and transferred, as at June 15, to Jas Crabbe. J. M'Nicol will discharge all liabilities due by the firm and J. Crabbe will uplift all debts due to the firm. July 10.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Shepperley's Manufacturing Chemists, Ltd., 43, Chancery Lane, London, W.C.; £22. 14s. 11d. May 10.

Blunt, W. H., and Son., 70, Snow Hill, Birmingham; wholesale chemists and druggists; £13. 3s. 8d, June 4; £14. 19s. 6d., June 12.

Index to Advertisers.

	PAGE
Allen, Marcus & Sons, Ltd.	44
Australian Alum Co., Ltd.	27
Bakers (Leeds) Ltd.	7
Baldwin, J., and Co.	6
Balston, W. & R., Ltd.	7
Bandon & Morris	iv
Bayley, F. S., Clanahan & Co.	27, 42
Benker & Millberg	5
Berk, F. W., and Co., Ltd.	24
Blackwell, G. G., Sons & Co., Ltd.	1
Blagden, Victor, and Co., Ltd.	19
Blair, Campbell & McLean, Ltd.	1, 20
Blythe, Wm., and Co., Ltd.	33
Boake, A., Roberts & Co., Ltd.	1, 20
Borax Consolidated, Ltd.	1, 9
Bottomley, J. C., and Emerson, Ltd.	42
Braby, F., and Co., Ltd.	16
British Hydrogen Co.	1
British Oxygen Co., Ltd.	9
Brown, J. M.	36, 37
Brotherton & Co., Ltd.	18, 36, 37
Brothers Chemical Co. (1922), Ltd.	37
Brown, H. G., and Co.	34
Bruce, W. T., and Co.	37
Brunner, Mond & Co., Ltd.	43
Buckley Brick and Tile Co., Ltd.	29
Burton, Baker and Co. Ltd.	8
Burton, Wm., and Sons, Ltd.	31
Bush, Beach & Gent, Ltd.	19
Buyer's Guide	38, 39, 40, 41
Capper, Pass & Son. Ltd.	1, 37
Castner, Kellner Alkali Co., Ltd.	35, 42
Centrifugal Separators, Ltd.	25
Chance & Hunt, Ltd.	12
Christie & Co.	7
Christopherson, C., & Co.	16
Cole, Marchant & Morley, Ltd.	21
Collett, J. M., and Co., Ltd.	36
Comp. Com. Du Nord Ltd.	7
Cortin, J., Ltd.	1
Crone & Taylor, Ltd.	4
Cross, Alex., and Sons, Ltd.	11
Cruickshank, R., Ltd.	17
Daglish, R., and Co., Ltd.	1
Dekker, J.	37
Dore, J., and Co.	9
Dorman, W. H., and Co., Ltd.	13
Douglas, W., and Sons, Ltd.	5
Doulton & Co., Ltd.	27
Drug and Chemical Markets	21
Electro Bleach and By-Products, Ltd.	6
Everitt & Co., Ltd.	36
Fletcher, Geo., and Co., Ltd.	7
Follows & Bate, Ltd.	17
Frickers Metal Co., Ltd.	16, 37
Fuller, W. N., junr.	5
Gardner, H., and Co., Ltd.	10
Gardner, Wm., and Sons, Ltd.	17
Garroway, R. & J.	31
Gibbons, Robert	36
Grey & Marten, Ltd.	24
Griffiths Bros. & Co. (London), Ltd.	1
Guthrie & Co.	6
Hadfield, J., and Sons, Ltd.	1
Hallams Ltd.	37
Harrison Blair & Co., Ltd.	30
Harrison, W., and Co., Ltd.	36
Hathern Station Brick and Terra Cotta Co., Ltd.	9
Haughton's Patent Metallic Packing Co., Ltd.	23
Heymann, Harry	iv
Hind & Lund, Ltd.	39
Honeywill Bros., Ltd.	30
Houlder, W., Son & Co.	42
Huncoat Plastic Brick & Terra Cotta Works	17
Hunt, J. T., and Son, Ltd.	36
Huntington, Heberlein & Co., Ltd.	29
Igranic Electric Co., Ltd.	28
International Electrolytic Co., Ltd.	16
Johnson, S. H., & Co., Ltd.	44
Johnson and Sons, M'f'g. Chemists, Ltd.	22
Keeling Oxides (1921), Ltd.	2
Keeling & Walker, Ltd.	36
Lankshear, Wickstead & Co., Ltd.	36
Laporte, B., Ltd.	8
Le Bas, Ed., and Co., Ltd.	6
Leigh, R. & H., and Sons, Ltd.	2
Lennox Foundry Co., Ltd.	30
Lewis, H. K. and Co., Ltd.	31
Liverpool Chemical Co.	iv
Locke, Blackett & Co. Ltd.	31
Lowe, Chas., and Co.	27
Major & Co., Ltd.	3
Manchester Oxide Co. Ltd.	17
Manlove, Alliott & Co. Ltd.	28
Mann, Egerton & Co., Ltd.	41
Mason, A., and Sons, Ltd.	5
May & Baker, Ltd.	26
McCarthy Ltd., H. G.	33
McKechnie Bros., Ltd.	42
Merchant Trading Co. Ltd.	i
Metcalf, Wm., Ltd.	42
Miscellaneous Advertisements	ii, iii, iv
National Gas Exhibition.	33
Neill, W., and Son, Ltd.	1
Newcastle Alloy Co. Ltd.	37
Nicholsons (Newcastle-on-Tyne), Ltd.	1
Oxley, J. C.	9
Page, C., and Co., Ltd.	26, 32
Patent Hygienic Strainer Co.	32
Paus & Paus	41
Perry and Hope, Ltd.	33
Petri Bros.	11
Potter, E. P., & Co., Ltd.	42
Premier Filter Press Co.	31
Ransome, A., and Co., Ltd.	39
Reeve, H., Angel & Co., Ltd.	7
Riley, W.	36
Riley, J., and Sons, Ltd.	34
Ritchie-Atlas Eng. Co.	31
Rose, J. L.	37
Sachs, C.	10
Salamon & Co., Ltd.	3
Scales, W. T., and Co., Ltd.	26
Sharp, Alph.	32
Sheffield Chemical Co., Ltd.	42
Sherman, J., and Co., Ltd.	11
Simon, R., and Sons, Ltd.	5
Sofnol Ltd.	30
South Metropolitan Gas Co.	4
Spence, P., and Sons, Ltd.	5
Spencer Chapman & Messel Ltd.	35
S.S. Mond Gas Co.	32
Staniar, J., & Co.	36
Statham, J., and Sons	29
Staveley Coal and Iron Co., Ltd.	25
Steel Barrel Co., Ltd.	23
Sturge, J. & E. Ltd.	42
Sturtevant Engineering Co. Ltd.	i
Todd Bros.	7
Townsend, J., Ltd.	11
United Glass Bottle Mfrs. Ltd.	6
Vickers, Ltd.	2
Waller, G., and Son	31
Ward, T. W., Ltd.	15
Warrington Chemical and Drug Co.	37
Washington Chemical Co., Ltd.	24
Watson, H. T.	iv
Waugh, W., and Co.	8
Western Chemical Co. (Paisley) Ltd.	24
White, J. & J., Ltd.	32
White, R., and Sons	42
Widnes Foundry Co., Ltd.	34
Wilkinson, J., and Son	24
Willcocks, H. S., and Co., Ltd.	26
Womersley, A., and Son, Ltd.	36

REPORTS OF COMPANIES.

British Cyanides Company, Ltd.

The annual general meeting was held in London on Wednesday of last week, Mr. G. F. Rowsell (the chairman) presiding.

The Chairman, in moving the adoption of the report and accounts, said. After very careful consideration, your board decided to carry forward the whole of the profits made during the year under review. At the same time they decided that, provided the next one or two months do not depart from the normal to any great extent, they would declare in the early autumn an interim dividend of 5 per cent. on account of the profits of the current year.

Sir Arthur Duckham seconded the resolution.

Mr. Kenneth M. Chance (managing director) said: The fixation of atmospheric nitrogen as it concerns this company has two stages. The first stage is where we can obtain from the nitrogen of the atmosphere raw material in unlimited quantities for the cyanogen products which we manufacture. The second stage will be when we can fix atmospheric nitrogen at a sufficiently low cost to convert it into ammonia at a price which will enable us to compete with any other method of manufacturing ammonia. It has been obvious now for many months that we were rapidly approaching the first stage, and, on the recommendation of the General Staff Committee, the board have to-day given instructions for estimates to be prepared for a plant for manufacturing cyanogen from the nitrogen of the atmosphere. The second stage to which I have referred is one which can only be reached gradually, but we have two plants in course of erection, each of which is a practical working unit, and the prospects of being able to fix the nitrogen of the atmosphere at exceedingly low cost in both these plants are excellent.

We have now overcome the last difficulties in respect of the manufacture of permanganate of potash by electrolysis, and new plant for the manufacture of that chemical is in course of erection at the Tat Bank works and should be in operation very shortly after the holidays. Our new works scale experimental house has also enabled us to prove out the manufacture of another chemical for which there is a good market, and it is only a question of time before we shall add this to the growing list of new processes that we are establishing; but I expect that the opening up of the permanganate plant and that for the fixation of atmospheric nitrogen will keep us rather too busy to take up any other work for the next few months.

The resolution was carried unanimously.

Major and Company, Ltd.

The annual meeting was held in Hull on Thursday of last week, Mr. J. L. Major (chairman of the company) presiding.

The Chairman, in moving the adoption of the report and accounts, apologised for the delay in presenting the accounts, and stated that it was possible that the accounts would in future be made up to March 31. Continuing, the Chairman said: We have, as you have already been informed, reconstituted our Tarslag business as a public company, providing that company with considerable additional funds. The issue was underwritten. The old company will receive £55,000. in cash and £70,000. ordinary shares out of £100,000. issued. After a deduction of certain payments to balance the old accounts, Major and Co. will receive the whole of the residue.

Our patent continuous still, which I mentioned last year, has now been adopted as far as possible for all our distillation purposes, and gives a considerable economy. We have not pushed it outside our own business to any extent, as we wish to gather all the experience and information regarding it in our own works, so that we can offer a perfect plant elsewhere. The still is patented in various foreign countries, including the United States. We have inquiries for the plant from the United States, and there are people there who are anxious to take it up.

Our dyestuffs department has been a very serious cause of anxiety, but we see a good time coming, and I do not think we shall regret having kept to it. We have confined ourselves to a limited range of pigment colours. I believe that there is a good future in front of the British dyestuffs industry if the Government continues with the very necessary, though tardy, support which is now given by the Dyestuffs Act. It would be a shameful thing if all the money and brains that have been poured forth to establish the industry in this country were wasted by a return to unrestricted imports, under the conditions prevailing in Europe to-day. When working conditions again become normal—it seems a very far away proposition at present,—I for one should have no fear of fair German or any other competition.

According to the report, the profit for 1922 was £30,403. (against £25,761 for 1921), while £2,140. was brought forward. It is proposed to pay a final dividend of 4½ per cent. on the preferred ordinary, making 8 per cent. for the year, and a dividend of 10 per cent. on the ordinary shares (the same). A sum of £2,443. is carried forward.

Mond Nickel Company, Ltd.

The annual general meeting was held on Thursday of last week. The Right Hon. Sir Alfred Mond, presiding, said that the credit balance to profit-and-loss account for the past three years was: In 1921, £222,000.; in 1922, £209,000.; and in 1923, £307,000.; which showed a recovery in the affairs of the company which everyone must think very satisfactory in the present disturbed state of trade. The demand for nickel, which had been at a very low ebb, had sustained a very considerable improvement during last year, an improvement which at present was maintained, and their turnover and deliveries had been satisfactory. Their products had been increased and their works were well employed, but the prices which had been ruling, owing to a somewhat unrestricted competition from a good many sources, had been lower than at almost any other period of the industry, and had counteracted to some extent the benefits derived from the larger sale and the larger production. Copper sulphate, of which they were the largest manufacturers in the United Kingdom, and which was the product which was chiefly exported to the Continent, had suffered not merely from competition, but also from severe fluctuations in the exchanges in most of the bigger export markets, such as France and Italy.

The Chairman proceeded to draw attention to the changes which had taken place in the uses of nickel during the war. Previous to the war, he said, probably 50 per cent. of their nickel had gone to steel makers for armaments and 50 per cent. for the production of non-ferrous alloys and pure nickel products, whereas last year only 12½ per cent. had gone to the former and 87½ per cent. to the latter. The use of nickel for coinage was increasing, many countries now replacing their paper currency with nickel; the use of nickel for cooking utensils was also on the increase.

The report and accounts were unanimously adopted.

Anglo-Continental Guano Works, Ltd.

Net profit for 1922, after providing for all trade charges, directors' fees, and doubtful debts, was £24,314., less income tax, corporation tax, and interest on instalments in respect of debenture issue, leaving £22,971., plus £5,530. brought forward, making £28,501. Preference dividends absorb £22,500., leaving £6,001., which directors recommend be carried forward.

DIVIDENDS.

United Alkali Co., Ltd.—Interim dividend of 4 per cent. actual, less tax, which is equivalent to 6 per cent. on the old share capital.

NEW COMPANIES.

Orient Company, Ltd.—Capital £52,575., 6s. shares. Manufacturers of vegetable products, oil extractors, etc. Office: Orient House, 21, Budge Row, London, E.C. 4.

Artificial Silk and Textile Company, Ltd.—Private company. Capital £10,000. Office: 64, Basinghall Street, London, E.C.

De Vains Process, Ltd.—Private company. Capital £5,000., £1. shares (4,500 A and 500 B). Manufacturers of paper pulp, cellulose, etc. Solicitors: J. D. Langton and Passmore, 57½, Old Broad Street, London, E.C.

Liquid Oxygen Explosives, Ltd.—Private company. Capital 31,500., in 30,000 ordinary of £1. and 30,000 founders' shares of 1s. Office: 1, Albemarle Mansions, Albemarle Street, London, W.

Giffen Chemical Company, Ltd.—Private company. Capital £3,000. Solicitors: Onderson, Fyfe and Littlejohn, 201, West George Street, Glasgow.

Thornley Binders, Ltd. — Private company. Capital £100,000. Manufacturers of products from seaweed and waste products, etc. Solicitors: Ashurst, Morris, Crisp and Co., 17, Throgmorton Avenue, London, E.C.

FERTILISER NEWS.

Nitrate of Soda.—As is usual at this time of the year, the market for nitrate is very quiet, with little business about. Shipments for the first half of the month totalled 110,000 tons, of which 63,000 tons were to Europe, 41,000 tons to the United States, and 6,000 tons to Japan and other countries. This compares with 68,000 tons in the corresponding period of 1922, 12,000 tons in 1921, and 61,000 tons in 1914. The heavy sales made by the Association for the current year have been the cause of much congratulation in the daily Press, and holders of nitrate shares have been encouraged by the promising outlook. But the inevitable has happened, and resales reported to be upwards of 25,000 tons have already been made. This material, contracted for at the lower range of the graduated price scale for August-October delivery, is now being sold by speculators at the rate of 20s. 5d. per metric quintal, or just 2d. per quintal under the figure of 20s. 7d. for November delivery, which is the cheapest price at present offering by the Association. This sort of thing is bound to affect the first-hand sales, and it is possible that with the extremely heavy rush to buy on the announcement of the new price list, this aspect of the nitrate market will be more evident than ever. In any case, the situation is such that the producers have been able to dispose of only 8,000 tons during the first half of July. If this slackening-off in orders continues it is difficult to see how the Association can pretend to maintain prices at the existing rates for forward delivery. It is understood that there is yet about 35,000 tons of material available for November shipment, but whether the 20s. 7d. to 21s. quotations will stand, remains to be seen. European stocks, including material afloat for the Continent, amounted on the 15th inst. to about 214,000 tons, against 238,000 tons at the same date of last year. So far as the position on the other side of the Atlantic is concerned, prices have again been generally advanced, both for spot and forward business, by about 5 cents per 100lbs. The general opinion seems to be that this is an effort to secure orders by creating the impression that the market was advancing. Little business has resulted from this manœuvre, however, and most consumers are buying from hand to mouth, though stocks in dealers' hands are of fair dimensions.

Sulphate of Ammonia.—The effects of the new and lower prices for this fertiliser in the home market are beginning to be apparent, and increased inquiry and better business is reported. Even at the attractive prices now ruling, however, there is still much hesitation amongst agriculturists owing to the difficult conditions. The definite proposals put forward in the House of Commons, and the evident anxiety to do something to assist the farming community in this country, may cause a reaction in favour of a more extensive use of fertilisers, which means a revival in the demand for home-produced sulphate. The official figures for exports of sulphate from the United States show a marked falling-off in the past few months, and it is evident that the world markets for some time to come will be open to United Kingdom manufacturers. On the Continent quotations are equivalent, at current rates of exchange, to from 25s. to 15s. below the price fixed by the Federation for home consumption. The seizure of the stocks of nitrogenous fertilisers, chiefly ammonium sulphate, by the French in the occupied area has resulted in a general weakening of the price in that country, and the quotation at which the French organisation has been doing business is round about £12. per ton. The rapid distribution of this material is bound to be followed by a scarcity, when prices will inevitably rise to a level at which British sulphate can once more be imported in quantity. Exports of sulphate from this country to France have been steadily falling off month by month, but the possibilities of large supplies from elsewhere are now very remote. In Germany the prices of nitrogenous products have again been raised, but figures in terms of German currency are meaningless to-day, and quotations would need to be revised almost hourly to keep pace with the receding value of German credit.

Egyptian Phosphate Industry.—In 1913 the production and exportation of phosphate from Egypt promised to result in an industry of considerable importance. During the past three years, however, a sharp decline has occurred, states an American consular report, although the average value per ton in 1922 shows an increase in comparison with 1921, and is more than 100 per cent. greater than the average value in 1913, when over 64,000 tons of phosphate were exported, mainly to Japan. In 1920 exports reached almost 145,000 tons, with Japan as the principal buyer, closely followed by Italy and British possessions in various parts of the world. During that year the average price per ton to Japan was considerably higher than to other customers. During 1921, in spite of a sharp price decline, the total exports amounted to only a little over 84,000 tons. In that year Spain was the principal buyer, followed by Japan, Italy, and Portugal in the order named. In 1922 exports amounted to only 18,000 tons, or approximately only 25 per cent. of the exports of 1913. Italy was the main purchaser, taking almost half of the total exports, with the United Kingdom and Japan dividing the remainder.

General Notes.—The British Phosphate Commission of Nauru, in its annual report for the year ended June, 1922, states that the tonnage of cargoes shipped was 360,000, of which Australia received 47 per cent., New Zealand 10½ per cent., Great Britain 4½, and other countries 38 per cent. All Empire demands were met at satisfactory prices, and the surplus was disposed of to foreign countries at market rates. The results of the first two years rendered possible substantial reductions in the selling price for the third year. The trading account shows a credit balance for the year of £91,000.

It is announced that a factory for the production of synthetic ammonia by the Claude process is to be erected in Spain in order to utilise the production of hydrogen at the electrolytic soda works of the Société Electroquimica de Flix.

Of the 18,300 tons of sulphate of ammonia imported into France during the first three months of 1923, 13,005 tons came from Great Britain, 1,983 tons from Germany, 1,226 tons from the Sarre province, 653 tons from Belgium and Luxemburg, and 1,433 tons from unspecified countries. For the same period of last year, 31,780 tons were imported, and 13,581 tons in 1921.

Superphosphate prices in Holland, to which allusion was made in our issue of June 1 last, were incorrectly quoted, owing to a typographical error in a correspondent's report. The current prices should have been given at 25fl. to 27.50fl. per ton for 30% grade, instead of the quotations given.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

One satisfactory feature of the hematite pig-iron trade, now in a very depressed condition, is that so far, the production of ordinary iron, in the smelting of which local coke is largely if not entirely used, has not been curtailed as has that of the low-phosphorus iron. There are still five furnaces blowing in West Cumberland that are smelting ordinary iron, and there are two furnaces at Barrow that are producing for steelworks consumption. A further reduction of iron output in this district that has taken place this week scarcely affects the coking industry. How long the furnaces at Workington will continue in full blast is not of course known, but it is hoped that here at all events it may not be necessary either to blow furnaces out or to damp them down. The outlook in the hematite pig-iron trade, it must be admitted, is not very encouraging. The depreciation in values has not apparently helped matters at all. Bessemer mixed numbers are now at £5. 15s. per ton delivered at Glasgow and Sheffield, and ordinary iron is in even less active request than it was a week ago. It is, however, the demand for East Coast coke and not that for local coke that has slackened off. East Coast coke supplies this week are not 7,000 tons, while practically the whole of the make in West Cumberland is being absorbed by smelters. That the position would have been somewhat different if the Whitehaven ovens had been in operation goes without saying. The collieries at Whitehaven, however, are still idle, and there does not appear to be the slightest prospect of their resuming work. To local smelters the price is now 29s. to 33s. per ton. Scotland is taking a small part of the make at 34s. per ton, and what coke is going to the Continent is being sold at 34s. to 40s. per ton. The make of tar is all being taken by the chemical works on the coast. Sulphate of ammonia is moving away satisfactorily, but crude benzol, since the price dropped, is a slower trade. Creosote is steady and some portion of the make is being exported. Tar acids are fairly firm, but road tar is quieter. Sulphuric acid is in fair demand.

PARLIAMENTARY NEWS.

Smoke Abatement Bill.

In the House of Lords on Thursday, July 19, the Earl of Onslow introduced the Smoke Abatement Bill, the object of which is to amend the law relating to smoke nuisances. The Bill was read a first time.

Industrial Alcohol Production.

In the House of Commons, on Wednesday, July 18, Mr. Hardie asked the President of the Board of Trade: Whether, in view of the fact that we are dependent on outside sources for a supply of liquid fuel, he will consider the question of immediately developing the manufacture of industrial alcohol in this country?

Viscount Wolmer: This question is discussed in the Interim Memorandum and Second Memorandum by the Fuel Research Board on Fuel for Motor Transport, published by His Majesty's Stationery Office in 1920 and 1921, respectively. Investigations by the Fuel Research Board are still proceeding with a view to discovering a suitable method of manufacturing alcohol from materials available in this country and in the Empire.

Mr. Hardie: Is not the Noble Lord aware that, with the knowledge that we have now, there is no need for any further investigation, but that we can go on and make industrial alcohol; and will his Department, in the interests of the trade of this country, see that the plant is allowed to work continuously instead of intermittently, and thereby make this country the equal of other countries in this respect?

Viscount Wolmer: I am sorry to say that the Fuel Research Board do not agree with the views of the hon. member.

Overalls for Oil-mill Workers.

Mr. Rhys Davies on Monday (July 23) asked the Home Secretary: Whether he will cause inquiries to be made into the operation of Order No. 959, factory and workshop welfare, in respect of the oil-mill workers employed by Messrs. Lever Brothers, in the Birkenhead area; whether he is aware that a claim made on behalf of such workers for protective clothing by way of overalls, agreed upon by employers and workpeople in the industry, has been ignored by the firm in question; and whether he will take the matter up with the firm so that the Order may be carried out in every detail and according to the custom prevailing in that district?

Mr. Bridgeman: I have no information at present in regard to the matter referred to in this question. Inquiries will be made and the result communicated to the hon. member.

SOUTH WALES NOTES.

[Specially Contributed.]

The tinplate industry does not show much promise of improvement, and such business as is now being done is on a small scale for quick delivery. The figures relating to exports for the half-year ending June 30 reveal a partial recovery, there being an increase of some 62,000 tons over the corresponding period of 1922. The increase is accounted for by greater export trade to Holland, France, Italy, China, Japan, Argentine, India and Australia. In June, there was an increase of 13,000 tons as compared with June last year, with a larger gain in values owing to the higher prices obtained. There was also a steady improvement in the galvanised sheet trade, an increase of some 12,500 tons over last year being shown. In this case, the Colonies were the chief factor of the improvement. Inquiries for patent fuel are more numerous and business is steadily improving, apart from the usual seasonal dulness. There is no alteration in the copper trade, smelting establishments now working having to stock the metal, although by-products are in fair demand. Cokes are in much better request, and orders have been received that will occupy many ovens over the remaining half of the year.

The imports for the week to Cardiff included 312cwt. barytes from Hamburg, 705cwt. phosphorus from Montreal, 5 tons manganese ore, and 103cwt. red lead from Antwerp, 3,560cwt. glucose from New York, 277 tons burnt ore from Wicklow; to Swansea, 7½ tons zinc ashes from Montreal, 80 tons copper ore, 207cwt. red lead from Genoa, 5,535 tons pitch from Pensacola, 3 tons tin oxide from Rotterdam, 7 tons lead ashes from Antwerp; 50 tons silicate of iron, 25 tons calcium carbide from Christiania; to Newport, 1,895 tons iron pyrites from San Juan. The Cardiff exports included 460 tons pitch to Antwerp, and 960 tons sulphate of ammonia to Galway; from Newport, 109 tons ammonium nitrate to Antwerp.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE COLOURING OF POISONS.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—May I, as an analytical, dispensing, and manufacturing pharmaceutical chemist, with some forty years' experience in these various branches, be allowed to reply to Mr. Sexton's letter? I would submit that in the matter of "Colouring poisons for medicinal use" no one, without a practical knowledge of the subject, is qualified to give an opinion for or against, and a debate in the House of Commons by members, the majority of whom would be entirely ignorant of the subject debated, would be either useless or, possibly, very dangerous.

I entirely agree with the decision of the General Medical Council. "A preparation of strychnine" mentioned I presume to be the "liquor strychnine" of the B.P. (a solution the official strength of which is, roughly, one per cent). To colour this green certainly would be objectionable in many ways, and would be no safeguard against carelessness. If carelessness occurs with a colourless preparation it will occur with a coloured one. The novelty of being coloured would soon wear away. But the greatest difficulty in legislating would be drawing the line as to what is "a preparation of strychnine." Take the hypodermic tablets of varying strengths. To introduce colouring matter into these would be as unscientific as colouring distilled water. Then Mr. Sexton cannot be aware that there are, besides the preparations of nux vomica, many others prescribed containing strychnine the natural colour of which would make it impossible to colour "green." I could enlarge considerably on the subject, but I have probably drawn sufficient attention to the difficulties to show that it is not a matter for men without the necessary qualifications to meddle with.—Yours, etc.,

Geo. D. Yates.

Birkenhead, July 20.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained.

Norway.

An agent in Christiania is desirous of securing the representation in Norway of a British manufacturer of boiled linseed oil. (Ref. No. 70.)

A firm of agents in Christiania are desirous of securing the agency in Norway of a British merchant supplying agar agar. (Ref. No. 73.)

United States of America.

A firm of manufacturers' agents in San Francisco wish to communicate with British manufacturers of coal tar products, lithopone, zinc oxide, whiting—lump or ground, barium carbonate and barium sulphate, and with producers of china clay, with a view to obtaining agencies for the Pacific Coast of the United States. They are prepared to act on a commission basis or would finance own stocks. (Ref. No. 83.)

A firm of chemical manufacturers and merchants in San Francisco wish to communicate with British exporters of shellac and varnish gums with a view to obtaining an agency, on a commission basis, for the Pacific Coast of the United States. (Ref. No. 86.)

Hong Kong.

A firm of Hong Kong importers are desirous of getting into touch with United Kingdom exporters of sulphate of ammonia. (Ref. No. 11,121/F.E./C.C.).

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

July 9 to 14 (inclusive).

Intermediates and Dyestuffs. Barnard, C. M. 17,821.
Dyestuffs. Barnard, C. M. 17,822.
Azo Dyestuffs. Bloxam, A. G. (*Chemische Fabrik Griesheim-Elektron*). 18,008.
Sulphuro-phosphate Bodrero, B. 18,087.
Toilet Soap. Clifford, W. 18,137.
Drying-kilns. Cutler, C. A. 17,891
Cellulose Derivatives. Dreyfus, H. 18,061.
Rust-proofing Process. Dunlop Rubber Co., Ltd.; and Macbeth, C. 17,962.
Highly Active Charcoal. Farbwerke vorm. Meister, Lucius, and Brüning. 18,092.
Manganese Steel. Hadfield, Sir R. A. 17,769.
Extraction of Moisture from Coal Sludge. Human, A. H. 17,973.
Controlling Water Gas Apparatus. Humphreys and Glasgow, Ltd. (*Gartley and Evans*). 17,768.
Vegetable Products for Manufacture of Paper. Köppel, P.; and Wuensch, E. 17,790.
Cellulose Ethers. Lilienfeld, L. 17,764.
Alkali Celluloses. Lilienfeld, L. 17,765.
Cellulose Conversion Products. Lilienfeld, L. 17,766.
Low water-content Alkali Cellulose. Lilienfeld, L. 18,091.
Treating Starch. Ling, A. R.; and Nanji, D. R. 17,934.
Grape Sugar. Marks, E. C. R. (*Corn Products Refining Co.*). 18,110.
Fractional Distillation of Hydrocarbons. Moeller, J. F. L. 17,837.
Deglutination of Artificial Silk. Soc. Chimique des Usines du Rhône. 17,967.
Bleaching Cellulose Pulp. Souchon, P. 17,883.
Purifying Sewage. Sturgeon, R. A. 17,800
Tar and Rubber Composition for Roads. Theilgaard, A 17,849.
Colloidal Sulphur. Vogel, H. 18,250.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. *in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.*

1922.

Metallurgical Furnaces. Kirby, E. B. 277. **200,117**
Distillation of Petroleum. Simonoff, M ; Beninson, M.; and Gros, F. 300. **200,118**
Extrusion Presses. Prescott, W. E.; Baker, Sons, and Perkins, Ltd., J.; and Standardised China Clay Co., Ltd. 6,468. **200,135**
Thymol. Howards and Sons, Ltd.; and Blagden, J. W. 7,170. **200,151**
Cellulose Derivatives. Plauson's (Parent Co.), Ltd. (*Plauson, Dr. H.*). 9,265. **200,160**
Chemical Reduction of Organic Compounds. Adam, W. G.; Siderfin, N. E.; Murdoch, D. G.; and Galbraith, W. L. 9,564. **200,167**
Detergent Compound. Guernsey, F. H.; and Electric Smelting and Aluminum Co. 9,679. **200,175**
Food Products Containing Fats. Spensley, J. W.; and Chemical Engineering Co. (Manchester), Ltd. 9,682. **200,176**
Recovery of Proteins and Milk-sugar (Lactose) from Whey. Thomson, D. 9,778. **200,185**
Cellulose Acetates. Zdarowich, J. O. 9,796. **200,186**
Treatment of Viscose Substances. Rushen, P. C. (*Soia Soc. di Navigazione Industria e Commercio Reparto Viscosa*). 9,905. **178,121**
Tanning Extracts. Redfern, T.; and Walker and Sons, Ltd., W. 10,025 **200,203**
Tanning Agents. Moeller, W. 11,876. **200,262**
Removing Easily Soluble Salts from Boiler Feed-water. Müller Ges., P.; and Ostertag, J. 11,882. **200,263**
Manufacture of Salts of Urea, more Especially Nitrate of Urea, from Cyanamides. Soc. d'Etudes Chimiques pour l'Industrie. 12,492. **179,544**
Water Filtering and Softening Processes. Hepburn, G. G. 14,438. **200,301**
Magnesium Cement. Sperni, J. 15,154. **200,311**
Water Gas. Trent Process Corporation. 15,335. **182,101**
Filtering Material. Torley, C. 16,251. **200,327**
Digesters, Retorts, and Drying Apparatus for Heat Treatment of Materials. Rooke, A. G. Shirling. 17,459. **200,345**
Composition for Softening Water. Lecomte, F. H. 19,269. **200,370**
Apparatus for the Electrolysis of Water. Casale, L. 19,617. **200,376**
Frames for Filter-presses. Stuart, A. T. 22,827. **185,116**
Electrolytic Manufacture of Lead Alloys. Mathesius, W. 24,926. **200,408**
Electrolysis of Metals. Cremer, A. 28,242. **187,607**

1923.

Preparation of Pitch. Coke and Gas Ovens, Ltd. (*Still, C.*). 12,094. **200,460**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1922.

Purifying Water. Lecomte, F. H. 26,996. **200,466**

1923.

Treating Liquor Accruing from the Lixiviation of Vegetable Matter. Colas, L. J. B. A.; Colas, A. P. J.; and L'Alfa, Soc. Anon. pour la Fabrication des Pâtes de Cellulose. 8,994. **200,482**
Organic Super-oxides in a Finely Divided Condition. Naamlooze Vennootschap Vereenigde Fabricken van Chemische Producten. 17,256. **200,508**
Aqueous Solutions from Difficultly Soluble Gums. Soc. Italiana E. De-Angeli per l'Industria dei Tessuti Stampati. 17,663. **200,523**
Binding Granular Substances. Jung, P. 17,667. **200,524**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Regenerating Rubber with Acetylene. J. C. Koller, Johannesburg, South Africa. British Patent, **198,067,** of 1922.

The resiliency of vulcanised rubber, etc., is restored, preserved or enhanced, or the plasticity of unvulcanised rubber is increased by treatment with acetylene. Perished vulcanised rubber is comminuted and washed with water or caustic solution to remove impurities and swell the rubber, and is then placed in an atmosphere of acetylene for about two weeks, and is finally washed with hot water. The resulting powder is capable of revulcanisation. The resiliency of rubber articles is restored or increased by the same treatment. Raw rubber is first treated to swell it and is then immersed in the acetylene. The acetylene is preferably generated by adding a solution of a carbohydrate to calcium carbide.

Ultramarine. E. F. Kur, Bognor, Sussex; and F. Wilkinson, Bradford. British Patent, **198,212,** of 1922.

Ultramarine is formed by heating to 700°-1,000° C. a mixture of calcined china-clay and an alkali polysulphide other than a polysulphide of ammonia. In an example, 30-40 parts of calcined china-clay free from iron and lime are mixed with 15-30 parts of sodium trisulphide and the mixture heated for at least six hours.

Active Carbon. Count L. le W. Hamon, Ballycumber, King's County; and T. H. Byrom, London. British Patent, **197,971,** of 1921.

Peat, lignite, sawdust or other carbonaceous material is saturated under pressure or otherwise with a metallic salt solution and a soluble phosphate, carbonate and/or silicate is added to precipitate in the pores of the material an insoluble phosphate, etc. The material is then carbonised and soluble matter extracted. In an example aluminium sulphate and magnesium and calcium chlorides are given as suitable salts and phosphoric acid as the precipitant. Hydrochloric acid, with or without heat, is used to extract the soluble matter after carbonisation, and the carbon is subsequently dried. The salts obtained in the extraction may be employed in the impregnation of fresh material.

Treatment of Animal Fibres with Acetic Anhydride. R. B. Ransford, London. (Cassella and Co., Ges., L., Frankfort-on-Main, Germany.) British Patent, **198,166,** of 1922.

In the production of shot effects, animal fibres are treated with acetic anhydride. The treatment may be effected cold or hot, and may be accelerated by the addition of aromatic sulphonic acids, condensation products thereof with aldehydes, free mineral acids and their salts with weak bases, for example, aluminium sulphate or dimethylaniline sulphate. Where the material is intended to be interwoven with white yarn, the material after dyeing is treated with a chromium salt such as chromium fluoride.

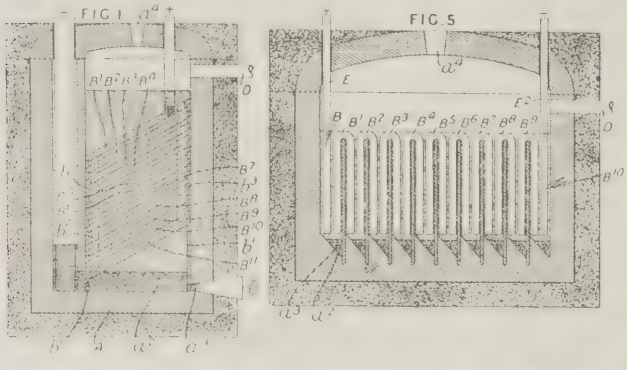
Rubber Containing Bituminous Compositions. A. C. de Caudemberg, Nice, France. British Patent, **198,136,** of 1922.

India-rubber is incorporated with asphalt, bitumen, pitch, etc., by means of liquids of high boiling-point which are solvents for india-rubber and bitumen. Suitable solvents are mixtures of tetrachlorethane with benzene or toluene containing 20 per cent. of tetrachlorethane for cold preparations and 86 per cent. for hot ones. An asphalt composition to be compressed cold is obtained by mixing in the cold 100 parts of powdered asphalt with 3-4 parts of a solution containing 2.5-5 per cent. of rubber. An asphalt to be used in

a fused condition is made by melting together 100 parts of asphalt, 5 parts of bitumen, and 4-5 parts of a solution containing 5-7.5 per cent. of rubber, with or without the addition of sand or gravel.

Electrolysis of Fused Salts. E. A. Ashcroft, London. British Patent, **198,024**, of 1922.

The electrolysis of fused metallic salts, such as fused chloride of zinc or lead, or a mixture thereof, is effected in an electrolyser provided with a series of closely-spaced electrodes constituting a series of electric couples immersed in the same electrolyte, only the first and last of the electrodes of the series being connected to the external circuit. Fig. 1 shows an electrolyser comprising a refractory container A, or a metal container lined with refractory material, surrounded by a casing of kieselguhr. The electrodes consist of a number of inclined graphite plates B^1 . . B^{11} resting on steps b of fused silica, vitreosil or obsidianite, the steps b^1 for the lowest plate being of graphite. Fused zinc chloride is introduced through an opening a^4 at about 350° to 400° C. and the temperature of the electrolyte is maintained between 420° and 600° C., and preferably between 450° and 500° C., during electrolysis. This may be done by applying external heat in the form of



a jacket through which superheated steam, hot air, or hot oil is circulated, by supplying a supplementary alternating current, or by supplying more direct current than is necessary for electrolysis. Zinc flows downwards through the perforations b^2 in the electrodes to the reservoir a^2 which is provided with a tap-hole a^3, and chlorine passes up through the perforations b^3 to the outlet D. A suitable proportion of sodium, or potassium or magnesium chloride may be added to the electrolyte to increase its conductivity. In a modification the electrodes consist of funnel-shaped plates through the centre of which passes a silica tube containing a graphite negative conductor. Fig. 5 shows an electrolyser with a number of saddle-shaped electrodes B^1 . . B^9 mounted on refractory partitions, the end electrodes B, B^{10} being connected directly to carbon rods E, E^2 which supply the current. The zinc gathers in a number of separate compartments a^2 having outlets a^3. The saddle-shaped electrodes may be replaced by graphite plates mounted in grooves in the sides of the container A. In every case the electrodes may be corrugated or grooved as desired. The current density used is 2 amps. per square inch of electrode surface. Metallic ores and other metal bearing materials are chlorinated and then subjected to the above process to obtain the pure material. Specifications 15649/92 and 8894/00 are referred to.

Anthraquinone Vat Dyestuffs. R. B. Ransford, London. (Cassella and Co., Ges., L., Frankfurt-on-Main, Germany.) British Patent, **193,077**, of 1922.

Vat dyestuffs, which are most probably oxazoles and thiazoles of the anthraquinone series are obtained by condensation of the azomethine compounds derived from anthraquinone-2-aldehyde or a substitution product thereof, and an *o*-aminophenol, or an *o*-aminothiophenol or an equivalent thereof respectively; the condensation is effected by heating alone or with a solvent, and with or without a condensing agent such as sodium acetate, zinc chloride, or sulphuric acid. A mixture of an anthraquinone-2-aldehyde with an *o*-aminophenol or an *o*-aminothiophenol may also be condensed directly to the dyestuff without isolation of the azomethine compound. Equivalents of *o*-aminothiophenols are aromatic amines sulphurised in the ortho position such as *o*-diaminoaryldisulphides, *o*-aminoarylthiosulphonic acids and particularly the substances described in Specifications 17417/14 and 18292/14 derived from the action of disulphur dichloride on primary aromatic amines, and their products of transformation.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Sulphuretted Vat Dyestuffs. H. Pereira, Vienna. British Patent, **197,932.** Convention date, May 18, 1922.

1:12- Dioxyperylene is heated with sulphur or alkaline sulphides or alkali hydroxides and sulphur. The product dyes cotton brown to black shades from a hydrosulphite vat.

Enamels. Chemische Werke vorm. Auerges, Berlin. British Patent, **197,933.** Convention date, May 18, 1922.

To prevent opaque enamel from bubbling during firing, a portion of the clay which is usually added to the mill is first made incandescent and then added to the other ingredients. One-half of the clay may be so treated, and the process is stated to be particularly applicable when zirconium or cerium oxide is present.

Catalytic Decomposition of Water Vapour. C. E. Laurent, Seine-et-Oise, France. British Patent, **197,647.** Convention date, May 13, 1922.

Water vapour is decomposed into its constituent elements by passage at temperatures of 125-400° C. over a catalytic material comprising a mixture in suitable proportions of (1) a substance of the class of "metallic poisons," such as salts of arsenic, mercury, silver, phosphorus, barium, sulphur, selenium, tellurium, boron, cyanides, and oxalates; (2) carbon in the form of graphite, coal, coke, etc.; with (3) a metallic salt of lead, zinc, tin, antimony, bismuth, or alumina, silica, magnesia, etc. The catalytic mixture, examples of which are given, is preferably made up into small balls or into a porous mass. The water vapour, prior to its catalytic decomposition, may be mixed with a small quantity of carbon-containing substance, such as gasoline, alcohol, benzine, acetylene, illuminating gas, and in general, all hydrocarbons and inflammable gases; the resulting gaseous products are useful for lighting, heating, and as a motor fuel.

Rubber Vulcanisation Accelerators. Naugatuck Chemical Company, Naugatuck, Connecticut, U.S.A. (Assignees of S. M. Cadwell, Leonia, New Jersey, U.S.A.) British Patent, **197,632.** Convention date, May 15.

The reaction product of an open carbon chain aldehyde having more than two and less than eight carbon atoms in the chain, and ammonia, is used as an accelerator in the vulcanisation of rubber, etc. Suitable aldehydes are heptaldehydes, propionaldehyde, cinnamylaldehyde, isovaleraldehyde. Specifications 7370/14 and 180,978 are referred to.

Ammonia Synthesis. L. Casale, Rome. British Patent, **197,655.** Convention date, May 13, 1922.

To avoid overheating of the catalyst in the synthesis of ammonia, the reaction gases are passed over the catalyst along with a predetermined quantity of the reaction product. This is preferably effected by withdrawing only a part of the ammonia as it is formed, the remainder being allowed to circulate with the reaction gases. The ammonia synthesis may take place under any pressure conditions and catalysts may be used which are active at temperatures lower than those usually employed.

Fertilisers. Soc. d'Etudes Chimiques pour l'Industrie, Geneva. British Patent, **197,690.** Convention date, May 15, 1922.

A fertiliser is made by treating a porous material such as peat or turf, clay, pozzuolana, or other volcanic ash, with a concentrated solution of cyanamide, obtained from calcium cyanamide, and drying the mixture in air. When peat or turf is used the fertiliser contains urea. Previous to the drying the mixture may be heated in the presence of nitrogen, oxygen, air or carbon dioxide, or of a mixture

of these gases, to a temperature preferably between 60° and 90° C. and not exceeding 120° C. and under a pressure of 5 to 25 atmospheres. When peat is used the treatment may be repeated with a view to increasing the nitrogen content of the final product.

Colloidal Solutions. Oderberger Chemische Werke Akt.-Ges., Oderberg, Czecho-Slovakia. British Patent, **197,966.** Convention date, May 19, 1922.

Sols are produced by mechanical dispersion of a substance in the dispersion medium in presence of the usual protective colloid and in addition an electrolyte preferably in the proportion necessary to precipitate the sol, if it were at rest. In examples crude sulphur and lamp-black respectively are colloidalised in water in presence of glue and common salt. It is stated that sols of almost any desired concentration are thus obtained, which are only coagulated by extremely strong alkalies or acids. The sols may be further concentrated by treatment in a centrifugal apparatus and may be carefully dried to produce reversible gels.

Benzoquinone Mordant Dyestuffs. Durand and Huguenin Akt.-Ges., Basle, Switzerland. British Patent, **197,940.** Convention date, May 20, 1922.

Benzoquinone dyes which dye and print on chrome-mordanted wool or cotton in violet to blue shades are prepared by warming with concentrated sulphuric acid a quinone dianilide obtained from one molecular proportion of chloranil and two molecular proportions of *p*-aminosalicylic acid, or a homologue or derivative thereof such as *p*-amino-*o*-cresotinic acid or nitroaminosalicylic acid (OH : COOH : NO_2 : NH_2 = 1 : 2 : 6 : 4); instead of commencing with nitro-*p*-aminosalicylic acid the condensation product from non-nitrated *p*-aminosalicylic acid and chloranil may be warmed with nitrosulphuric acid to effect nitration and formation of the new dyestuff simultaneously, or the heating with sulphuric acid may first take place followed by addition of nitrosulphuric acid to effect nitration. The condensation of *p*-aminosalicylic acids with chloranil is effected in aqueous suspension in the presence of sodium acetate. Examples are given of the various methods, together with tables of properties of the resulting dyestuffs.

Agglomerating Fuel. H. Du Boistesselin and O. Dubois, both in Rouen; F. W. Tabb, Paris; L. Varnier, Rouen; and L. Hertenbein, Levallois-Perret, Seine, all in France. British Patent, **197,639.** Convention date, May 12.

In agglomerating powdered material, particularly fuel dust, by means of pitch, a pseudo-solution of pitch and water, for example in equal quantities, is mixed with the material and the mixture pressed and dried, preferably at a temperature—*e.g.*, 200-250° C., which ensures the removal by evolved steam of volatile products of the pitch. In one method, pitch is ground with water as the dispersing agent. Small amounts of gummy or resinous substances, such as dextrin, resin soaps or concentrated extracts of sulphite cellulose may be added to the water, and oxidising agents such as chloride of lime or nitrates of metals having two degrees of oxidation such as iron, chromium, cobalt, etc., may be introduced into the pseudo-solution before it is mixed with the fuel dust in order to oxidise oils contained in the pitch and promote the combustion of the fuel.

THIRTY-FIVE YEARS AGO.

(From the " Chemical Trade Journal, July 28, 1888.)

Cheshire Salt Combine.—On Thursday afternoon the 12th inst. a well attended meeting of the salt trade was held at the Adelphi Hotel, Liverpool, for the purpose of meeting Messrs. W. H. Fowler and Co., solicitors, of London, as the representatives of a syndicate of London financiers who are desirous of purchasing the whole of the salt interests in Cheshire, with the idea of forming one large company. With one or two exceptions, the entire trade was represented, and the meeting was practically unanimous in its determination to assist in the formation of a company which should do away with the present most wretched state of the trade. It has been known for some time that the prices many salt makers have realised for their manufactured article has been much less than the cost of production, and the salt manufacturers present at the meeting at the Adelphi Hotel seemed to think that such an opportunity of putting the trade on a satisfactory basis had never before occurred, and that if the opportunity was let slip it was not likely to occur again for many years. It has been stated that the purchasers are displaying the utmost willingness to meet the vendors in a spirit of liberality and equity, and are prepared to give a satisfactory price to all parties for everything they have to sell having an element of value in it, that is capable of earning or being accessory to earning money. At the meeting in question an arrangement was entered into by which each salt proprietor or manufacturer was to send in within one week the value which he places upon his works, flats, steamers, wagons, and everything used by him in carrying on his business. This will be submitted to Messrs. Fowler and Co., and it is believed that an arrangement will be made which will be satisfactory to all parties.

MARKET REPORTS.

LONDON " OPEN MARKET " REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Owing to the dock strike there is some difficulty in getting goods landed, and for that reason holders of spot supplies have been able to obtain their prices. However, business remains very slow in most quarters in the home trade. The demand from the textile industries seems to have ceased for the time being. **Acetic Acid,** 80% technical, £47. to £48.; 80% pure, £50.; 98% glacial, £60. in casks, and £75. in glass demijohns, ex wharf, London; there is not much offering on spot, and these prices are fully maintained. **Acetone,** British Government specification, about £120. per ton, in drums; this is a particularly firm item, and there has been good inquiry on the market. **Arsenic,** Cornish, white powdered, about £72. to £73. per ton, for small spot lots; actual business remains very small. **Alum,** lump, £10. 10s. to £11. per ton, in casks; hardly any inquiry about at present; dealers offering at these figures. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; this price is still quoted, with business dull. **Barium Chloride,** 98/100%, £15. to £15. 10s. per ton, for spot parcels; supplies are moving off but very slowly. **Bleaching Powder,** 35/37%, £10. to £10. 10s. per ton; importers are offering at about these rates for shipment, but find business very poor. **Borax,** commercial, granulated £26. 10s., crystals £27., powdered £28., extra fine £29.; B.P., crystals £31., powdered £32., extra fine £33. per ton, for home trade only, in 2cwt. free bags, carriage paid to destination; British makers' prices are unchanged. Importers are quoting under similar conditions, commercial, granulated £25. 10s., and powdered at £27. per ton. **Borax Glass,** lump £74., powdered £75. per ton, in tin-lined cases; British makers selling for home trade only, packages free, carriage paid to destination. **Boric Acid,** commercial, crystals £50., powdered £52; B.P., crystals £56., powdered £60., extra fine £62. per ton, in free bags, carriage paid to destination; British makers' prices for home trade only are unchanged; dealers are competing at about level rates. **Cream of Tartar,** 99/100%, 92s. to 94s. per cwt., less 2½%; there has been a fair demand of late, but mostly for small quantities; slightly cheaper rates are quoted for 1 ton lots. **Citric Acid,** B.P., crystals, about 1s. 7d. to 1s. 7½d. per lb., less 5%; the spot position seems rather easier and the outlook is not at all promising. **Epsom Salts,** commercial quality, about £5. per ton, in bags; there is still very little life in this market. **Formaldehyde,** 40% volume, about £96. per ton, nominal; it is very unlikely that there will be any business done in this product until

the referee's decision is published on the recent appeal case. **Glauber's Salt,** commercial quality, about £3. 15s.. to £4. per ton, in bags; this product is seldom inquired for. **Lead Acetate,** brown, about £42. to £43. 10s., white crystals about £43. per ton; dealers are doing a limited business here, with prices ruling steady. **Litharge,** pure flake, British, about £37. per ton; dealers are offering Continental material in the region of about £36. per ton. **Lithopone,** about £22. to £22. 10s. for 30% Continental red seal; a fair inquiry continues here, and these slightly easier prices govern a steady market. **Ammonium Chloride,** grey galvanising, about £30. 10s. per ton; business during the week has been very limited; spot holders are asking this unchanged figure. **Nickel Sulphate,** home trade, single and double salts, £38.; export, single and double salts, £38. per ton, carriage paid or f.o.b.; British makers quote at these unaltered prices. **Oxalic Acid,** about 6d. per lb.; inquiry remains poor and quoted rates are level on the week. **Bichromate of Potash,** about 6d. per lb.; this item is very dull, with no change in quoted values. **Carbonate of Potash,** 90/92%, about £28. to £28. 10s. per ton; 96/98%, about £32. per ton; some moderate business has been done at perhaps a shade under the quoted prices. **Chlorate of Potash,** crystals and granulated, about 3d. per lb.; no interest shown in this product at present. **Caustic Potash,** 88/92%, solid, about £32. 10s. per ton, in drums; spot supplies are available but the demand is poor. **Permanganate of Potash,** commercial quality, about 9½d. to 9¾d. per lb.; some little business has been on the market, and at the prices quoted the market appears to be steady. **Prussiate of Potash,** yellow, about 1s. 3d. per lb.; the demand for this article is still confined to small lots; prices are now steady. **Sulphate of Potash,** 90%, £11. 10s. per ton, ex ship; there is no change to record here. **Mercury,** about £10. 10s. per bottle of 75/76lbs., net; the spot position shows little change on the week, and the demand has been slow. **Red Lead,** imported, about £36. per ton; dealers offering at about this figure are doing a little business. **Salammoniac,** dog-tooth crystals £48. 10s. to £49., medium £43. to £44., fine white crystals £26. to £27. per ton; spot supplies are offering, with the demand very limited; prices seem fairly steady after the recent reductions. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; export, about £5. 10s. per ton, f.o.b.; quoted rates are unchanged on a very steady market. **Acetate of Soda,** about £25. 10s. per ton; this price is fully maintained. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid to destination; British makers continue to quote at this level; their prices for export vary according to destination. **Soda Crystals,** about £5. 5s. per ton, in bags, carriage paid to destination; British makers' price for home trade only; dealers are offering Continental material at competitive prices. **Caustic Soda,** 70/72% £18. 10s., 76/77% £20. 10s. per ton, in drums, ex wharf, shipping port; dealers' prices show no further decline and business is very quiet; British makers' prices for home trade are unaltered at £19. to £21. 10s. per ton, in drums, carriage paid to destination; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination; British makers' prices given; dealers are competing at about the same level. **Bichromate of Soda,** about 4½d. per lb. for home trade, and slightly more for export; British makers quote at these rates. **Chlorate of Soda,** crystals and granulated, 2⅞d. per lb.; there has been but very little inquiry on the market again this week. **Cyanide of Soda,** 98/100%, export 8½d. to 9d. per lb., home trade about 10½d. per lb.; British makers' prices given. **Nitrate of Soda,** 96%, £13. 7s. 6d. per ton, f.o.r. Liverpool; this market keeps very steady. **Nitrite of Soda,** 100%, about £26. 10s. per ton; after the slight reduction recorded last week this market is now quite steady. **Prussiate of Soda,** about 7d. per lb.; business seems very light here, and the price quoted might be shaded for good lots. **Hyposulphite of Soda,** pea crystals, about £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £10. per ton, in casks; dealers' prices have eased somewhat, and the market seems irregular on quotation. **Sodium Sulphide,** 60/62%, solid about £14.; broken £15. to £15. 10s. per ton, in drums; dealers prices; little doing; 60/65% concentrated, about £15. per ton, in casks. **Sulphate of Copper,** about £26. per ton; this market has been quiet of late and prices are easier; cheap offers are being made from the Continent. **Tin Crystals,** about 1s. 4d. per lb.; the market is unchanged on the week. **White Lead,** imported, about £43. to £44. per ton; dealers are quoting steadily at about these figures, with business moderate. **Zinc Oxide,** B.P., about £51., white seal about £43.; 99.5% about £37. per ton, f.o.r. makers' works; the demand is recorded as being disappointing.

Pharmaceutical Chemicals.—The continued slackness of business is about the only matter to comment upon this week. Spot holders are quoting most products at unaltered prices, but the tone of the market is anything but good. **Acetanilid,** crystals and powder, about 1s. 5d. per lb.; the market remains dull, with prices fairly easy as quoted. **Acetyl-Salicylic Acid,** B.P., 3s. to 3s. 1d. per lb.; at these rates the spot market seems fairly steady, but business is quiet. **Benzoic Acid,** B.P., about 2s. 3d. per lb.; there has been very little inquiry of late. **Diethylbarbituric Acid,** B.P. (barbitone), about 21s. per lb.; dealers' prices are steady at this rate, but business is very slow. **Salicylic Acid,** B.P., about 2s. 2d. to 2s. 4d. per lb.; prices are now quite steady; the demand is slow. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; last week's easier rates hold good on a dull market. **Amidopyrin,** about 14s. per lb.; hardly any inquiry during the past week; quoted rates unchanged. **Ammonium Bromide,** 7d. to 9d. per lb.; the spot position is still irregular, with business dragging. **Benzonaphthol,** about 5s. per lb.; the market is reported idle, and quotations are unaltered. **Benzaldehyde 03,** about 3s. per lb.; business has been poor again, with prices the same. **Betanaphthol,** resublimed, about 1s. 10d. per lb.; this market keeps fairly steady, but there is little doing. **Calcium Lactate,** 1s. 11d. to 2s. per lb.; some cheaper offers are said to be on the market for good quantities. **Chloral Hydrate,** duty paid, 4s. to 4s. 3d. per lb.; at these figures the spot position seems steady. **Creosote Carbonate,** about 8s. 6d. per lb.; slightly cheaper rates are being quoted this week. **Creosote,** B.P., about 2s. 2d. per lb.; the market keeps fairly steady at this level, but business is lacking. **Guaiacol Carbonate,** about 8s. 3d. per lb.; quoted rates are level on the week, with business quiet. **Hexamine,** about 3s. 10d. to 4s. per lb.; only some small business has been on the market; quoted rates are level on the week. **Hydroquinone,** 3s. 6d. to 3s. 9d. per lb.; this item has been fairly active, with prices as quoted steady. **Methyl Salicylate,** 2s. 5d. to 2s. 6d. per lb.; these prices govern a fairly steady but rather quiet market. **Methyl Sulphonal,** about 15s. per lb.; quoted at this rate on a lifeless market. **Paraformaldehyde,** 3s. 9d. to 4s. per lb.; prices are well maintained; here and there there has been a fair call on the market. **Paraldehyde,** about 1s. 5d. per lb.; some large lots might be obtained for a shade less. **Phenacetin,** about 6s. 3d. to 6s. 6d. per lb.; these cheaper rates of last week hold good, but business very limited. **Phenazone,** about 7s. 3d. to 7s. 6d. per lb.; the market seems steadier after the declines in values recorded last week. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; the spot position holds quite firm at these figures. **Piperazine,** about 4s. 6d. per oz., nominal; no business transacted. **Potassium Bromide,** B.P., crystals and granular, 6½d. to 7d. per lb.; spot supplies seem rather heavy, and there is not much demand at present; the quoted rates are varying. **Potassium Permanganate,** B.P., 10d. to 10½d. per lb.; these figures govern a much quieter market. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; quoted at lower levels this week on a dull market. **Salol,** 2s. 8d. to 2s. 9d. per lb.; no further decline in values is recorded, but business is slow. **Sodium Benzoate,** about 2s. 6d. per lb., nominal; the market has been idle. **Sodium Bromide,** B.P., crystals and granular, 7d. to 8d. per lb.; not much of the spot supplies seem to have been cleared and holders are showing a tendency to cut the market for business. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; a big drop in the spot price is recorded this week. **Sodium Salicylate,** powder 2s. 4d. to 2s. 7d. per lb., crystals 2s. 8d. to 2s. 10d., pure flake 2s. 10d. to 3s. per lb.; spot holders continue to ask these rates; business has been slow. **Sulphonal,** 14s. 6d. to 15s. per lb., nominal; no interest shown in offers at these rates. **Terpin Hydrate,** about 1s. 9d. per lb.; dealers continue to quote at about these figures. **Thymol,** about 15s. per lb.; spot offers are being made, but the demand is not good.

Coal-tar Products, Intermediates, Etc.—About the only matter of interest to be recorded is a much better tone in carbolic acid crystals, which have been well inquired for for export. Other items have been generally quiet, with prices about the same. **Aniline Oil,** about 9d. to 9½d. per lb., drums free; prices show a further slight reduction on a dull market. **Aniline Salt,** about 9½d. to 10d. per lb., casks

free; there has been some little inquiry here. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; things are still very flat here. **Benzol,** about 1s. 7d. per gallon, f.o.r. makers' works, in buyers' packages; this product keeps in poor demand, and the quoted rate is rather weak. **Toluol,** 2s. per gallon, f.o.r. makers' works, in buyers' packages; quoted rates show no change on a dull market. **Xylol,** pure 2s. 3d., commercial 1s. 6d. per gallon, drums extra; quoted prices are unchanged on the week with business slow. **Naphtha,** about 1s. 5d. per gallon; there has been no improvement in demand, and prices are unaltered. **Solvent Naphthas,** 90/160, 1s. 5d. per gallon, drums extra; the demand is slow, but quoted rates are maintained. **Heavy Solvent Naphtha,** 90/190, 1s. 4d. per gallon, drums extra; there is no change on the week in prices, with market rather weak. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; this product is maintained in value on a dull market. **Burning Oil,** crude, No. 3 8½d., No. 2 8d. per gallon, barrels free; no improvement in demand, and prices are unaltered. **Creosote Oil,** about 10d. per gallon, naked, f.o.b.; dealers are offering at this rate, with the market steady but not active. **Carbolic Acid,** crystals, about 1s. 2d. to 1s. 3d. per lb., f.o.b.; there has been much more inquiry this last week, and the tone of the market is considerably better; there is a decided tendency to higher rates here. **Naphthalene,** about £20. per ton; prices are maintained, although business has been slow; crude £7. to £13., crystals £21., powder about £17., balls £24., tablets £24., candles £24. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; quoted rates show no change on the week. **Pyridine,** about 18s. per gallon; this market keeps very firm, with spot supplies difficult to locate. **Hexamethylene,** 4s. to 4s. 3d. per gallon; there is no sign of a break in this market. **Pure Methyl Alcohol,** £100. per ton, ex wharf, London; the demand has been fair and the market keeps very steady. **Pitch,** about 135s., London, spot; the market has kept steady all the week and closes at unchanged rates; good inquiry continues for forward positions, with the quotation fully 145s. to 150s. per ton.

LONDON METAL MARKET. WEDNESDAY.

Copper: Standard brands, £65. 12s. 6d. to £65. 15s., cash; £66. 7s. 6d. to £66. 10s., three months; electrolytic, £72. 10s. to £73. **Tin:** Standard, £181. 5s. to £185. 10s., cash; £186. to £186. 5s., three months; Straits, £188. 5s.; English, £186. **Lead,** soft foreign, £24. 7s. 6d., prompt; English, £26.; chemical sheet, 33s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £30. 10s.; hard, £25. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £10. 2s. 6d. to £10. 5s. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 13s. per unit, c.i.f., United Kingdom or Continent. **Zinc Dust,** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. WEDNESDAY.

The demand for heavy chemicals still continues quiet in the home trade, but rather more inquiry prevails for export account. Values, however, show no improvement, and quotations generally are in buyers' favour. Prices for **Alkali** products are unchanged at current rates, and makers fairly well engaged with orders. **Bleaching Powder,** soft-wood casks, steady at £11. 7s. 6d. on rails. Foreign supplies of **Epsom Salts** and **Magnesium Chloride** are offering at cut rates. The demand for **Bichromates** and **Chlorates** is quiet and prices are unaltered. Roasted **Saltcake** is firm at £4. 10s. in bulk, carriage paid. **Copper Sulphate** is in only small request, and quotations easy at £26., f.o.b. American **Rock Sulphur,** £5. 5s. on rails. **Phosphate** and **Hyposulphite of Soda** are neglected. **Nitrite of Soda** scarce on spot, and price firm at £26. 10s., basis 100%, ex store. Concentrated **Sodium Sulphide,** £15. per ton. White powdered **Arsenic,** steady, at £70., on rails Cornish works. **Yellow Prussiate** is only moving off slowly; **Potash** at 1s. 2¾d., and **Soda** 6¾d. per lb. **Carbonate** and **Caustic Potash** are in fair demand, and values firm. Brown **Acetate of Lime,** dearer, at £11. 10s.; grey lower, at £20. per ton. **Acetate of Soda,** in short supply, and price maintained at £24. 18s. per ton. **Lead Salts** are dull; white **Acetate** £40., brown £42.; and **Nitrate** £42., delivered. **Barium Chloride,** firm, at £15. per ton, ex store. **Oxalic Acid** is quiet, at 6d. per lb. **Permanganate of Potash,** 9½d. to 9¾d. per lb.

SWANSEA MARKET REPORT. WEDNESDAY.

Business in **Tinplates** very quiet, with no inclination among users in placing contracts; small immediate delivery orders were secured on the minimum basis of £1. 3s. 1½d. per standard box. **Galvanised Sheets** easier, on the general basis of £17. 2s. 6d. per ton. **Copper** showed a better tendency, at £65. 10s. per ton for prompt and £65. 12s. 6d. for forward. **Tin** rather dull, and quotations very irregular round £185. 17s. 6d. per ton prompt, and £187. 2s. 6d. forward. **Lead,** fairly steady, at £24. 7s. 6d. prompt, and £23. 17s. 6d. per ton forward, for foreign; English, £25. 15s. **Spelter** prices were firmer at £30. 2s. 6d. per ton, f.o.b. **Zinc Sheets,** active, at £38. 17s. 6d. per ton on rail at works. **Sulphate of Ammonia,** quiet, at £14. 15s. to £13. 12s. per ton. **Sulphate of Copper,** dull, at £26. 7s. 6d., less 5%, in casks, f.o.b. **Nitrate of Soda,** more active, at £13. 7s. 6d. per ton prompt, and £13. 12s. 6d. forward. **Bone Meal,** slow with prompt; Indian £8. 17s. 6d. per ton. **Sulphuric Acid** in steady demand, with fair supplies at £3. 7s. 6d. to £6. 17s. 6d. per ton. **Oxalic Acid,** very dull, at 6¼d. per lb., f.o.r. **Pitch** keeps very dear, with no signs of reductions in prices, which stand at £6. 12s. 6d. for inferior qualities. **Copperas,** rather dull, at £2. 2s. 6d. per ton. **Arsenic** still remains in scant demand, with white powdered at £70. per ton. **Raw Linseed Oil,** prompt, £2. 4s. 9d. per cwt., in barrels. **Cottonseed Oil,** common edible £2. 4s. 6d., and deodorised £2. 7s. 6d. **Cocoanut Oil,** slow, with Ceylon £2. 2s. 3d. per cwt., f.o.b. **Olive Oil,** little doing, with prompt £67. 2s. 6d. per ton. **Palm Oil,** quietly steady; Lagos, prompt, £34. 15s.; softs, prompt, £34. 2s. 6d.; mediums £34. 15s.; and hards £36. 2s. 6d. per ton. **Turpentine,** quiet with American, prompt, £3. 19s. 3d. per cwt. **Coals** were steady, with numerous inquiries for steam qualities; best Admiralty £1. 10s., seconds £1. 9s., ordinaries £1., Monmouthshire black vein £1. 8s. 6d., all per ton f.o.b. **Anthracite** coals were firm, with best large at £2 10s.; French nuts £3. 2s. 6d. per ton, f.o.b. **Patent Fuel,** prices were very steady, from £1, 12s. 6d. to £1. 15s. per ton, f.o.b.. **Cokes** were inclined to be firmer, more especially the better foundry grades, at £2.; furnace £1. 10s. per ton; export £2. 10s., f.o.b.

LIVERPOOL CHEMICAL MARKET. WEDNESDAY.

Inquiries for chemicals of the heavier kinds have again been moderate in number, as far as requirements for the home trade are concerned. In the export branch trade has been moderately active and shipments of chemicals are being made steadily and on a fair scale. **Bleaching Powder** has been rather more in demand, and is £10. to £11. per ton for use in the United Kingdom and £11. per ton for export. **Calcium Chloride** has been in fair request, and is £5. 17s. 6d. per ton. **Caustic Soda** has been in quietly steady demand on home-trade account, but has again had a moderate shipment for foreign ports; it is £20. 7s. 6d. to £21. 7s. 6d. per ton for 76%, carriage paid, for home-trade use, and £20. 10s. per ton for export. **Bicarbonate of Soda** continues to sell rather freely on home-trade account and has had a very firm shipment for export; it is £10. 10s. per ton, carriage paid, for use in the United Kingdom. **Soda Crystals** have had a fairly active inquiry, and are £5. 5s. per ton for home-trade uses. **Nitrate of Soda** has been but little in demand, and is £13. 5s. to £13. 10s. per ton. **Borax** has been in very fair request for use in the U.K., but has been quiet in the export trade; commercial crystals are £27. per ton, and powdered £28.; higher grades are, crystals £31. per ton, and powdered £32. per ton, carriage paid in the U.K. **Saltcake** has been quieter; it is £4. 10s. to £5. per ton for home-trade uses, and £5. 10s. to £6. per ton for export. **Bichromate of Soda** has had a slow sale, and is 4½d. per lb., c.i.f. to usual ports. **Ammonia Alkali** has been steadily called for on home-trade account and has been in good demand for export; the price is

£7. 12s. 6d. per ton for home-trade uses, and £8. per ton for export. **Hyposulphite of Soda** has been in very fair demand, and is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £16. per ton, in 1cwt. kegs, for photographic. **Sulphide of Soda** has had a very limited inquiry; solid is £16. per ton, and crystals £10. 10s. to £11. per ton. **Chlorate of Soda** has been quiet, and is 3d. to 3½d. per lb. **Phosphate of Soda** has been very quiet, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has moved but slowly, and is 7d. to 7½d. per lb. **Yellow Prussiate of Potash** has been in fair request and the price is slightly lower; it may be given as 1s. 3d. to 1s. 3½d. per lb. **Red Prussiate** has been quiet, and is 3s. 3d. to 3s. 6d. per lb. **Carbonate of Potash** has been but little in request, and is £26. to £32. per ton, according to quality. **Nitrate of Potash** has again been steadily inquired for, and is £33. to £35. per ton for refined. **Chlorate of Potash** has been but little called for, and is 4d. to 4½d. per lb. **Caustic Potash** has been quiet, and is £32. to £33. per ton. **Permanganate of Potash** has had a fair inquiry, and is 10d. to 10½d. per lb. **Bichromate of Potash** has been rather more in request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has had a moderate inquiry; first quality is £63. per ton, second quality £60., and third £57. **Sulphate of Ammonia** continues quiet for use in the U.K., but has moved somewhat freely in the export branch; neutral is £14. 15s. per ton, and ordinary £13. 12s. per ton, to the end of August. **Carbonate of Ammonia** has had a fair inquiry, and is 4d. per lb. **Muriate of Ammonia** has moved but slowly, and is £32. to £33. per ton. **Magnesia** has been in rather good demand; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. per ton. **Alum** has been more inquired for; it is £12. per ton for the home trade and £11. 10s. to £12. per ton for export. **Sulphate of Alumina** has been in fair request, and is £8. to £12. per ton, according to quality. **Sulphur** has been in very fair demand; flowers are £10. per ton, roll is £8. 10s. per ton, rock is £8. to £8. 10s. per ton, and American £5. to £5. 10s. per ton. **Tartaric Acid** has been more in request, and is 1s. 3d. to 1s. 3½d. per lb. **Cream of Tartar** has been in good demand, and is £4. 12s. to £4. 15s. per cwt. **Boric Acid** has been in steady request. **Commercial Crystals** are £52. per ton and powdered £58., and £2. more per ton if in casks. **Citric Acid** has been well inquired for, and is 1s. 9d. to 1s. 10d. per lb. **Oxalic Acid** has been very quiet, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** has been more in request, and is £42. to £43. per ton. **Sulphate of Copper** has been quiet for the home trade, but has had a fair shipment for foreign ports; it is £26. to £26. 5s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** continues quiet, with Cornish still in small supply; white powdered is £71. to £72. per ton.

WEST OF SCOTLAND CHEMICALS, Wednesday.

The demand for chemicals on home-trade account has been rather restricted on account of the holidays. Export inquiries also continue to be limited. Prices are easier in certain lines, but otherwise nominal quotations still hold steady. The following prices are at Glasgow, unless otherwise stated:—**Alum,** little doing, and in small demand; prices have been reduced and now stand at £12. 5s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; it is quoted on spot at £76. 10s. net. **Barium Chloride** remains very quiet, despite a further reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation still stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax,** granulated, is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride,** 70—75 per cent. solid, £5. 12s. 6d. per ton. **Citric Acid** is a declining market, though last week's reduced price is maintained at 1s. 8¼d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure of £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar,** easier, with better inquiry, and the price is 2s. lower, at £4. 8s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in quieter demand; brown steady at £40. 10s. per ton, net, and white better at £40. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid** at 6¼d. per lb. **Paraffin Wax** experiences a fair export trade at 2¾d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the rather easier figure of 1s. 4d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 11s. per ton, but business is nominal. **Sodium Bichromate** remains steady, with business on the basis of 4¼d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2 cwt. bags; and £11. 10s. in 1 cwt. kegs. **Tartar Emetic,** 43—44%, in fair request at 1s. 1½d. **Tartaric Acid** still shows a quieter tendency at 1s. 2¾d. per lb.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending July 21.

ALBUMEN—
Hamburg, 6 cks.

ALUMINIUM SULPHATE—
Marseilles, 30 bgs.

AMMONIA—
Hamburg, 2 cylds.

AMMONIUM CHLORIDE—
Hamburg, 8 cks.

ANTIMONY SALTS (*otherwise undes.*)
Bremen, 10 cks.

BARYTES—
Bremen, 150 bgs.

CALCIUM CYANIDE—
Hamburg, 666 dble. bgs.

CASEIN—
Buenos Ayres, 50 bgs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 5 brls., 64 drms.
Marseilles, 20 cs.

COAL TAR PRODUCTS—
Naphthalene
Hamburg, 33 brls.

CREAM OF TARTAR—
Marseilles, 106 cks.
Oporto, 10 cks.

FULLER'S EARTH—
Norfolk (Va.), 400 bgs.

GELATINE—
Bremen, 8 cs.

GLUCOSE—
New York, 1,020 brls.

IRON OXIDE—
Marseilles, 16 cks.

LEAD ACETATE—
Bremen, 22 cks.

MAGNESIUM CHLORIDE—
Hamburg, 49 drms.

MINERAL WAX—
New York, 36 bgs.

OCHRE—
Marseilles, 34 cs.
Norfolk (Va.), 127 brls.

PLUMBAGO—
Bremen, 29 bgs.

POTASH—
Hamburg, 9 cks.

SALT—
Bremen, 350 bgs.
Hamburg, 800 bgs.

SOAP—
Marseilles, 135 cs.

SODIUM HYPOSULPHITE—
Marseilles, 140 cks.

SODIUM PHOSPHATE—
Hamburg, 22 cks.

SODIUM SULPHATE—
Hamburg, 300 bgs.

STEARINE—
Buenos Ayres, 257 trcs.
Hamburg, 6 brls.
Monte Video, 59 trcs.
New York, 224 brls.

TALLOW—
Buenos Ayres, 250 trcs.
Monte Video, 184 trcs.

TALLOW—
Wellington, 102 cks.

TANNING MATERIALS—
Quebracho
Buenos Ayres, 2,032 bgs.
Unspecified
Norfolk (Va.), 145 bgs.

TARTARIC ACID—
Marseilles, 4 cks.

WAX (*otherwise undescribed*)—
Hamburg, 3 cs.
New York, 31 brls.

WHITE LEAD—
Bremen, 38 cks.

GOOLE.

Week ending July 21.

FERRO CHROME—
Halmstad, 85 cks.

FERRO MANGANESE—
Halmstad, 1 ck.

GLUE—
Antwerp, 120 bgs.

IRON PYRITES—
Huelva, 1,480 t.
Pomaron, 1,700 t.

MAGNESITE—
Amsterdam, 50 bgs.

MANGANOUS CARBONATE—
Antwerp, 1 brl.

POTASH SALTS (*otherwise undes.*)
Bremen, 1,000 bgs.

POTASSIUM NITRATE—
Antwerp, 5 bgs.

POTASSIUM PRUSSIATE—
Rotterdam, 12 cks.

SALT—
Hamburg, 560 t., 100 bgs.

SOAP—
Boulogne, 8 cs.

GRANGEMOUTH.

Week ending July 21.

BONE PHOSPHATE—
Rotterdam, 750 bgs.

CASEIN—
Dunkirk and Rouen, 77 bgs.

OCHRE—
Dunkirk and Rouen, 20 cs.

ZINC OXIDE—
Rotterdam, 50 cks.

GRIMSBY.

Week ending July 21.

CALCIUM CARBIDE—
Antwerp, 1 cs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 3 cs.

SALT—
Hamburg, 2 cs.

HULL.

OFFICIAL AMENDMENTS.

From Return for week ending July 14, Deduct—

COAL TAR PRODUCTS—
Tar Oil
Helsingfors, 600 galls.

Week ending July 21.

CALCIUM CARBIDE—
Christiania, 10 t. 5 c.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 3 t.
Ghent, 1 t. 19 c.
Gothenburg, 1 c.

COAL TAR PRODUCTS—
Tar Oil
Helsingfors, 600 galls.

FERRO CHROME—
Gothenburg, 51 t.

FERRO SILICON—
Christiania, 55 t.

FERTILISER (*otherwise undescribed*)
Christiania, 3 t.

GLUE—
Hamburg, 4 c.

ROSIN—
Pensacola, 17 t. 1 c.

LEITH.

Week ending July 21.

ACETIC ACID—
Rotterdam, 11 cks.

ALUMINA—
Gothenburg, 20 cks.

CASEIN—
Dunkirk, 268 bgs.
Nantes, 100 bgs.

CREAM OF TARTAR—
Amsterdam, 132 pkgs.
Rotterdam, 200 kgs.

GLUE—
Antwerp, 20 cs.

LEAD ACETATE—
Rotterdam, 6 cks.

OCHRE—
Dunkirk, 21 cks.

OXALIC ACID—
Rotterdam, 7 cks.

ROSIN—
Bordeaux, 100 cks.

SALT—
Hamburg, 300 bgs.

SILICO MANGANESE—
Gothenburg, 54 cs.

SOAP—
Copenhagen, 15 cs.

SODA CRYSTALS—
Antwerp, 100 bgs.

LIVERPOOL.

OFFICIAL AMENDMENTS.

To Return for week ending April 21, Add—

ACID (*otherwise undescribed*)—
Amsterdam, 83 crbys.

From Return for week ending Mar. 24, Deduct—

TALLOW—
Brazil, 100 pps.

From Return for week ending Feb. 3, Deduct—

SOAP—
Bordeaux, 5 cs.

To Return for week ending April 14, Add—

COPPER PRECIPITATE—
Spain, 2,455 bgs.

From Return for week ending June 9, Deduct—

SULPHUR—
Galveston, 2,002 pkgs.

To Return for week ending July 14, Add—

SULPHUR—
Catania, 700 bgs., 50 cks., 40 bgs.

RED LEAD—
Genoa, 62 cks.

GLUE—
Boston, 5 brls.

Week ending July 21.

BEESWAX—
Valparaiso, 17 sks.

BISMUTH ORE—
Antofagasta, 126 sks.

BLEACHING POWDER—
Bombay, 4 drms.

BONE BLACK—
Philadelphia, 100 bgs.

BONE FERTILISER—
Karachi, 2,056 bgs.

BORIC ACID—
St. Johns (N.F.), 4 kgs.

BORO CARBON—
Bordeaux, 40 sks.

BORON MINERAL—
Wilmington, 600 sks.

CARBON BISULPHIDE—
Gothenburg, 22 cks.

CARBON BLACK—
Nantes, 572 bgs.

CHEMICALS (*otherwise undescribed*)
Bordeaux, 3 cs.; Bremen, 3 cks.; Marseilles, 100 cks.; New York, 2 cs.; Rouen, 1 ck.

CREAM OF TARTAR—
Bordeaux, 284 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rouen, 1 cs.

DYESTUFFS (NATURAL)—
Cochineal
Las Palmas, 5 bgs.
Logwood
New York, 200 cks.
Unspecified
Philadelphia, 5 brls.

FERRO SILICON—
Gothenburg, 39 cks.

GLUE—
Buenos Ayres, 10 pkgs.

KIESELGUHR—
Bremen, 97 bgs.
California, 1,284 bgs.
Los Angeles, 450 bgs.

LITHARGE—
Bremen, 10 cks.

LITHOPONE—
Rotterdam, 160 cks.

MANGANESE ORE—
Bombay, 1,500 t.
Poti, 4,826 t.
Sekondi, 896 t.

OCHRE—
Marseilles, 10 cks.

PARAFFIN WAX—
New York, 132 cs.

POTASSIUM CHLORATE—
Gothenburg, 700 cs.

POTASSIUM PERSULPHATE—
Rotterdam, 6 cs.

ROSIN—
Bordeaux, 50 cks.

SALT—
Bremen, 200 bgs.

SOAP—
Marseilles, 462 cs., 147 pkgs.
Rouen, 4 cs.

SODIUM ACETATE—
Antwerp, 40 kgs.

SODIUM CHLORATE—
Rouen, 100 cks.

STEARINE—
Antwerp, 39 bgs., 89 tcs.

TALLOW—
Antwerp, 258 brls.; Campana, 558 cks.; New York, 100 brls., 100 trcs.; Santa Cruz, 30 brls.; Wellington, 36 cks.

TANNING MATERIALS—
Chestnut
Rouen, 80 cks.
Myrabolans
Bombay, 4,000 pkts., 1,079 bgs.
Wattle
Durban, 5,377 bls.
Unspecified
Bordeaux, 10 cs., 274 cks.

TARTAR—
Marseilles, 206 bgs.

WAX (*otherwise undescribed*)—
Balik Papan, 400 bgs.; Boston 1 cs.; Philadelphia, 1,600 brls.
Valparaiso, 1 pkg.

WHITE LEAD—
Bremen, 19 cks.; Genoa, 19 cks.

ZINC ASHES—
Boston, 497 bgs.

ZINC OXIDE—
Antwerp, 40 brls.

LONDON.

Week ending July 21.

ACETIC ACID—
Germany, 741 pkgs.

ACETONE—
Germany, 3 t. Honeywill Bros.

ALUMINA—
Sweden, £23.

ALUMINIUM SULPHATE—
France, £299. J. Bailey
,, £38. L. Le Personne
Spain, £150. Macandrews

ARGOLS—
France, 598 pkgs.
Italy, 303
Spain, 1,319

BARIUM CHLORIDE—
Germany, £65. Brown & Forth
,, 4 t. 18 c. Petri Bros.

BARYTES—
Belgium, 181 cks. Felton & Crepin
Germany, 30 t. Pallister Luck

BEESWAX—
Morocco, 39 bgs. Muller

BORAX—
U.S.A., 65 t. Jones Dooly

BROMIDES (*otherwise undescribed*)
Germany, £204. J. Harris

CANDELILLA WAX—
U.S.A., 69 bgs. Weber Smith & Hoare

CARBON BISULPHIDE—
Germany, £300. Roberts Brining
Sweden, £350. Jones Dooly

CARBON BLACK—
Czecho-Slovakia, 2 cks.
Germany, 41
U.S.A., 330 cs. Beck & Pollitzer
,, 100 Binney & Smith
,, 150 Chance & Hunt
,, 2
,, 281 Hughes & Hughes
,, 100 O'Hara & Hoar
Canada, 150 cs.

CASEIN—
Argent. R., £2,100.
France, £355.
,, £764. Boize
Irish F.S., £521.
N.Z., £2,768. J. Nathan

CERESINE WAX—
Germany, 30 bgs. Holroyds Oil Co.

CHEMICALS (*otherwise undescribed*)
Belgium, £142.
B.W.I. £560.
Canada, £132. Allen & Hanburys
Denmark, £22. Lock
,, £67.
Holland, 23,321 oz. Greeff
U.S.A., £1,075. Hackney
,, £42. Kimpton
,, £70.

CITRIC ACID—
Spain, 4 pkgs. Kemball Bishop

COAL TAR PRODUCTS—
Benzol
U.S.A., £1,062. W. Waugh
Naphthalene
Belgium, £200. Burt Boulton

COBALT OXIDE—
Canada, £2,575. Kimpton

CREAM OF TARTAR—
Germany, 40 pkgs. Zimmermann

DEXTRINE—
Poland, 10 t. Winn

DYESTUFFS (ARTIFICIAL)—
Carmine
France, £170. Zimmermann
Unspecified
Germany, 8 pkgs.
Belgium, 1 pkg.
Canada, 81 pkgs. Knight & Morris

DYESTUFFS (NATURAL)—
Annatto
France, £32.
Cutch
Burmah, 100 pkgs.
Indigo
Brit. India, 6 chts. Parsons & Keith
U.S.A., £102. Knight & Morris
Saffron
Spain, 1 pkg. Smith
Turmeric
Brit. India, 63 pkgs. Litchfield & Saundy
,, 198

FERTILISERS (*otherwise undes.*)—
Irish F.S., 5 t.

GELATINE—
Belgium, 71 t. 10 c. Cazaly Mills
,, £665. Duche
Germany, £173. Crowe
,, £39. Golding
Hoptroff
,, £892. Smart
,, £191. Tilleray
,, £22. Williams & Geils
Switzerland, £17.

GLUE—
Austria, £325.
Belgium, £82.
France, £259. Beresford
,, £25. Symons
Germany, £5.
U.S.A., £10. Gerhard & Hey

GLYCERINE—
Holland, £162.

HEXAMINE—
Germany, £260. Brown & Forth

HYDROCHLORIC ACID—
Germany, 74 pkgs. Jones & Co.

ISINGLASS—
Brit. India, 18 cs.
E. Turkey, 39 cs.

KIESELGUHR—
Algeria, 41 t.

LACTOSE—
N. Zealand, 240 pkgs.

LITHOPONE—
Belgium, 40 cks. Taylor & Cox

MAGNESITE—
Holland, £48.

MAGNESIUM CHLORIDE—
Germany, £47. Gillam

MANGANESE ORE—
Brit. India, 750 t.
Sweden, 5 t. Master & Co.

MINERAL WAX—
Germany, 65 bgs. Friedlander

OCHRE—
France, 18 brls. Lovell & Sons

OZOKERITE—
Germany, 10 bgs. Holroyds Oil Co.
Poland, 130 bgs. Poth Hille

PARAFFIN WAX—
Germany, 10 t. 4 c. Holroyds Oil Co.
U.S.A., 5 c. Asiatic Petr.
,, 14 t. 10 c. Brit. Amer. Pet.
,, 30 t. Burmah Oil

PARAFORMALDEHYDE—
U.S.A., £75. Knight & Morris

PARISIAN BLUE—
Germany, 10 cks. Stancourt & Muir
Holland, 8 cks. Ingenlath
,, 2

PLUMBAGO (GRAPHITE)—
France, 12 bgs. Symons
Germany, 25 Wilson
Irish F.S., 1 ck.

POTASSIUM CARBONATE—
Germany, 20 pkgs. Beck & Pollitzer

ROSIN—
France, 100 cks. Langley Smith
Germany, 25 cks. Hearne Bell
U.S.A., 150 brls. Everett
,, 200 Bigland & Jeffreys
,, 250 Fox Stockell
,, 200 Green
,, 100 Hill
,, 300 Lowden Connell
,, 550 Rosin & Turps. Co.

SALAMMONIAC—
Germany, 41 pkgs. Beck & Pollitzer

SALT—
Germany, 30 t.

SIZE—
U.S.A., £1,100. Pochin

SOAP—
Austria, £11.
Belgium, £93. S. Kalisky
Canada, £3,361. Gerhard & Hey
Denmark, £18. Honeychurch & Co.
,, £7.
France, £33. Brown & Forth
,, £290. Maeder
,, £450.
,, £70. Symons
Germany, £188. Hartrodt
,, £102.
U.S.A., £80. American Exp.
,, £65. Christy
Victoria, £5,200. Smith

SODIUM NITRATE—
Germany, 5 t. Stott & Hotopf

STEARINE OIL—
U.S.A., 102 brls. Loders & Nucoline

SULPHUR—
Italy, £70.

TALLOW—
Argentine, 1 t. 18 c. Oppenheimer Casing
N.S.W., 15 t. 3 c. Anning & Cobb
N. Zealand, 841 4
,, 25 8 Anning & Cobb
,, 4 16 Goad Rigg
,, 24 4 Lever Bros.
,, 106 6 Thornett & Fehr
,, 9 Weber Smith & Hoare
,, 18 Co-op. W'sale

TANNING MATERIALS—
Myrabolans
Brit. India. 189 pkgs.
Valonia
E. Turkey, 53 t. Whittall

TAR (*otherwise undescribed*)—
Finland, 15 brls.
Poland, 100 brls.
,, 50 bls.

TARTARIC ACID—
Italy, 260 pkgs. Duche & Sons

TURPENTINE—
U.S.A., 1475 brls. Fairclough Dodd
,, 500 Rosin & Turps. Co.
,, 1,927

VEGETABLE WAX—
Poland, 500 bgs. Gerhard & Hey

WHITE LEAD—
Belgium, 55 cks. Farmiloe & Sons
U.S.A., 48 cks. R. W. Greeff

ZINC OXIDE—
Belgium, 150 cks. Ashby, Ld.

MANCHESTER.

OFFICIAL AMENDMENTS.

To Return for week ending Mar. 24, Add—

SOAP—
Mediterranean Ports, 25 cs.

DEXTRINE—
Baltimore, 430 bgs.

Week ending July 21.

ACETIC ACID—
Hamburg, 15 crts.
Rotterdam, 10 cks.

ANTIMONY SALT (*otherwise undescribed*)—
Hamburg, 10 cks.

BARIUM CHLORIDE—
Hamburg, 14 cks.

BARIUM SULPHOCYANIDE—
Hamburg, 7 cs.

CALCIUM CHLORIDE—
Hamburg, 32 drms.

CARBON BLACK—
New York, 100 cs.

CAUSTIC POTASH—
Hamburg, 51 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 100 bgs.; Hamburg, 197 cks., 57 drms.; Rotterdam, 20 cks.

CREAM OF TARTAR—
Hamburg, 100 cks.

DEXTRINE—
Baltimore, 892 bgs.
New York, 200 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 3 cks.
Unspecified
Hamburg, 5 cks.

FORMIC ACID—
Hamburg, 143 crbys.
Rotterdam, 52 crbys.

GELATINE—
Hamburg, 10 cs.

GLUCOSE—
Rotterdam, 127 cks.

GLUE—
Antwerp, 60 bls.

LEAD ACETATE—
Hamburg, 59 cks.
Rotterdam, 14 cks.

LITHOPONE—
Antwerp, 20 cks.; Hamburg, 20 cks.; Rotterdam, 220 cks.

MAGNESITE—
Rotterdam, 150 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 515 drms.

MAGNESIUM SALTS (*otherwise undescribed*)—
Hamburg, 38 drms.

PHOSPHATE (*otherwise undescribed*)
Hamburg, 5 bgs.

POTASSIUM CARBONATE—
Hamburg, 4 cks.

PYRITES (COPPER)—
Pomaron, 930 t.

ROSIN—
Savannah, 650 brls.

SALT—
Hamburg, 200 bgs.

SALTPETRE—
Hamburg, 40 kgs.

SOAP—
New York, 14 brls.

SODIUM BICHROMATE—
Baltimore, 30 cks.

SODIUM PRUSSIATE—
Rotterdam, 17 cks.

STEARINE—
Antwerp, 13 bgs.

TARTARIC ACID—
Genoa, 140 brls.

TIN OXIDE—
Hamburg, 10 cks.

TURPENTINE—
Brunswick, 200 cks.
Savannah, 500 brls.

WAX (*otherwise undescribed*)—
Baltimore, 125 brls.
Hamburg, 40 bgs., 60 cs.

ZINC DUST—
Antwerp, 50 cks.

ZINC OXIDE—
Antwerp, 20 cks.
Rotterdam, 20 cks.

NEWCASTLE-ON-TYNE

Week ending July 21.

ACIDS (*otherwise undescribed*)—
Rotterdam, 20 cks.

AMMONIUM CHLORIDE—
Hamburg, 19 cks.

CALCIUM CARBIDE—
Rotterdam, 70 drms.

BARYTES—
Hamburg, 71 pkgs.

GLUE—
Antwerp, 20 bls.

IRON OXIDE—
Lisbon, 251 brls., 200 sks.

LITHOPONE—
Antwerp, 20 cks.

MAGNESIUM SALTS (*otherwise undescribed*)—
Hamburg, 35 drms.

OCHRE—
Lisbon, 40 brls.

STEARINE—
Antwerp, 13 bgs.

ZINC OXIDE—
Rotterdam, 50 cks.

N. & S. SHIELDS.

Week ending July 21.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending July 21.

AMMONIUM CARBONATE—
Algoa Bay, 1 c.

CAUSTIC SODA—
Rangoon, 80 drms.

CHEMICALS (*otherwise undescribed*)
Algoa Bay, 259 pkgs.; Barbados, 3 pkgs.; Bombay, 41 pkgs.; Cape Town, 179 pkgs.; Demerara 15 pkgs.; East London, 250 pkgs.; Rangoon, 302 pkgs.; Trinidad, 35 pkgs.

COAL TAR PRODUCTS—
Tar
Algoa Bay, 1 t. 5 c.; Demerara, 1 t. 18 c.; East London, 1 t. 5 c.; Rangoon, 68 t. 5 c.

GLUE—
Rangoon, 1 t. 3 c.

PARAFFIN WAX—
Calcutta, 20 t. 1 c.

POTASSIUM BICHROMATE—
Gothenburg, 1 t. 16 c.

SHEEP DIP—
Antigua, £28.
Puerto Cortes, £99.

SOAP—
Demerara, 2 c.; Rangoon, 1 t. 10 c.; St. Kitts, 1 t. 18 c.; Trinidad, 3 t. 17 c.

SODA ASH—
Rangoon, 1 t.

SODIUM BICHROMATE—
Algoa Bay, 1 t. 19 c.

WOOD PRESERVATIVE—
Singapore, 2 t. 16 c.

GRANGEMOUTH.

Week ending July 21.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiansand, 8 c.

PARAFFIN WAX—
Christiansand, 20 t.
Rouen, 5 t. 1 c.

POTASSIUM SALTS (*otherwise undescribed*)—
Rouen, 2 t. 7 c.

WOOD PRESERVATIVE—
Christiansand, 300 galls.
Stockholm, 383 galls.

HULL.

Week ending July 17.

AMMONIUM SULPHATE—
Amsterdam, 508 bgs.
Naples, 1,200 bgs.

BLEACHING POWDER—
Rotterdam, 31 cks.

CAUSTIC SODA—
Wiborg, 85 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 15 pkgs., 250 drms.
Amsterdam, 10 cks.

CHEMICALS (*otherwise undescribed*)
Christiania, 26 cs., 1 ck., 100 bgs.; Copenhagen, 12 cs. 3 cks. 20 bgs., 171 pkgs.; Genoa, 2 cs.; Gothenburg, 2 cs., 1 ck., 2 kgs., 1,043 pkgs., 124 drms., 885 slbs.; Helsingfors, 12 brls.; Kotka, 4 drms.; Malmo, 100 drms.; Newfairwater, 17 cks.; Pt. Said, 22 drms.; Rouen, 50 brls.; Rotterdam, 10 brls.; Stockholm, 1 cs., 3 cks., 100 drms.; Wiborg, 1,312 slbs.

COAL TAR PRODUCTS—
Aniline Oil
Oporto, 9 drms.
Creosote
Helsingfors, 25 cks., 10 brls.
Oporto, 2 drms.
Creosote Oil
Oporto, 295 brls.
Naphtha
Aalesund, 12 drms.

COAL TAR PRODUCTS—
Pitch
Dunkirk, 145 t.
New York, 600 brls.
Tar
Bergen, 17 drms.
Rouen, 26 drms., 4 brls.
Unspecified
Hango, 16 cks.

DISINFECTANTS (*otherwise indes.*)
Alexandria, 3 cs.
Hamburg, 800 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Aalesund, 1 drm.
Christiania, 2 cs., 7 kgs., 1 ck.
Stavanger, 6 kgs., 1 cs.

GELATINE—
Rotterdam, 8 bgs.

GLUE—
Abo, 20 bgs.; Christiania, 1 bg.; Ghent, 2 cs.; Helsingfors, 20 bgs., New York, 20 bgs.; Norrkoping, 6 cs.; Santa Marta, 1 bg.; Stavanger, 1 ck.; Trondhjem, 1 ck.

MINERAL WHITE—
New York, 200 bgs.

SALT—
Alexandria, 70 cs.; Amsterdam, 35 cs.; Christiania, 81 cs.; Copenhagen, 1 cs.; Gothenburg, 105 cs.; Malmo, 18 cs.

SALTCAKE—
Wiborg, 601 t.

SOAP—
Amsterdam, 1,000 cs.; Bombay, 6 cs.; Christiania, 1,008 cs.; Copenhagen, 29 cs., 1 bl., 5 cks.; Helsingfors, 1 cs.; Lisbon, 40 cs., 50 drms.; Rotterdam, 25 cs.

STEARINE—
Aalesund, 5 brls.
Hamburg, 12 brls.
Rotterdam, 112 brls.

TURPENTINE—
Antwerp, 22 brls.; Copenhagen, 5 cks.; Harlingen, 3 cks.; Jersey, 1 drm.; Stockholm, 3 cks.

LEITH.

Week ending July 21.

CALCIUM CARBIDE—
Trangisvaag, 8 drms.

COAL TAR PRODUCTS—
Pitch
Antwerp, 10 cks.

ETHYL CHLORIDE—
Rotterdam, 30 drms.

PARAFFIN WAX—
Gothenburg, 16 bgs.
Hamburg, 10 bgs.

SALTPETRE—
Akureyri, 2 cks.

SILICO MANGANESE—
Antwerp, 4 cks.

SOAP—
Aasberg, 2 cs.
Akuruyri, 10 cs.
Reykjavik, 4 cs.
Seydisfjord, 14 pkgs.
Thorshavn, 6 cs.

SODA—
Thorshavn, 10 bgs.

SODIUM BICARBONATE—
Trangisvaag, 2 cks.

TALLOW—
Rotterdam, 80 cks.

TURPENTINE—
Reykjavik, 3 brls.

LIVERPOOL.

Week ending July 19.

ALUM—
Melbourne, 2 t. 1 c., £20.
Salonica, 10 c., £12.
Serbia, 1 t. 9 c., £15.

ALUMINIUM SULPHATE—
Lisbon, 20 t., £190.
Montreal, 20 t., £107.
Valencia, 5 t., £51.

AMMONIUM CARBONATE—
Alexandria, 1 t. 5 c., £51.
Bordeaux, 1 t. 2 c., £39.
Melbourne, 2 t., £79.
New York, 6 t. 7 c., £228.
Para, 10 c., £23.

AMMONIUM CHLORIDE—
Bolivia, 19 c., £35.; Constantinople, 19 c., £41.; Galatz, 5 t. 2 c., £159.; New York, 10 t., £300.; Patras, 10 c., £18.

AMMONIUM SALTS (*otherwise undescribed*)—
Copenhagen, 1 t. 9 c., £46.
Hamburg, 1 t. 10 c., £44.

AMMONIUM SULPHATE—
Amsterdam, 24 t., £408.; Kobe, 430 t., £7,095.; Las Palmas, 86 t. 10 c., £1,372.; Naples, 25 t., £377.; Palermo, 10 t., £165.; Teneriffe, 3 t. 10 c., £54.; Yokohama, 456 t. 4 c., £7,527.

ANTIFOULING PAINT—
Rio de Janeiro, 12 c., £90.
Teneriffe, 6 c., £29.

ARSENIC—
Valencia, 2 t., £186.

BARIUM CHLORIDE—
Rouen, 10 t., £155.

BLEACHING POWDER—
Hong Kong, 10 c., £13.; Lisbon, 20 t. 3 c., £178.; Montreal, 9 t. 17 c., £90.; Rotterdam, 5 t. 5 c., £47.; Vancouver (B.C.), 2 t. 4 c., £68.

BOILER COMPOSITION—
Antwerp, 5 c., £10.
Montreal, 2 t., £76.
Penang, 2 t., £25.

BORAX—
Alexandria, 19 c., £28.; Auckland, 1 t. 5 c., £36.; Calcutta, 5 t., £142.; Constantinople, 19 c., £30.; Danzig, 1 t. 10 c., £37.; Monte Video, 1 c., £3.; Puerto Barrios, 2 c., £5.; Rotterdam, 1 t., £28.; Rio de Janeiro, 6 t. 8 c., £183.; Sydney, 2 t., £59.; Sekondi, 2 c., £3.; Switzerland, 4 t., £111.

BORIC ACID—
Amsterdam, 1 t., £50.; Auckland, 1 t. 10 c., £82.; Hong Kong, 10 c., £27.; Karachi, 2 c., £7.; Puerto Barrios, 2 c., £10.; Rotterdam, 10 c., £25.; Rio de Janeiro, 19 c., £52.

CALCIUM CHLORIDE—
Auckland, 5 t. 5 c., £33.
Arica, 2 t. 19 c., £17.

CHEMICALS (*otherwise undescribed*)
Auckland, 2 t., £56.; Bilbao, 2 t.; £21.; Brisbane, 4 t. 10 c., £125.; Bahia Blanca, 8 c., £20.; Calcutta, 5 t., £135.; Fremantle, 1 t., £28.; Libau, 6 t. 1 c., £52.; Melbourne, 1 t., £29.; Rouen, 5 t. 4 c., £220.; Rosario, 2 t. 5 c., £381.; Sao Paulo, 17 t. 18 c., £499.; St. Johns (N.F.), 5 c., £12.; Valencia, 1 t. 9 c., £40.; Valparaiso, 1 t. 1 c., £53.

CHLORINE—
Buenos Ayres, 10 c., £14.

CITRIC ACID—
Auckland, 10 c., £95.
Brisbane, 2 c., £18.
Sydney, 10 c., £95.

COAL TAR PRODUCTS—
Carbolic Acid
Amsterdam, 6 c., £45.
Dairen, 10 t., £1,453.
Hamburg, 5 t. 2 c., £666.
Creosote
Sydney, 1 t., £34.
Smyrna, 37 t. 12 c., £412.
Naphthalene
Iddo, 2 t., £46.
Pyridine
Cardenas, 16 c., £84.
Tar
Pt. Harcourt, 1 t., £10.
Sekondi, 1 t. 4 c., £13.
Unspecified
New York, 19 t., £705.
Piraeus, 2 t., £160.

COBALT OXIDE—
Hong Kong, 11 c., £650.
Oporto, 1 c., £50.

COPPER SULPHATE—
Puerto Alegre, 73 t. 16 c., £1,937.
Rosario, 1 t., £25.
Santos, 19 c., £27.

CREAM OF TARTAR—
Auckland, 1 t. 5 c., £125.; Adelaide, 10 c., £50.; Lyttleton, 1 t. 5 c., £125.; Maracaibo, 2 c., £12.; Pt. Chalmers, 1 t. 5 c., £125.; Sydney, 3 t., £312.

DISINFECTANTS (*otherwise undes.*)
Accra, 4 c., £11.; Auckland, 9 c., £34.; Alexandria, 1 t. 16 c., £81.; Boston, 1 c., £44.; Chemulpo, 13 t. 14 c., £641.; Hong Kong, 1 c., £17.; Havre, 14 c., £85.; Lyttleton, 9 c., £22.; Oporto, 6 c., £20.; Puerto Cortes, 15 c., £45.; St. Johns (N.F.), 2 c., £28.; Shanghai, 2 t., £93.; Wellington, 4 c., £26.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 14 t. 18 c., £1,669.
Indigo
Chefoo, 11 t. 18 c., £1,500.; Dairen, 7 t. 18 c., £977.; Switzerland, 9 t. 18 c., £448.; Tientsin 7 t. 13 c., £900
Unspecified
Adelaide, 1 c., £20.; Montreal, 1 t. 14 c., £495.; Melbourne, 11 c., £83.; Sydney, 15 c., £422.

DYESTUFFS (NATURAL)—
Annatto
Halifax, 4 c., £25.
Cutch
Halifax, 7 c., £10.

ESSENTIAL OILS (SYNTHETIC)—
Sydney, 1 c., £53.

GLYCERINE—
Caracas, 4 c., £20.

IODINE (RESUBLIMED)—
Loanda, 44 lb., £27.

IODOFORM—
Loanda, 44 lb., £31.

MAGNESIA (CALCINED)—
Maracaibo, 1 c., £20.

MAGNESIUM CARBONATE—
Puerto Barrios, 2 c., £13.

MAGNESIUM SULPHATE—
Accra, 1 c., £1.; Burutu, 1 c., £3.; Cotonou, 10 c., £19.; Half Assince, 2 c., £6.; Lagos, 2 c., £3.; Limon, 6 c., £4.; Pt. Harcourt, 2 c., £2.; St. Johns (N.F.), 6 c., £8.; Sierra Leone, 10 c., £13.

PHOSPHORUS—
Barranquilla, 5 c., £55.

PHOSPHORUS (AMORPHOUS)—
Melbourne, 1 t. 9 c., £350.
Sydney, 19 c., £230.

PHOSPHORUS SESQUISULPHIDE
Bolivia, 9 c., £105.
Melbourne, 1 t. 9 c., £323.

POTASSIUM BICHROMATE—
Auckland, 10 c., £27.; Sydney, 2 c., £15.; Varna, 1 t. 3 c., £60.

POTASSIUM CHLORATE—
Wellington, 2 t. 10 c., £100.

POTASSIUM CYANIDE—
Iddo, 1 c., £13.
Montreal, 4 c., £30.

POTASSIUM IODIDE—
Iddo, 15 lb., £16.; Koko, 30 lb., £29.; Pt. Harcourt, 171 lb., £179.

SALAMMONIAC—
Salonica, 1 t., £55.

SALTCAKE—
Christiania, 500 t. 1 c., £2,144.
Wiborg, 698 t. 15 c., £3,194.

SHEEP DIP—
Auckland, 6 t. 4 c., £419.; Bahia Blanca, 27 t. 19 c., £1,233.; Dunedin, 3 t. 15 c., £160.; Monte Video, 8 t. 18 c., £542.; Punta Arenas, 2 t. 7 c., £112.

SULPHURIC ACID—
Zanzibar, 7 c., £30.

TANNING MATERIALS—
Quebracho
Melbourne, 6 t. 3 c., £113.
Unspecified
Durban, 1 t. 3 c., £21.; Hamburg, 30 t., £644.; Pasages, 18 c., £28.; Skien, 6 t. 10 c., £76.

TARTARIC ACID—
Maracaibo, 1 c., £16.
Sydney, 12 c., £79.

TIN OXIDE—
Sao Paulo, 6 c., £25.

WOOD PRESERVATIVE—
Burutu, 1 t., £28.
St. Johns (N.F.), 2 t. 4 c., £56.

ZINC CHLORIDE—
Bombay, 2 t. 2 c., £54.

ZINC OXIDE—
St. Johns (N.F.), 10 c., £16.

ZINC SULPHATE—
NewYork, 5 c., £58.

Week ending July 20.

CALCIUM CHLORATE—
Melbourne, 56 pkgs.
Wellington, 19 pkgs.

CAUSTIC POTASH—
La Guaira, 26 drms.

CAUSTIC SODA—
Alexandria, 36 drms.; Amsterdam, 17 drms.; Auckland, 10 drms., 43 pkgs.; Batavia, 30 drms.; Beyrout, 30 drms.; Bombay, 530 drms.; Brisbane, 62 drms.; Bundaberg, 6 drms.; Cairns, 15 pkgs.; Cape Town, 50 drms.; Christiania, 80 drms.; Colombo, 87 drms.; Dunedin, 10 drms.; Copenhagen, 135 drms.; Corinto, 21 pkgs.; East London, 82 drms.; Fremantle, 43 cs.; Geelong, 6 pkgs.; Gisborne, 10 drms.; Hamburg, 9 drms.; Jaffa, 34 drms.; Kilindini, 12 cs.; Lyttleton, 8 cs.; Maceio, 150 drms.; Mackay, 35 drms.; Madras, 300 drms.; Maranham, 210 drms.; Mazatlan, 40 drms.; Melbourne, 454 drms.; Mombasa, 3 drms.; Napier, 15 drms.; Monte Video, 200 drms.; Oporto, 17 drms.; Pt. Said, 6 cs.; Penang, 42 drms.; Pt. Swettenham, 50 drms.; Rangoon, 10 drms.; Rio de Janeiro, 285 drms.; Rockhampton, 50 cs.; Rotterdam, 15 drms.; Rosario, 102 drms.; Salonica, 30 drms.; St. Johns (N.F.), 12 drms.; Shanghai, 672 drms.; Salaverry, 15 drms.; Singapore, 212 drms.; Sekondi, 100 drms.; Seychelles, 15 drms.; Sierra Leone, 21 cs.; Sydney, 123 drms.; Townsville, 17 cs.; Vera Cruz, 69 drms.; Wiborg, 17 drms.; Zanzibar, 20 drms.

DEXTRINE—
Naples, 8 kgs.

FERRO MANGANESE—
Antwerp, 112 t.; Baltimore, 826 t.; Barcelona, 5 t.; Boston, 500 t.; Hamburg, 19 t.

FERRO PHOSPHORUS—
Newcastle, 20 t.

GLUE, SIZE, AND GELATINE—
Bombay, 32 pkgs.; Boston, 102 cks.; Calcutta, 20 bgs.; Ceuta, 20 bgs.; Copenhagen, 40 pkgs.; Habana, 73 pkgs.; Halifax (N.S.), 25 pkgs.; Lyttleton, 20 pkgs.; Madras, 65 bgs., 31 cks.; New York, 165 bgs.; Pt. Sudan, 10 bgs.; Quebec, 25 pkgs.; St. Johns (N.F.), 5 bgs.; Singapore, 10 bgs.; Wellington, 1 cs.

PARAFFIN WAX—
Hamburg, 20 pkgs.

RED LEAD—
Volo, 10 kgs.

ROSIN—
Rangoon, 10 brls.

SALT—
Barbados, 70 t.; Bombay, 5 t.; Burutu, 15 t.; Calabar, 105 t.; Calcutta, 6,018 t.; Coquimbo, 3 t.; Demerara, 23 t.; Koko, 9 t.; Malmo, 400 t.; Monte Video, 34 t.; Montreal, 50 cs.; New Orleans, 50 t.; Opobo, 20 t.; Puerto Barrios, 10 t.; Pt. Harcourt, 52 t.; Rangoon, 3 t.; Shanghai, 4 t.; Sierra Leone, 20 t.; Valparaiso, 1 t. 10 c.; Warri, 1,601 t.; Winnebah, 18 t.

SOAP—
Accra, 708 bxs.; Aden, 3 pkgs.; Alexandria, 296 pkgs.; Amsterdam, 11 pkgs.; Antwerp, 348 bxs.; Antigua, 80 bxs.; Bangkok, 1,255 pkgs.; Barbados, 977 pkgs.; Belawan, 1,000 bxs.; Belize, 50 bxs.; Beyrout, 24 bxs.; Bombay, 10 bxs., 2,425 pkgs.; Bonny, 30 cs.; Bourgas, 30 bxs.; Buenos Ayres, 373 pkgs.; Burutu, 125 pkgs.; Calicut, 55 bxs.; Calcutta, 907 pkgs.; Casablanca, 22 pkgs.; Christchurch, 10 pkgs.; Christiania, 1,129 bxs.; Colombo, 24 bxs.; Colon, 42 bxs.; Constantinople, 44 bxs.; Copenhagen, 279 bxs.; Dar-es-Salaam, 200 pkgs.; Demerara, 955 bxs.; Grand Bassam, 25 pkgs.; Haiffa, 15 bxs.; Helsingfors, 70 pkgs.; Hong Kong, 130 pkgs.; Iddo, 50 pkgs.; Karachi, 325 pkgs.; Kilindini, 369 pkgs.; Kingston (Ja.), 48 pkgs.; Lagos, 1,303 pkgs.; Las Palmas, 260 bxs.; Larnaca, 37 bxs.; Limassol, 14 bxs., 14 cs.; Lyttleton, 10 pkgs.; Madras, 1203 cs.; Malta, 52 cs.; Marmagoa, 350 bxs.; Melbourne, 6 cs.; Mellila 28 drms.; Mombasa, 680 pkgs.; Monrovia, 37 bxs.; Monte Video, 15 cs.; New York, 18 pkgs.; Oamaru, 6 cs.; Opobo, 510 cs.; Penang, 100 cs.; Puerto Colombia, 2 cs.; Pt. Antonio, 81 bxs.; Pt. Elizabeth, 35 pkgs.; Pt. Gentil, 51 pkgs.; Pt. Harcourt, 951 pkgs.; Pt. Maria, 111 bxs.; Pt. Said, 33 cs., 150 bxs.; Pt. Sudan, 51 bxs.; Rangoon, 582 cs., 1,550 bxs.; Rio del Rey, 10 cs.; Rotterdam, 600 pkgs.; Rouen, 15 cs.; Sandakan, 65 bxs.; Santos, 4 cs.; Sapele, 20 cs.; Sekondi, 5 cs., 100 bxs.; Shanghai, 92 cs., 8 brls.; Sierra Leone, 2 cs., 6 bxs.; Singapore, 3,882 pkgs.; St. Johns (N.F.), 36 pkgs., 250 bxs.; St. Kitts, 200 cs.; St. Lucia, 65 cs.; Stockholm, 653 cs.; St. Vincent, 75 cs.; Sydney, 11 cs.; Tabou, 10 cs.; Tandjong Balei, 93 bxs.; Tenceriffe, 104 bxs.; Trinidad, 710 cs.; Tuticorin, 7 cs.; Valparaiso, 1 cs.; Wellington, 17 bxs.

SODA ASH—
Adelaide, 117 pkgs.; Auckland, 20 pkgs.; Bahia, 20 cs.; Bahia Blanca, 20 cks.; Brisbane, 54 pkgs.; Buenos Ayres, 1,169 cks.; Callao, 40 cks.; Calcutta, 3,000 bgs.; Coconada, 4,000 pkgs.; Copenhagen, 300 pkgs.; Dalny, 238 pkgs.; Geelong, 10 pkgs.; Guayaquil, 58 bgs.; Hamburg, 2,432 bgs.; Kingston (Ja.), 300 pkgs.; Kobe, 13,889 pkgs., 1,082 bgs.; Lyttleton, 260 pkgs.; Melbourne, 59 pkgs.; Maranham, 5 t. 2 c.; Medellin, 45 bgs.; Moji, 5,626 bgs.; Monte Video, 18 pkgs.; Newcastle, 177 bgs.; New Plymouth, 20 kgs.; Norrkoping, 600 pkgs.; Penang, 16 pkgs.; Puerto Alegre, 130 pkgs.; Rio de Janeiro, 815 pkgs.; San Antonio, 313 cks.; Rosario, 190 pkgs.; Rotterdam, 1,100 pkgs.; St. Johns (N.F.), 50 bgs.; Sydney, 1,204 bgs.; Salonica, 20 bgs.; Samarang, 140 bgs.; Tientsin, 1,680 bgs.; Santos, 100 cks.; Sekondi, 6 kgs.; Tampico, 300 bgs.

SODA CRYSTALS—
Aden, 20 pkgs.; Batavia, 10 kgs.; Belawan, 12 kgs.; Gibraltar, 40 kgs.; Kingston (Ja.), 56 pkgs.; Madras, 100 pkgs.; Malta, 40 bgs.; Samarang, 20 kgs.; Zanzibar, 10 brls.

SODIUM BICARBONATE—
Aarhus, 68 pkgs.; Adelaide, 34 pkgs.; Alexandria, 200 kgs.; Aden, 50 pkgs.; Algoa Bay, 7 pkgs.; Amsterdam, 300 pkgs.; Antwerp, 507 pkgs.; Auckland, 170 pkgs.; Bari, 160 kgs.; Basrah, 40 kgs.; Belawan, 14 kgs.; Bergen, 80 kgs.; Beyrout, 20 kgs.; Bombay, 1,300 bgs.; Bourgas, 140 kgs.; Brisbane, 12 bgs., 100 kgs.

SODIUM BICARBONATE—
Casablanca, 50 kgs.; Coconada, 100 pkgs.; Constantinople, 145 pkgs.; Copenhagen, 160 pkgs.; Danzig, 50 bgs.; Genoa, 206 pkgs. Greymouth, 7 kgs.; Guayaquil, 65 pkgs.; Hamburg, 250 pkgs.; Kingston (Ja.), 130 pkgs.; Leghorn, 200 pkgs.; Kobe, 3,554 pkgs.; Leghorn, 265 pkgs.; Moji, 3,877 bgs.; Lyttleton, 101 pkgs.; Mazatlan, 60 kgs.; Newcastle, 100 pkgs.; Melbourne, 729 pkgs.; New Orleans, 1,500 pkgs.; Palermo, 90 kgs.; Pt. Said, 60 bgs.; Piraeus, 20 pkgs.; Pt. Sudan, 30 pkgs.; Rangoon, 1,000 kgs.; Salonica, 100 drms.; Santos, 382 pkgs.; Sav la Mar, 20 kgs.; Shanghai, 535 pkgs.; Smyrna, 40 kgs.; Stockholm, 20 kgs., 30 bgs.; Tuticorin, 500 kgs.; Vejle, 150 kgs.; Wellington, 129 pkgs.; Yokohama, 2,154 pkgs.

SODIUM BICHROMATE—
Sydney, 16 cks.

SODIUM BISULPHITE—
Penang, 60 drms.

SODIUM CYANIDE—
Puerto Alegre, 8 cs.

SODIUM HYDROSULPHITE—
Cartagena (Col.), 6 kgs.
Rio de Janeiro, 20 kgs.

SODIUM PRUSSIATE—
Kobe, 5 t.

SODIUM SILICATE—
Adelaide, 172 pkgs.; Auckland, 32 pkgs.; Christiania, 64 pkgs.; Cienfuegos, 26 pkgs.; Dunedin, 217 pkgs.; East London, 15 pkgs.; Fremantle, 57 dblc. bgs.; Gothenburg, 16 cks.; Lisbon, 32 pkgs.; Mackay, 4 cs.; Madras, 6 drms.; Maranham, 25 brls.; Melbourne, 115 pkgs.; Mombasa, 3 pkgs.; Monte Video, 45 pkgs.; Pt. Said, 117 pkgs.; Seychelles, 16 cks.; Sydney, 12 cks.; Yokohama, 96 cks.; Zanzibar, 11 pkgs.

SODIUM SULPHIDE—
Gothenburg, 9 drms.; Sekondi, 62 drms.; Sydney, 50 drms.

SODIUM SULPHITE—
Penang, 30 drms.

STEARINE—
Bordeaux, 67 bgs.
La Guaira, 14 pkgs.
New York, 90 cks.
Rotterdam, 30 brls.

TALLOW—
Galatz, 6 brls.
Hamburg, 66 tres.
Shanghai, 14 cks.

LONDON.

OFFICIAL AMENDMENT.

From Return for week ending May 2, 1923, Deduct—

DISINFECTANTS (*otherwise undes.*
Buenos Ayres, 2 t. 4 c., £65.

Week ending July 18.

ACETANILID—
Hankow, 1 cs., £5.

ACETIC ACID—
Bombay, 4 cs., £12.
Melbourne, 12 cs., £37.
Perth (F.), 6 cs., £18.

ACETONE—
Sydney (F.), 6 drms., £46.

ACETYL SALICYLIC ACID—
Colombo, 31 cs. (pt.), £7.; Melbourne (F.), 2 cs., £31.; Montreal, 4 cs. (pt.), £44.; Sydney, 1 ck., £14.; Toronto, 5 cks., £75.

ALUM—
Sydney, 10 kgs., £9.

ALUMINIUM SULPHATE—
Madras (F.), 9 bgs., £17.

AMMONIA—
Belgium Congo (*via* Antwerp), 6 cs., £7.; Bermuda, 4 cs., £7.; Calcutta, 20 cs., £35.; Demerara, 4 cs., £7.; Irish Free State, 20 cs., £38.; Suez, 5 cylds., £35.

AMMONIA (ANHYDROUS)—
Lisbon, 17 cylds., £105.
Rangoon, 36 cylds., £346.

AMMONIUM CARBONATE—
Adelaide, 10 c., £22.; Antwerp, 2 t., £71.; Cape Town, 4 c., £10.; Dunedin, 10 c., £18.; Dunkirk, 1 t. 19 c., £69.; Hong Kong, 2 c., £16.; Melbourne, 9 c., £17.; Paris, 12 t. 6 c., £472.; Penang, 9 c., £25.; Pt. Elizabeth, 6 c., £18.; Singapore, 3 c., £9.; Wellington, 8 c., £20.

AMMONIUM IODIDE—
Adelaide, 1 cs. (pt.), £7.

AMMONIUM MERCURY CHLORIDE—
Melbourne, 2 cs. (pt.), £14

AMMONIUM MOLYBDATE—
Adelaide, 1 cs. (pt.), £10.

AMMONIUM NITRATE—
Antwerp, 5 t., £118.

AMMONIUM SULPHATE—
Beira, 5 t. 10 c., £89.

ANTIMONY SULPHIDE—
Buenos Ayres, 4 cks., £79.
Christiania, 1 ck., £29.
Gothenburg, 2 cks., £20.
New York, 25 cks., £249.

ARSENIC SULPHIDE—
New York, 5 cs., £46.

BARIUM SULPHATE—
Melbourne, 1 cs. (pt.), £9.

BISMUTH CARBONATE—
Melbourne, 1 cs. (pt.), £39.

BISMUTH SALICYLATE—
Melbourne, 1 cs. (pt.), £14.

BISMUTH SALTS (*otherwise undes.*)
Bombay, 2 cs., £117.
Colombo, 31 cs. (pt.), £20.

BISMUTH SUBNITRATE—
Adelaide, 1 cs. (pt.), £30.

BONE FERTILISER—
Antwerp (transit), 50 t., £400.

BORAX—
Cape Town, 2 c., £6.
Durban, 2 c., £5.
Irish Free State, 16 c., £118.
Madras, 3 c., £6.
Toronto, 2 c., £5.

BORAX GLASS—
Sekondi, 12 c., £45.

BORIC ACID—
Colombo, 13 c., £71.
Melbourne, 2 c., £8.
Toronto, 2 c., £6.

CADMIUM SULPHIDE—
Antwerp, 1 cs., £19.

CALCIUM CARBIDE—
Accra (F.), 6 c., £6.
Sekondi, 10 c., £8.
Sierra Leone (F.), 10 c., £6.

CALCIUM CHLORIDE—
Suez, 1 t. 11 c., £18.

CAUSTIC SODA—
Hong Kong, 4 c., £16.

CHEMICALS (*otherwise undescribed*)
Adelaide, 3 cs. (pt.), £9.; Aden, 10 pkgs., £19.; Alexandria, 2 cs. (pt.), £37.; Amoy, 2 cs., £7.; Bagdad, 1 cs., £9.; Bombay, 9 cs. (pt.), £51.; Calcutta, 10 pkgs. (pt.), £162.; Callao, 10 pkgs., £27.; Christiania, 7 pkgs., £6.; Colombo, 4 pkgs., £7.; Constantinople, 10 pkgs., £27.; East London, 4 pkgs., £8.; Gothenburg (F.), 5 pkgs., £26.; Hong Kong, 7 pkgs. (pt.), £52.; Irish Free State, 1 t. 14 c., £207.; Jamaica, 2 cs., £6.; Lourenco Marques, 21 cs., £76.; Melbourne, 4 cs. (pt.) (F.), £14.; Melbourne, 35 pkgs. (pt.), £210.; Montreal, 4 cs. (pt.), £93.; Mormugao, 6 pkgs., £6.; Perth, 4 pkgs., £11.; Port-au-Prince, 1 cs. (pt.), £6.; Pt. Elizabeth, 3 pkgs., £6.; Puerto Alegre, 10 pkgs., £14.; Pt. Sudan, 2 cs., £9.; Sekondi, 4 cs., £11.; Solomon Islands, 5 pkgs., £5.; Swatow, 4 pkgs., £9.; Sydney, 10 cs. (pt.), £142.; Toronto, 43 pkgs., £588.; Valencia, 5 pkgs., £14.; Wellington, 1 cs., £5.

CHROME ALUM—
Christiania (F.), 4 kgs., £7.

CHROMIUM OXIDE—
Melbourne, 2 cks., £37.

CITRIC ACID—
Bermuda, 1 c., £5.; Bombay, 1 c., £11.; Calcutta, 7 c., £80.; Colombo, 2 c., £21.; Gothenburg, 6 c., £50.; Shanghai, 5 c., £54.; Stockholm, 5 c., £42.; Sydney, 1 c., £10.; Tokio, 1 c., £10.; Toronto, 1 c., £10.; Townsville, 2 c., £22.; Vancouver, 8 c., £67.

COAL TAR PRODUCTS—
Carbolic Acid
Alexandria, 20 drms., £25.
Colombo, 31 cs. (pt.), £6.
Creosote
San Francisco, 15 drms., £250.
Creosote Oil
East London, 50 drms., £7.
N. York, 777,751 galls., £28,700.
Naphthalene
Irish Free State (F.), 5 cs., £6.
New York, 1,000 bgs., £1,125.
Pitch
Calcutta, 20 brls., £55.
Rangoon, 20 kgs., £12.
Pyridine
Durban, 3 drms., £28.
Helsingborg, 7 drms., £341.
Tar
Sekondi, 10 brls., £24.
Sierra Leone, 25 drms., £7.

COPPER SALTS (*otherwise undes.*)
Melbourne, 1 cs., £23.

COPPER SULPHATE—
Durban, 4 c., £7.

CREAM OF TARTAR—
Hong Kong (F.), 2 c., £13.; Jaffa, 1 c., £7.; Lyttleton, 11 t. 8 c., £1,023.; Montreal (transit) (F.), 7 t. 10 c., £792.; Newcastle, 10 c., £53.; Pt. Elizabeth (F.), 11 c., £23.

CYANIDE OF LIME—
Rotterdam, 22 drms., £59.

DISINFECTANTS (*otherwise undes.*)
Accra, 9 c., £54.; Auckland, 4 c., £16.; Beira, 2 c., £11.; Bombay, 11 t. 3 c., £520.; Calcutta, 3 c., £27.; Colombo, 5 c., £21.; Irish Free State, 15 c., £51.; Kilindini, 5 t. 19 c., £214.; La Libertad, 18 c., £33.; La Union, 1 t. 10 c., £49.; Madeira, 4 c., £10.; Pt. Harcourt, 3 c., £11.; Pt. Sudan, 1 c., £5.; Walvis Bay, 1 c., £8.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 30 kgs., £172.
Unspecified
Adelaide, 1 cs., £14.; Aden, 1 cs., £8.; Auckland, 1 cs. (pt.), £24.; Barbados, 3 cs. (pt.), £13.; Calcutta, 9 cs., £43.; Dunedin, 1 cs. (pt.), £16.; Durban, 1 cs., £11.; Irish Free State (F.), 1 bx., £6.; Levuka, 5 cs., £61.; New York, 1 cs. (pt.), £8.; Penang, 1 cs., £18.; Perth, 1 ck., £9.; Pt. Elizabeth, 1 cs., £13.; Sydney, 1 cs. (pt.), £7.; Tokio, 1 cs., £75.

ETHER—
New York, 1 cs., £5.
Pt. Harcourt, 3 cs., £15.
Alexandria, 1 cs., £16.

FERTILISERS (*otherwise undes.*)—
Irish Free State (F.), 2 pkgs., £5.

FORMALDEHYDE—
Colombo (F.), 3 cs., £13.

GLYCERINE—
Amsterdam, 4 t. 14 c., £196.; Cape Town, 3 t. 2 c., £218.; Colombo, 1 c., £7.; Madras, 1 t. 19 c., £130.

GLYCEROPHOSPHORIC ACID—
Melbourne (F.), 1 cs. (pt.), £5.

HEXAMINE—
Melbourne (F.), 1 cs. (pt.), £5.

HYDROCHLORIC ACID—
Colombo, 5 c., £16.
Irish Free State, 2 c., £7.

HYDROCYANIC ACID—
Melbourne, 1 cs., £6.

HYDROGEN PEROXIDE—
Jaffa, 2 cs. (pt.), £5.

HYPOPHOSPHITES (*otherwise undescribed*)—
Boston, 68 cs., £1,023.

IODINE—
Adelaide, 1 cs., £53.
Perth, 1 cs. (pt.), £26.

IODINE (RESUBLIMED)—
Calcutta, 1 cs. (pt.), £27.

IRON AMMONIUM CITRATE—
Wellington, 1 cs., £11.

IRON CARBONATE—
Sydney, 1 ck., £12.

IRON SULPHATE—
Calcutta, 2 cs., £15.

LEAD ARSENATE—
Melbourne, 54 drms., £199.

LITHIUM CARBONATE—
Bombay, 1 cs. (pt.), £6.

LEAD CHROMATE—
Bordeaux, 5 cks., £35.

LEAD NITRATE—
Calcutta, 2 cks., £30.

MAGNESIA (CALCINED)—
Lisbon, 2 cs., £28.

MAGNESIUM CARBONATE—
Adelaide, 1 cs., £8.; Bombay, 6 cs., £26.; Melbourne, 45 cs., 11 pkgs., £112.; Mormugao, 3 cs., £7.; Sydney, 2 cs., £5.

MAGNESIUM SULPHATE—
Accra, 2 c., £6.; Bombay, 1 t., £28.; Cape Town, 13 c., £18.; Christchurch, 8 c., £11.; Jamaica, 14 c., £52.; Mormugao, 16 c., £21.; Toronto, 8 c., £19.

MANGANESE DIOXIDE—
Bangalore, 1 ck., £8.
Durban, 1 ck., £8.
Sydney, 72 pkgs. (pt.), £154.

MANGANESE HYDROXIDE—
Genoa, 2 cks., £15.

MERCURY IODIDE—
Melbourne, 1 cs. (pt.), £10.

NICKEL OXIDE—
Brussels, 1 cs. (pt.), £6.

NICKEL SALTS (*otherwise undes.*)—
Adelaide, 4 cs., £9.
Melbourne, 5 cs., £11.

NITRIC ACID—
Irish Free State, 5 c., £24.

PHOSPHORIC ACID—
Adelaide, 8 cs., £20.
Calcutta, 2 cs., £6.

PHOSPHORUS—
Melbourne, 1 cs., £9.

PICRIC ACID—
Sydney, 1 cs., £5.

PLATING SALTS (*otherwise undes.*)
Brussels, 2 cs., £35.

PLATINUM CHLORIDE—
Durban, 2 cs. (pt.), £10.

POTASH—
Melbourne, 2 c., £5.

POTASH (PEARL ASH)—
Melbourne (F.), 10 c., £15.

POTASSIUM BICARBONATE—
Callao, 1 ck., £6.

POTASSIUM BROMIDE—
Adelaide, 2 cs., £7.
Melbourne, 1 cs. (pt.), 10 cs., £43.

POTASSIUM CARBONATE—
Christiania (F.), 94 cks., £975.

POTASSIUM CHLORATE—
Irish Free State (F.), 1 kg., £6.

POTASSIUM CITRATE—
Adelaide, 1 ck., £12.
Melbourne, 1 cs. (pt.), 2 cs., £41.

POTASSIUM FERRICYANIDE—
East London, 1 cs. (pt.), £11.

POTASSIUM HYPOPHOSPHITE—
Sydney, 1 cs. (pt.), £7.

POTASSIUM IODIDE—
Accra, 2 cs., £38.
Bangkok, 1 cs., £92.
Calcutta, 1 cs. (pt.), £44.
Colombo, 31 cs. (pt.), £19.
Lome, 4 cs., £76.
Melbourne, 1 cs. (pt.), 1 cs., £135.

POTASSIUM PERMANGANATE—
Calcutta, 1 drm., £5.
Hobart (F.), 10 drms., £48.

POTASSIUM PHOSPHATE—
Sydney, 1 cs., £7.

POTASSIUM PRUSSIATE—
Melbourne, 2 cs., £15.

POTASSIUM SALTS (*otherwise undescribed*)—
Colombo, 31 cs. (pt.), £8.

PRUSSIAN BLUE—
Genoa, 8 cks., £344.

SALAMMONIAC—
Melbourne, 1 cs., £14.

SALICYLIC ACID—
Calcutta, 1 cs. (pt.), £6.; Melbourne, 1 cs., £13.; Shanghai, 1 cs., £7.; Singapore, 1 kg., £13.

SALTPETRE—
Adelaide, 2 t. 1 c., £87.; Durban, 1 t., £43.; Irish Free State, 3 t. 15 c., £156.; Lagos, 3 c., £10.; Melbourne, 10 t. 2 c., £416.; Perth, 1 t. 1 c., £43.

SILVER NITRATE—
East London, 1 cs. (pt.), £6.
New York, 1 cs. (pt.), £8.

SODA CRYSTALS—
Reval, 1 cs., £6.

SODIUM ARSENITE—
Delagoa Bay, 1 t., £72.

SODIUM BENZOATE—
Cape Town, 4 c., £45.

SODIUM BICARBONATE—
Fremantle, 6 c. £8.; Pt. Elizabeth 10 c., £15.; Toronto, 2 t., £100.

SODIUM CITRATE—
Melbourne, 1 cs., £5.

SODIUM GLYCEROPHOSPHATE—
Melbourne, 1 cs. (pt.), £6.

SODIUM HYPOPHOSPHITE—
Hong Kong, 1 t. 10 c., £30.
Melbourne, 1 cs., £15.

SODIUM IODIDE—
Melbourne, 1 cs. (pt.), £13.
Perth, 1 cs. (pt.), £6.

SODIUM PRUSSIATE—
Irish Free State, 5 t., £420.

SODIUM SALICYLATE—
Colombo, 31 cs. (pt.), £15.
Hankow (F.), 1 cs. (pt.), £8.
Melbourne, 1 cs., £14.

SODIUM SULPHATE—
Accra, 2 c., £7.
Barbados, 2 t. 15 c., £17.
Irish Free State, 2 t., £18.

SODIUM SULPHITE—
Durban, 1 t., £21.

SODIUM TARTRATE—
Adelaide, 10 c., £40.

SPENT OXIDE—
Hamburg, 1,208 t. 5 c., £2,033.

SULPHITE OF LIME—
Brussels, 2 kgs., £7.

SULPHUR—
Bagdad, 1 cs., £8.
Malacca (F.), 10 cs., £8.

SULPHUR (PRECIPITATE)—
Melbourne, 2 c., £8.

SULPHURIC ACID—
Accra, 3 c., £9.; Iddo, 1 t. 3 c., £44.; Irish Free State, 4 c., £14.; Memel, 2 t., £150.; Sekondi, 2 t. 9 c., £48.

TARTARIC ACID—
Calcutta, 4 c., £41.; Cristobal, 2 c., £12.; Colombo, 1 c., £8.; Gothenburg, 14 c., £90.; Hamburg, 1 t., £131.; Irish Free State (F.), 5 c., £35.; Irish Free State, 2 c., £14.; Lyttleton, 7 c., £47.; Mandalay, 1 c., £8.; New York, 2 t. 10 c., £327.; Penang, 1 c., £8.; Perth, 3 c., £28.; Shanghai, 5 c., £42.; Stockholm, 2 c., £13.; Townsville, 2 c., £16.; Viborg, 6 c., £41.

TANNIC ACID—
Shanghai, 2 brls., £9.

TIN OXIDE—
Brussels, 3 cs., 8 cks., £354.

ZINC OXIDE—
Amsterdam, 32 bgs., £95.; Malmo, 50 cks., £193.; Paris, 1 cs., £6.; Wellington, 11 bgs., £25.

Week ending July 21.

BEESWAX—
Stockholm, 1 c.

DEXTRINE—
Valparaiso, 6 c.

FERRO TUNGSTEN—
Rouen, 10 t. 10 c.
Stockholm, 5 t.

FULLER'S EARTH—
Rotterdam, 100 t.
Toronto, 20 t.

GELATINE—
Durban, 11 c.
Melbourne, 1 c.
Rangoon, 2 c.
Sydney, 6 c.
Toronto, 1 t. 6 c.

GLUE—
Antwerp, 2 t. 5 c.; Bombay, 2 t.; Cape Town, 10 c.; Dunedin, 1 c.; Demerara, 4 c.; Durban, 1 t. 6 c.; East London, 12 c.; Irish Free State, 5 t.; Jamaica, 2 c.; Karachi, 1 t. 2 c.; Montreal, 5 t. 10 c.; Paris, 6 t. 18 c.; Penang, 1 c.; Perth, 5 c.; Riga, 6 t. 5 c.; Rio de Janeiro, 2 t. 1 c.; Salonica, 1 t.; Shanghai, 4 c.; Sydney, 2 t. 10 c.; Tetuan, 2 c.; Tientsin, 13 t.; Trinidad, 2 c.; Vancouver, 1 t.; Wellington, 3 c.

PLUMBAGO—
Santander, 19 c.
Singapore, 3 t.

QUININE—
Calcutta, 2,036 oz.; Irish Free State, 14 oz.; Loanda, 1,204 oz.; Lobito, 447 oz.; Melbourne, 1,300 oz.; Rio de Janeiro, 960 oz.; Sekondi, 816 oz.; Toronto, 5,120 oz.

SALT—
Durban, 13 c.; East London, 1 t. 5 c.; Karachi, 6 c.; Fiji Islands, 30 t.; Gibraltar, 5 c.; Hong Kong, 2 c.; Karachi, 3 t. 14 c.; Quelimane, 1 c.; Rangoon, 11 c.

SIZE—
Brisbane, 2 t. 4 c.; Cape Town, 1 c.; Paris, 17 c.; Rotterdam, 13 t. 6 c.; Pt. Elizabeth, 2 c.; Wellington, 2 c.

SOAP—
Accra, 6 t. 10 c.; Amsterdam, 1 t. 14 c.; Antwerp, 12 c.; Bangkok, 2 c.; Bombay, 6 c.; Boulogne, 5 c.; Brussels, 4 c.; Calcutta, 6 c.; Cape Town, 8 c.; Christchurch, 4 c.; Cuba, 10 c.; Cyprus, 11 c.; Dunedin, 4 c.; Delagoa Bay, 1 c.; Durban, 9 c.; Gibraltar, 1 c.; Gisborne, 6 c.; Grenada, 5 c.; Hankow, 1 c.; Helsingborg, 1 c.; Hong Kong, 11 c.; Iddo, 8 c.; Irish Free State, 2 t. 15 c.; Jamaica, 10 t. 1 c.; Karachi, 2 c.; Kilia, 9 c.; Labrador, 4 c.; Lagos, 10 c.; Leghorn, 2 c.; Madras, 1 c.; Melbourne, 13 c.; Monrovia, 1 c.; New York, 1 t. 14 c.; Padang, 1 t. 3 c.; Palembang, 2 t. 6 c.; Paramaribo, 6 c.; Perth, 1 c.; Pt. Sudan, 1 c.; Pt. Swettenham, 1 c.; Punta Arenas, 1 t. 2 c.; Rangoon, 10 c.; Rio de Janeiro, 2 c.; Rotterdam, 5 c.; Saltpond, 2 t.; Samarang, 2 t. 17 c.; San Pedro, 3 c.; Sapele, 3 t.; Sekondi, 2 t. 5 c.; Shanghai, 7 c.; Sourabaya, 4 t. 12 c.; Stockholm, 1 c.; Sydney, a qty.; Tientsin, 3 c.; Toronto, 1 t. 15 c.; Trinidad, 7 c.; Turks Isl., 1 t.; Wellington, 12 c.; Winnebah, 2 t.

SUPERPHOSPHATE—
Grenada, 6 t.

TALLOW—
Danzig, 85 t. 16 c.; Demerara, 3 t. 3 c.; Hamburg, 27 t. 2 c.; Harlingen, 10 t. 5 c.; Oporto, 9 t. 18 c.; Wiborg, 22 t. 8 c.

TAR (STOCKHOLM)—
Dunedin, 1 t. 10 c.
Gibraltar, 1 t. 7 c.

WAX (*otherwise undescribed*)—
Durban, 5 c.
Havre, 16 c.
Irish Free State, 1 t. 1 c.

WHITE LEAD—
Auckland, £295.; Bombay, £13.; Durban, £14.; East London, £51.; Gisborne, £49.; Havre, £10.; Karachi, £600.; Irish Free State, £158.; Jamaica, £15.; Melbourne, £139.; Newcastle, £142.; Panama, £40.; Rangoon, £130.; Rio de Janeiro, £113.; Vancouver, £154.; Walvis Bay, £12.

MANCHESTER.

Week ending July 21.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Australia, 61 kgs., 28 drms., 6 cs., 1 ck.; Bombay, 26 cks.; India, 1 ck.; Melbourne, 16 kgs., 3 drms.; Sydney, 7 kgs., 2 cs.

GLUE—
Alexandria, 20 bgs.; Alexandretta, 20 bgs.; Cairo, 1 brl.; Canada, 400 bgs.; Famagusta, 5 bgs.

LEAD ACETATE—
Adelaide, 4 cks.

LEAD NITRATE—
Adelaide, 4 cks.

MAGNESIUM SULPHATE—
Alexandria, 50 cs.

SALT—
Montreal, 2,400 sks.

SOAP—
Samari, 2 cs.; Tunis, 13 cs.

SODIUM BICHROMATE—
St. John, 250 kgs.

SODIUM BISULPHITE—
St. John, 6 hhds.

NEWCASTLE-ON-TYNE

Week ending July 21.

ANTIMONY OXIDE—
Antwerp, 153 cks. and kgs.

BARIUM SULPHATE (BLANC FIXE)—
Antwerp, 2 cs.

BLEACHING POWDER—
Christiania, 20 cks.
Rotterdam, 41 cks.

CAUSTIC SODA—
Bergen, 10 drms.; Copenhagen, 79 drms.; Gothenburg, 17 drms.; Rotterdam, 59 drms.

COAL TAR PRODUCTS—
Tar
Bergen, 2 kgs.

COPPER SULPHOCYANIDE—
Copenhagen, 2 cks.

FERRO PHOSPHORUS—
Christiania, 2 cks.

GLUE—
Bergen, 1 cs.
Copenhagen, 20 bgs.

LITHARGE—
Christiania, 23 cks.; Copenhagen, 4 cks.; Gothenburg, 1 ck.

MAGNESIA—
Antwerp, 220 bgs.
New York, 60 cs.

MAGNESIUM CARBONATE—
Antwerp, 3 cks.

RED LEAD—
Antwerp, 15 cks., 350 kgs.; Christiania, 46 cks.; Copenhagen, 14 cks.; Rotterdam, 50 cks.

SALT—
Bergen, 27 cs.

SIZE—
Christiania, 2 cks.

SODIUM SULPHATE—
Antwerp, qnty.

SUPERPHOSPHATE—
Pernau, 7,260 bgs.

WHITE LEAD—
Copenhagen, 24 cks.

ZINC OXIDE—
Rotterdam, 2 cks.

N. & S. SHIELDS.

Week ending July 21.

NIL.

PRICES CURRENT.

WEDNESDAY, JULY 25, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & Co., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	24/- & 48/-		
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	50	0	0
Citric	lb.	0	1	8¼
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6¼
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	2	3
Tarteric (crystals)	lb.	0	1	3
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9½
Aniline Salt	*lb.	0	0	10
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	7
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	3
Creosote	*gallon	0	0	9
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	7	2	6
Pyridin	gallon	0	18	0
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	2	0
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	121	0	0
Alum, loose lump (delivered)	*ton	12	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	71	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	15	0	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	10½
Bleaching Powder, 35%	*†ton	11	7	6
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	10	0
Carbon Bisulphide	*ton	28	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	26	0	0
Formaldehyde, 40%	ton	97	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	40	0	0
Lead Acetate (brown)	ton	42	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	20	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	37	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	50	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	18	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	32	0	0
Potassium Permanganate (commercial)	lb.	0	0	9¾
Potassium Prussiate (yellow)	lb.	0	1	2½
Potassium Prussiate (red)	lb.	0	3	9
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	60/- & 57/-		
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d. to 9d.		
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	21	10	0
Sodium Hydrate (70% C. Soda)	†ton	20	0	0
Sodium Hydrate (60% C. Soda)	†ton	19	0	0
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	10	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	26	0	0
Sodium Hyposulphite (commercial)	†ton	10	0	0
Sodium Hyposulphite (photographic)	ton	14	0	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	7	6
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	6¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	15	0	0
Sodium Sulphide Crystals (casks)	†ton	8	10	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	5	0
Sulphur (Roll Brimstone)	ton	8	5	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	65	17	6
Lead (Chemical Sheet), delivered	cwt.	1	13	0
Lead (Foreign Pig)	ton	24	12	6
Nickel	ton	130	0	0
Silver	oz.	0	2	6 15/16
Tin, English Ingots	ton	188	10	0
Zinc (Spelter)	ton	50	15	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	44	10	0
Linseed, Raw	*ton	45	15	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	40	0	0
Turpentine	cwt	3	18	9

* *Packages extra or returnable*; otherwise prices usually include packages.

† Makers' prices for home consumption only.

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
The Valueless German Patent.	123
Chemical-waste Dump Dangers	123
Service Contracts in Restraint of Trade	124
Copper Price Prospects	124
Glass in Factory Construction.	124
The Ethyl-alcohol Industry	125
Society of Glass Technology	127
The Estimation of Glycerine	127
The Factory Inspector's Report	129
Safeguarding of Industries Act	131
Indian Market for British Heavy Chemicals	132
British Association of Chemists	133
The Month in Engineering	134
Parliamentary News	136
Items of Interest	137
Correspondence	138
Fertiliser News	139
Reports of Companies	140
Trade Inquiries	140
New Companies	140
Gazette News	141
South Wales Notes	141
Cumberland Coking and By-product Industries	141
Thirty-five Years Ago	141
Publications Received	141
The Patent List:—	
Applications for British Letters Patent	142
Complete Specifications Accepted	142
Complete Specifications Open to Public Inspection before Acceptance	142
Abstracts of Latest Complete Specifications	142
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	144
Market Reports	
London "Open Market" Report	144
Swansea Market Report	146
London Metal Market	146
Manchester Chemical Market	146
Liverpool Chemical Market	146
West of Scotland Chemicals	147
Imports of Chemical Products	147
Exports of Chemical Products	149
Prices Current	152

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CURRENT TOPICS.

THE VALUELESS GERMAN PATENT.

THE proceedings which the American Government are taking against the Chemical Foundation for the return of the patents purchased by the latter corporation from the Alien Property Custodian during the war are stretching out to an interminable length, and the end is not yet in sight. The latest plea put forward by the defence, however, is one that will be fully appreciated by those in this country who have had experience with German patents. American manufacturers who obtained licences from the Foundation to work the patents soon found that from an economic standpoint the documents were worth little more than the paper upon which they were printed, and that large sums had to be expended in detailed research before any of the processes could be placed upon a practicable basis. Dealing with the Haber nitrogen fixation patents, for example, Dr. Charles L. Parsons declared that in the 58 patents involved, and upon which the American Government place a value of 17 million dollars, the amount of really valuable information is practically nil. Similar evidence was given by manufacturers of dyestuffs and drugs under German patents. Thus vital steps were found to be omitted from the descriptions of the processes, and in those few cases where the methods could be followed the yields were low to the point of absurdity. This all confirms the view that to the German the patent was merely a legalised form of obstructing his competitors. Foreign patent laws had given him the opportunity of gaining a pronounced advantage over his rivals at a very small cost, and he was not slow to take advantage of the opportunity. It is the bounden duty of our chemists and lawyers to ensure that such an opportunity never again presents itself.

CHEMICAL-WASTE DUMP DANGERS.

THE death from sulphuretted-hydrogen poisoning, some weeks ago, of three men working in a pumping shaft and sump at a chemical waste heap near Bury, Lancashire, has focussed attention upon the potential sources of danger such heaps, which are scattered widely in various parts of the country, constitute. Our contemporary, *The Engineer*, which discusses the subject rather fully, expresses the view that the responsibility for taking precautionary measures when working near recent or old waste heaps should rest upon someone with

chemical qualifications, and that the engineer or contractor should be relieved of the responsibility. The fundamental soundness of this contention will be accepted by all chemists. The comparative freedom from serious mishaps that has hitherto characterised operations conducted in the neighbourhood of dumps is no argument for a policy of *laissez faire*. The close chemical supervision of all recent waste heaps will be comparatively simple to carry out, as such heaps are either on or adjoining the property of a chemical works. The position as regards old waste heaps which have been levelled, or have been covered over with layers of innocuous material, the existence of which may have been quite forgotten, is, however, not so simple. The only safe procedure would appear to be the compulsory registration of the site and extent of all chemical waste dumps with the district surveyor, who, in the event of the land being used at some subsequent period for building or other operations, would point out the danger, and make certain that adequate precautionary measures would be taken.

SERVICE CONTRACTS IN RESTRAINT OF TRADE.

The law relating to contracts made in restraint of trade, particularly as regards contracts of service, is of considerable interest to both employers of chemists and chemists themselves. Two weeks ago we printed part of an address given by Mr. E. J. MacGillivray, barrister-at-law, before the Institute of Chemistry, in which the opinion was expressed that the great majority of contracts now existing, containing a clause relating to restraint of trade, would, if challenged, be deemed unenforceable by the Court of Appeal or the House of Lords, even if the Court of first instance upheld the legality of the contract. A recent decision of the Court of Appeal (*H. J. Willett, Ltd., v. Beasley*) has proved the views held by Mr. MacGillivray to be correct. The particular case related to a contract between a firm of motor-car agents and their salesman, which contained a clause under which the latter had agreed that he would not, under penalties during five years after leaving the firm's service, be in any way engaged, or interested, in any branch of the motor business within a radius of fifty miles from the firm's headquarters. The appeal judges, in reversing the decision of Mr. Justice Roche in favour of the firm, who sought an injunction compelling the salesman to abide by the conditions of this clause, confirmed a recent judgment of Younger, L.J., in which he had held that the onus was upon the employer to show that the restriction imposed upon the employee went no further than was necessary for the protection of the employer's business. In the present case the Court held the restriction to be far too wide. The whole agreement was thus rendered invalid, and the injunction was refused Judgment was entered for the salesman. The important point is that within certain limits the law does permit restraints. In many cases it would be highly inimical to the interests of the chemical employer were he not able to impose reasonable restraints. So long as an employer does not impose upon his employee a restraint against fair competition and a restraint that is no wider than is reasonably necessary, there can be no legal objection. The greatest care and forethought are necessary, however, if the above two conditions are to be fulfilled.

COPPER PRICE PROSPECTS.

The publication by the United States Geological Survey Department of the corrected figures for the American copper production during 1922 has attracted considerable attention, and has led to the suggestion in several quarters that a rise in the selling price of the metal may be expected during the closing months of the present year. Practically the whole of the war-time stocks of old copper and brass scrap have now been disposed of, and supplies both for American domestic use and export must come out of current production. Stocks of refined copper at the end of 1922 were over 50 per cent. lower than twelve months previously. It is claimed by the American producers that statistically copper is better now than at any time since the armistice. Although the trade boom in the United States has passed its zenith, and the smelter copper production during 1922 exceeded that of 1921 by 200,000 tons, the fact that the price keeps up so well in America indicates that actual requirements are still being met with difficulty. Those who predict a higher price for the metal in the near future, however, base their prophecy largely on an early restoration of normal conditions in Europe, and the re-entry of Germany as a buyer, a view which the present political situation can scarcely be held to warrant. Still, the arguments that when a clearing up of the European political and industrial atmosphere does materialise, the price movement of copper will have an upward tendency, do not seem entirely devoid of validity.

GLASS IN FACTORY CONSTRUCTION.

It is generally believed that the extensive use of glass in the roofs and sides of factory buildings, whilst obviously of great value in giving a well-illuminated and cheerful interior, has in bright and hot weather the disadvantage of making working conditions inside the building extremely oppressive. Whilst this may be true for a factory in which the ventilation arrangements are not highly efficient, some interesting results that have just been made public demonstrate that when efficient natural ventilation is provided the disadvantage does not exist. The results in question were obtained in tests recently undertaken at the new engineering works of Messrs. The International Combustion Engineering Company, Limited, a works which has probably a greater glass area in the roof and sides per unit of effective floor area than any other factory building in the world. The tests have proved that during the recent heat wave the average temperature inside the shops when working at normal speed was actually lower by several degrees than that in the shade outside. There is nothing remarkable in the nature of the glass, but particular care was taken that means were provided for an effective and purely natural circulation of air.

THE ETHYL-ALCOHOL INDUSTRY.

A GENERAL SURVEY.

By "Omega."

ETHYL alcohol, in combination with various organic acids, occurs in a number of vegetable plants, and has been known since about the ninth century. Of the various alcohols a few have found industrial uses, but ethyl alcohol alone is of outstanding importance, has found the widest applications, is essentially a cheap commodity and should be treated as such. The Governments of the more prominent nations of the world have, during recent years, realised the vital necessity of the production and distribution of duty-reduced or duty-free alcohol when used for industrial purposes. Alcohol, besides being used for heating and power purposes, enters into the manufacture of nearly 200 industrial commodities. The statistics given below show the vast importance of alcohol in the explosives industry alone. The alcohol consumed in the manufacture of propellants during 1918 being:—

United States of America	52,500,000 gallons
France	33,600,000 ,,
England	16,000,000 ,,

The industrial use of ethyl alcohol has suffered no mean extent by the restrictions in its use and the safeguarding of the interests of the revenue authorities. Less serviceable substitutes have been used where pure alcohol would have given more efficient results.

Raw Materials for Alcohol Production.

The choice of raw material for use in the manufacture of alcohol is influenced more by economic than by chemical considerations. The range of materials which can be used is almost inexhaustible, an important fact in regard to its use as a motor fuel. The raw materials for alcohol manufacture fall into three main classes:—(1) Starch-containing materials—*e.g.*, potatoes, cereals; (2) Vegetation containing sugars—*e.g.*, sugar cane, beet, mangolds, fruits, and molasses; (3) Cellulose materials and residues. The table given below indicates how local conditions affect the choice of raw materials used. The figures are for the normal pre-war year 1913.

Material used.	Alcohol Produced (Gallons). Germany.	France.
Potatoes	66,000,000	—
Yeast	8,000,000	—
Grain	13,000,000	23,000,000
Molasses	3,000,000	12,000,000
Beet	—	42,000,000
Fruit	900,000	—

In England the principal raw material used in spirit manufacture is grain, maize constituting about 80 per cent. of the total used, other material used to a lesser extent being malt, oats, barley, rye, rice, and molasses. The chief source in America at the present time is cane or black strap molasses from the sugar refineries of Cuba, Porto Rico, and the South-Eastern States.

From a chemical standpoint almost any starch-containing material may be utilised as basis, but commercial and economic conditions operate to limit the availability of raw materials. During the war period, the Central European countries found potatoes easier to cultivate than cereals, and potatoes were used extensively as an alcohol source, beet-sugar molasses being used as a fertiliser. At the end of the war the number of potato distilleries in operation in Germany alone was 6,000 (*Zeit. Angew. Chem.*, Mar. 9, 1920). The table given below records the amount of alcohol obtainable from the various raw material:—

Material.	Fermentable Carbohydrates Per Cent.	Average Yield Per Acre. Tons.	Yield of Alcohol Per Acre. Gallons.
Wheat	66	0.5	42
Maize	68	0.7	61
Potatoes	18	7.0	139
Sugar Beet	16	15.0	298
Sorghum	15	16.0	190

Synthetically Produced Alcohol.

Synthetically, alcohol can be produced from its elements by electrolytic methods. The pioneer of synthetic alcohol was Hennell, who found in 1828 that by dilution and distillation of a concentrated solution of ethylene in sulphuric acid, alcohol was obtained according to the equations:—

$$C_2H_4 + H_2SO_4 = C_2H_5HSO_4.$$
$$C_2H_5HSO_4 + H_2O = C_2H_5OH + H_2SO_4.$$

The majority of the synthetic alcohol processes developed in war time used as a basis acetylene, which was in turn produced from synthetic calcium carbide. Processes in which the reduction of acetylene to ethylene has been effected have not attained any commercial success, it having been found to be more efficient to hydrate directly the acetylene into acetaldehyde using a mercury salt as a catalytic agent and then to reduce the acetaldehyde to alcohol by the Sabatier and Senderen reaction in which a mixture of the aldehyde vapour and hydrogen is passed over heated nickel at 140° C. Most of the earlier patents on the production of synthetic alcohol were based upon the initial reduction of acetylene to ethylene. Later Freeman (*Brit. Pat.* 28928, 1913), prepared pure ethylene by passing hydrogen under pressure—with the exclusion of air—between the carbon poles of an electric arc. The ethylene was absorbed in sulphuric acid and then converted into alcohol.

Under war conditions alcohol was produced synthetically to a large extent in Germany, but under the present economic conditions, reversion has been made to the fermentation methods. According to the Annual Report of the German Government Department on Alcohol for 1918, a firm at Lonza, Switzerland, offered to supply the Swiss Federal Government with rectified spirit at 1s. per gallon, but the Report considers it doubtful whether synthetic alcohol produced from calcium carbide will ever compete from an economic standpoint with that produced by means of fermentation processes. The opinion is expressed that the quantity of alcohol produced would be quadrupled by converting the carbide into cyanamide, and using the latter as a fertiliser for the potatoes to be used in the fermentation process.

Prospects for Synthetic Alcohol.

Detailed information concerning the production of synthetic alcohol in Germany is given in the schedules to the Spirit Monopoly Bill introduced into the Reichstag in August, 1921. The Expert Committee set up to investigate synthetic alcohol production, viewed with favour, synthesis from calcium carbide, a process which was then in operation at the Badische Anilin-und Sodafabrik Factories. According to *Chimie et Industrie*, November, 1921, during 1921, the estimated production of reparation dyestuffs alcohol was 90,000 gallons at the Ludwigshafen factory alone. The Bavarian works at Burghausen were anticipated to produce 220,000 gallons per annum. The total production of the ten alcohol factories in Germany producing spirit from sulphite liquor was: 730,000 gallons in 1920 and 1,200,000 gallons in 1921.

For the production of the basic material, the calcium carbide, England is not so well situated as countries which possess adequate water power. Prior to the war, calcium carbide was manufactured in Norwegian factories at £8. 5s. per ton, and that in a country with very limited lime and coal deposits. In studying the prospects of the production and utilisation of synthetic alcohol, the basic fact of fundamental importance is that the source of carbon in synthetic alcohol is coal, supplies of which are not inexhaustible, and will certainly become more difficult to obtain in course of time. The quantity of coal used in synthetic alcohol manufacture is necessarily high, owing, not only to that used in the carbide charge itself, but also in the production of the electrical energy utilised in the carbide manufacturing process. Some authorities claim that electrical energy may be obtained as cheaply near coal sources as near water-power stations. From a study of post-war problems, however, the synthetic alcohol question may reduce itself finally, not so much to the economic production of alcohol as to a conservation of coal supplies from a national asset standpoint. Recently, the production of economical electrical power in this country has engaged the attention of a committee of electrical engineers, who have suggested various schemes, the most important perhaps being the harnessing of the tides in the Severn, for establishing and controlling electrical distribution stations throughout the country. The materialisation of these schemes will have an important bearing on a large number of industries in this country, in effecting economies in coal consumption for power purposes, and diverting the supplies towards the production of synthetic products, of which alcohol is of paramount importance for chemical industries.

Pure and highly concentrated alcohol was first prepared in 1800 by Lowitz, who dehydrated the crude distilled product with potassium carbonate, and then distilled the alcohol in the presence of a further quantity of anhydrous potassium

carbonate. Drinkwater and Richter (*Crells Annallen* II. p. 221), used a mixture of hot calcium chloride and quicklime, and distilled at a low temperature. Squibb later applied distillation at a reduced pressure and obtained a highly pure product of specific gravity 0.7935 at 15.5° C. The modern method is to dehydrate by means of metallic calcium.

Commercial Production from Vegetable Products.

The commercial production of alcohol consists in the fermentation of cereals, potatoes or sugars. The first operation is either to hydrolyse certain plants or fruits, or allow carbohydrates to be acted upon by bacteria or moulds, thereby forming a wort, which is essentially the product of a diastatic fermentation process, maltose and dextrine being produced. The extract or wort is then subjected to alcohol fermentation induced by means of yeast. The weak alcoholic liquor is then submitted to fractional distillation, by means of which the alcohol is concentrated and isolated. The temperature of the wort fermentation needs considerable attention and skill, as otherwise excessive quantities of degradation products are formed. One of the features of alcohol manufacture is the quality and " age " of the yeast used. An impure yeast may introduce into the wort other ferments, with the production of acetic acid and acetaldehyde and consequent loss of alcohol. Wort fermentation difficulties are of more frequent occurrence during the summer months, possibly owing to the partial decomposition of the yeast during storage at a somewhat higher temperature. One of the operations in spirit manufacture requiring most skill is that of rectifying and distilling the weak alcoholic liquors. The type of still in general use in this country is Coffey's Distillation Apparatus, which combines the two processes of rectification and distillation, producing a comparatively pure product. The spirit obtained from this apparatus contains 94 to 96 per cent. by volume of alcohol.

Within recent years several attempts have been made towards the direct production of alcohol from cellulose. The latter material being converted into sugars by means of acid hydrolysis in autoclaves, and subsequently neutralised, fermented with yeast and distilled. During some experiments conducted in America using pine-wood saw-dust, the yield obtained was 175lb. of 95 per cent. alcohol per ton of wood used. In Norway, Sweden, and Switzerland, where cheap water power is available, alcohol is produced from the waste sulphite liquors obtained in the manufacture of wood and paper pulp. The alcohol content of these liquors is about 2 per cent., and is recovered by eliminating the sulphur dioxide, neutralising, fermenting, and distilling off the spirit.

Mariller and Ruymbeke (*Compt. Rend.* 175, p. 588 to 592), 1922, propose a method for the production of absolute alcohol at a low cost by the use of glycerine as a dehydrating agent.* It is claimed that a 99.9 per cent. alcohol, is obtained by allowing to run down the rectifying column a counter current flow of glycerine containing 30 per cent. potassium carbonate solution. The glycerine is recovered by heating under reduced pressure so as to eliminate the alcohol and water.

Denaturants and Excise Regulations.

Alcohol is met with under various names, generally indicative of an approximate concentration. Rectified spirit (*British Pharmacopœia*), requires a specific gravity of 0.8337 at 15/15° C., which is equivalent to 85.7 per cent. alcohol by weight. The U.S.A. Pharmacopœia requires a specific gravity of 0.820 which is equivalent to 91 per cent. Absolute alcohol as marketed contains up to 1 per cent. of water. Methylated spirit is duty-free alcohol, used in various manufacturing operations, and which has been denatured by means of certain solvents so as to render it unsuitable for potable purposes. The principal denaturants used are: wood naphtha, petroleum, and bone oil.

In England the Excise Authorities have authorised two varieties of methylated spirit:—(1) Industrial methylated spirit; its sale being restricted to particular manufacturing processes. This spirit contains a minimum of 5 per cent. denaturant, the type of which depends on the particular manufacturing operation to which the spirit is to be applied; (2) Mineralised methylated spirit; for general use (except as a beverage). It contains 10 per cent. wood naphtha and a small percentage of dyed mineral naphtha. Denaturants used in Continental countries are very similar, but slightly more varied so as to comply with the requirements of the various industries.

The Canadian Excise Authorities recognise 10 different grades of denatured spirit, and in the United States 81 are recognised. Amongst the denaturants used in America are pyridine, nitro-benzol, pine oil, iodine, cadmium iodide, ammonium iodide, brucine sulphate and diethylphthalate.

Particular concentrations of alcohol are used industrially, and may be prepared by diluting the quantities of 90 per cent. alcohol given below to one litre at 15° C.

	20 Per cent.	45 Per cent.	60 Per cent.	70 Per cent.
Sp. Gr.	0.9760	0.9435	0.9134	0.8899
Alcohol 90 per cent.	222.2 cc.	500 cc.	666.7 cc.	777.8 cc.

The following figures published by the Bureau of Internal Revenue U.S.A. for 1922, are of interest in view of the National Prohibition Act now in operation in America. At the close of the financial year 1922, it reports that there were, in operation: 73 industrial-alcohol manufacturing plants; 78 bonded warehouses; 74 denaturating plants qualified to operate for production, storage, and denaturation of alcohol, and that also, during 1922, the following new plants were established: 9 industrial-alcohol manufacturing plants; 10 bonded warehouses; and 12 denaturing plants. They collectively produced 80,000,000 proof gallons of alcohol. The number of licensed manufacturers using specially denatured alcohol at the end of 1922 was 3,287.

Physical Properties of Ethyl Alcohol.

The pure product is a colourless inflammable liquid, a powerful solvent, hygroscopic at high concentrations and miscible with water in all proportions. On mixing alcohol with water, contraction in volume takes place with evolution of heat. The physical constants of ethyl alcohol are as follows:—

Specific gravity 0/4° C.	0.8063
" " 15/15° C.	0.7936
" " 20/20° C.	0.7910
" " 25/4° C.	0.7851
Boiling point	78.4° C. at 760 mms. pressure.
Freezing point	−130.5° C.
Critical temperature	243.6° C. at 49 mms.
Flash point	12.8° C.
Spontaneous ignition in air	510° C. (Holm. *Zeit fur angew. Chem.*, 1913, xxvi., p. 273).
Explosive range	4–13.6 per cent. by volume (Lewes. *Jour. Royal Soc. of Arts*, 1915, p. 761).
Vapour pressure	43.8 mms. at 20° C.
Electrical conductivity	0.097×10^{-6} at 15° C.
Specific heat	0.6120 at 20° C.
Latent heat of evaporation	220.5 calories per gramme.
Refractive index	1.36332 at $n \frac{15°}{D}$
" "	1.35730 at $n \frac{30°}{D}$
Net calorific value	11,645 B.Th.U. per lb.
" " "	92,450 B.Th.U. per gallon.

Industrial Applications of Ethyl Alcohol.

Alcohol is used extensively as a solvent in the manufacture of chemicals and explosives, in the extraction of perfumes, essences and drugs, as a constituent of motor fuels and also as a preservative. In the dyestuffs industry, ethyl alcohol is used as a solvent, in the manufacture of ethers and of other intermediates. It is used for the extraction of turpentine gum and for the production of ethylene, which appears under various trade names for copper welding purposes. Strass (*Bestr. klin. Chim.*, 99, p. 402) states that ethyl alcohol is a powerful agent for tanning the skin, and hence localising the germs during surgical operations. Alcohol, alone or in admixture with ether or benzol, has been shown to possess superior qualities as a motor fuel, and is becoming an industrial rival to petrol. Although the calorific value of alcohol is considerably below that of petrol, its relatively greater combustion gives alcohol a higher efficiency. It has a high compression factor, and its property of high ignition temperatures under pressure is not seriously influenced by admixture with 20 per cent. of petrol or benzol, a mixture which starts an engine readily in the cold and gives smooth running. During the war much of the German military motor transport was run on high-alcohol-content fuel mixtures; and the experience gained at that period will lead probably to great developments in connection with the power alcohol question and resolve itself into a question of price. The miscibility of alcohol with water in all proportions offers also the use of alcohol a greater safety from fire compared with petrol. An Australian combine has been

* See also *Brit. Pats.*, Nos. 184,036 and 184,129, *Chemical Trade Journal and Chemical Engineer*, October 13, 1922, page 461.

formed recently on co-operative lines, to encourage farmers to raise sorghum crops, which are stated to yield over 80 gallons of 95 per cent. alcohol per ton of material. This project would render Australia independent of outside sources for liquid fuel, and Australian import duties paid on motor spirit last year were £2,500,000.

Alcohol as a Motor Fuel.

It will be some few years before pure alcohol will be used as a motor fuel, owing to mechanical difficulties and also Excise difficulties regarding denaturants, but it is already being used with advantage in America in admixture with other oils.* Its use is superior in that it burns more cleanly in internal-combustion engines, gives greater mileage, no pre-ignition, more power and more uniform application of power during piston power stroke. Owing to more complete combustion the efficiency is higher.

The British Inter-departmental Committee on the Production and Utilisation of Power Alcohol recommended as follows:—"As the price of alcohol for power and traction purposes to which we propose the name of 'Power Alcohol' should be given, must be such as to enable it to compete with gasoline, it is essential that all restrictions, concerning its manufacture, storage, transport, and distribution should be removed as far as possible, consistent with safeguarding the revenue and preventing improper use, and that cheap denaturing should be facilitated."

The intrinsic attraction of alcohol as an alternative for mineral oil fuels, is that its principal sources being the vegetable world, are almost inexhaustible and capable of much expansion without detriment to food supplies, whereas fuels obtained from coal or oil are necessarily limited in quantity and not inexhaustible, being confined to deposits limited in extent and which cannot be renewed. As the realisation of the advantages of the use of alcohol become more general, it will be used in greater quantities, but its future is entirely dependent upon its economical production.

SOCIETY OF GLASS TECHNOLOGY.

INTERESTING VISIT TO FRANCE.

IN connection with the visit of members of the Society of Glass Technology to France, during the first week of July, two meetings with French glass manufacturers were held on Monday, July 2nd. In the morning the visiting party was received by the Chambre Syndicale des Maitres Verreries, and was welcomed by its President, Mons. L. Houdaille, who described to the visitors how the French glass manufacturers were all united in one body—the Chambre Syndicale,—which was divided into six sections representing various branches of the industry. The work of these sections was organised in such a way as to prevent ruinous competition between members, and at the same time encouraged individual research and development. Mons. L. Delloye spoke of the need for co-operation among manufacturers of different countries Professor W. R. S. Turner, Colonel S. C. Halse, and Mr. E. A. Hailwood replied for the Society of Glass Technology.

List of Papers Communicated.

The following papers were communicated:—(1) Professor H. Le Chatelier, "La Méthode Scientifique dans L'Industrie"; (2) Dr. A. Granger, "Les Verres Opaques et Colorés, et les Glacures Céramiques de Même Espèce"; (3) Mons. Lafon, "La Dilatation des Verres et Cristaux"; (4) Professor W. E. S. Turner, "Specifications for Glass Products"; (5) Mr. T. Teisen, "Improvements in the Design of Recuperative Glass Pot Furnaces"; (6) Mr. S. English and Professor W. E. S. Turner, "The Physical Properties of Boric Oxide Glasses."

During the week visits were paid to the following glass works: (*a*) Etablissements Legras at St. Denis; (*b*) Verreries de Reims (Messrs. Charbonneaux and Cie); (*c*) New plate-glass works at Chantereine; (*d*) Glaceries de St. Gobain, Chauny, and Cirey. The social side of the excursion was not neglected. In addition to the reception and lunch already mentioned, a number of other receptions was given, and also a complimentary dinner by members of the visiting party to Mons. L. Delloye, who had been responsible for making all the arrangements on the French side.

* The new regulations whereby the use of 10 per cent. of ethyl alcohol in all imported fuels for internal-combustion engines has been rendered compulsory in France, has already been referred to in these columns on several occasions.—ED. *C.T.J. and C.E.*

THE ESTIMATION OF GLYCERINE.

NEW ITALIAN DIRECT METHOD.

IN a paper which was presented by Professor S. Fachini at the Italian Congress of Chemistry, held in Rome from June 3 to June 7 last, and to which reference was made in our issue of July 6, page 10, a detailed critical examination of the various methods proposed for the estimation of glycerine was made. The methods in question include the oxidation methods based on the use of permanganate of potash, proposed by Benedikt and Zsgimondi; the potassium bichromate and sulphuric acid method, proposed by Legler, Burkhardt, Cross, Bevan and Hehner, and by Plancon, Herbig and Suhr; the method based on the transformation of the glycerine into nitro-glycerine, proposed by Champion and Pellet and by Lewkowitsch; the triacetin method of Benedikt and Cantor; the iso-propyl iodide method of Zeisel and Fanto; the acrolein process of Ztzsche, and other methods based on the indirect determination of glycerol. The paper then mentioned a method of direct determination, proposed originally by Shukoff and Schestakoff, and modified by Fachini and Dorta, in which the glycerol is extracted with acetone and weighed.

Limitations of the Acetin and Bichromate Methods.

Of all the above methods, two only—namely, the acetine process and the bichromate process—enter into common use with the analyst, and these were retained as official methods by an International Committee in 1911. Unfortunately, these two methods do not give identical results, and even to-day there is felt the necessity of a single method that can unify and co-ordinate the results of the analysis of all glycerines.

Pure glycerines and crude glycerine do not only consist of pure glycerol $C_3H_5(OH)_3$ and water, but contain other constituents, amongst which tri-methylene-glycol $C_3H_6(OH)_2$ may be specially mentioned. From the theoretical point of view the acetin method of determining glycerine is more logical than the bichromate process, since in the former the alcoholic hydroxyl groups enter into the reaction. The glycerol content determined by the acetin process depends, therefore, on the content of hydroxyl group in the sample under test, and in accordance with this method the tri-methylene glycol, calculated as glycerol, corresponds to 80.69 per cent.

The bichromate process, on the other hand, oxidises both the glycerol and the tri-methylene-glycol, transforming these into carbonic acid and water. In this process, since the molecule of tri-methylene-glycol absorbs one atom of oxygen more than does the molecule of glycerol, it is evident that too-high results are obtained, and, in fact, the tri-methylene-glycol, calculated in this case as glycerol, corresponds to 138.3 per cent. It is clear, therefore, that neither of the above two methods can give the exact content of glycerol in a glycerine, but only very approximate results, the real content of glycerol and tri-methylene-glycol being obtained through the union of the two methods, or by the other method that will be described below.

Even if, theoretically speaking, the acetin method is more accurate than the bichromate process, yet it is so delicate that it is not possible to avoid errors. Above all, it is very difficult to neutralise the excess of acetic acid after the esterification, especially owing to the fact that the mass to be treated is always about five hundred cubic centimetres—a volume sufficiently great to require an excess of alkali to influence the indicator. The addition even of a very small excess of alkali means the saponification of a part of the triactin, leading to serious errors. For this reason attempts to eliminate the excess of acetic acid, by transforming it into acetanilide, and separating the triacetin from the mixture by organic solvents have been made, with but little success however. In addition, the great ease with which triacetin hydrolyses must not be overlooked. The acetin method is, moreover, extremely tedious and complicated, it being necessary to repeat each determination, with the concomitant dangers of error indicated above, not only on the glycerine, but also on the reagents and on the organic residue at 160° C.

For the above reasons, Professor Fachini thinks the bichromate of potash method the better of the two, when accuracy and speed are required, and especially if this method be carried out together with other determinations which permit, from the apparent or approximate content of glycerol

at first obtained, the real contents of glycerol and the contents of tri-methylene-glycol to be deduced with accuracy.

Measurement of the Carbon Dioxide Evolved.

If the calculation of the glycerol content is not based on the quantity of bichromate of potash reduced, but on the quantity of carbonic acid evolved during the oxidation, it is possible to obtain much more exact results. When considering separately the oxidation of glycerol and tri-methylene-glycol, the following equations are obtained: —

$$C_3H_5(OH)_3 + 7O = 3CO_2 + 4H_2O$$
$$C_3H_6(OH)_2 + 8O = 3CO_2 + 4H_2O$$

From these it is seen that 132 parts per weight of carbonic acid correspond to 92.064 parts of glycerol and to 76.064 parts of tri-methylene-glycol, and that if the tri-methylene-glycol be calculated as glycerol the result corresponds to 121.03 per cent., which means a great advantage over the usual bichromate process, where the tri-methylene-glycol, calculated as glycerol, corresponds to 138 per cent. The principal value of the new carbonic acid method consists, however, in the possibility of determining simultaneously the glycerol and tri-methylene-glycol. The equations given above show that the quantity of carbonic acid evolved during the oxidation of the glycerol and during the oxidation of the tri-methylene glycol is identical, and for this reason the quantity will be identical with a sample constituted entirely either of glycerol or of tri-methylene-glycol. The quantity of oxygen or bichromate of potash necessary for the oxidation will, however, be different, and the quantity of this required will be larger when the content of tri-methylene-glycol is higher.

When the quantity of carbonic acid evolved during the oxidation of a given quantity of glycerine has been determined, the approximate quantity of glycerol in it can be calculated at once, and will always be more accurate than when calculated on the amount of bichromate used.

To obtain the actual contents of glycerol and tri-methylene-glycol, the theoretical quantity of bichromate that would have been necessary for the oxidation of the sample if this was constituted only of glycerol is calculated from the carbonic acid produced, and compared with the quantity of bichromate of potash actually reduced. If the sample contains tri-methylene-glycol, the theoretical quantity of bichromate of potash will be smaller than that actually reduced, and the difference will represent the bichromate employed for the oxidation of the trimethylene-glycol. Knowing from the above two equations that every 16 parts of oxygen in excess correspond to 76.064 parts of trimethylene-glycol, or (that in this case one gramme of bichromate of potash equals 0.7748 of the glycol) it will be easy to determine exactly the quantity of the same. This, calculated as glycerol, is deducted from the approximate quantity of glycerol first found, and calculated on the carbonic acid produced. In this way the real glycerol present in the sample is found.

Deduction of the Quantities of Glycerol and Tri-methylene-glycol Present.

Taking a as the quantity of glycerine weighed as the sample under test, B as the quantity of bichromate actually reduced, B_1 as the theoretical quantity of bichromate calculated on the carbonic acid produced, G as the approximate quantity of glycerol calculated on the carbonic acid evolved, and C as the quantity of carbonic acid evolved during the oxidation.

1 gramme of carbonic acid = 0.57624 gramme of glycol.

1 gramme of carbonic acid = 0.69745 gramme of glycerol.

1 gramme of glycerol = 7.4564 grammes of bichromate of potash.

1 gramme of bichromate in excess = 0.7748 gramme of glycol.

X = amount of glycerol present.

y = amount of tri-methylene-glycol present.

It is seen that—

$$G = C \times 0.69745$$
$$B = G \times 7.4564$$
$$y = (B - B_1)\,0.7748$$
$$X = G - \frac{y \times 92.064}{76.064}.$$

Experimental Details of New Process.

Pure glycerines are submitted at once to oxidation. A thin glass flask of fifty cubic centimetres capacity is tared, 20 grammes of water are added, and then from four to five drops of the glycerine to be analysed. The whole is then weighed again. About 1.5 grammes of bichromate (1 gramme of glycerine = 0.4564 gramme of bichromate) are then added, and the whole weighed again.

The flask is then closed by a rubber stopper with three holes, through one of which is inserted a small tap funnel; through another a tube for the entrance of the air, reaching to the bottom of the flask; and through the third an exit tube for the air and carbonic acid. The exit tube is provided with a two-bulb tube and with a water condenser, so as to condense as much as possible the steam formed when the flask is warmed. The exit tube is also connected with a U-tube containing small glass beads moistened with concentrated sulphuric acid, and with three other U-tubes containing anhydrous calcium chloride, submitted before use to the action of carbonic acid, so as to eliminate any lime that may be present in the chloride.

The absorption apparatus for the carbonic acid—the usual combustion apparatus—is weighed, and is connected to the last U-tube mentioned above. To the absorption tube is then connected still another small weighed U-tube containing calcium chloride, to absorb any moisture escaping from the absorption apparatus; and this is followed by a final tube containing calcium chloride, to protect the one preceding it from atmospheric moisture.

When the flask has been connected to the apparatus described, the entry of the air is stopped, and about nine cubic centimetres of sulphuric acid of 66° Bé. are made to drop through the tap funnel. The acid is made to drop slowly, and not to have any loss of carbonic acid it is advisable to operate as follows. To the upper opening of the funnel there is a tap supplied with an indiarubber tube. By blowing gently down this tube with the mouth a small pressure on the acid is exerted, and the latter is thus made to drip out slowly, until the funnel contains a small residue of about one-half one cubic centimetre. This small pressure is necessary, since the carbonic acid that is at once evolved would otherwise escape through the funnel, and not through the exit tube. The small residue of acid must be left in the funnel, to avoid blowing directly carbonic acid with the mouth into the apparatus. After the above operation has been effected the analyst waits until the evolution of the carbonic acid has somewhat subsided, and then immerses the flask into a beaker of hot water, and maintains the latter in slow ebullition for about two hours.

At this temperature the glycerine is completely oxidised, whilst if there are traces of acetic acid in it they remain unaltered up to a temperature of 120° C. After the two hours' treatment, the tap leading in the air is slowly opened, and a gentle stream of air is caused to pass through the whole apparatus for about three-quarters of an hour, the warming of the flask being discontinued after one-quarter of an hour. In this way all the carbonic acid is collected in the absorption apparatus, which is then weighed together with the calcium-chloride tube which serves as a control.

The difference in weight gives the quantity (C) of carbonic acid evolved from the quantity (a) of glycerine. The contents of the flask are transferred quantitatively into a tared flask of five hundred cubic centimetres capacity, and made up with distilled water to the mark at 15° C. From the resulting solution fifty cubic centimetres are pipetted into a glass beaker, and 2 grammes of crystallised potassium iodide and 25 cubic centimetres of 20 per cent. hydrochloric acid are added, finally diluting with water to about one-half litre. The excess of bichromate is now titrated with decinormal thiosulphate of soda, using starch as indicator.

Accuracy of the New Method.

In this way there is obtained the weight (B) of bichromate actually reduced by the quantity (a) of glycerine, after which all the factors for proceeding with the calculations are available. The method was tested on several samples of chemically-pure glycerol, and the following results were obtained: —

	Old Bichromate Method. Per Cent.	Carbonic Acid Method. Per Cent.
Sample A	0.918 ...	0.916
Sample B	88.90 ...	88.69

THE FACTORY INSPECTOR'S REPORT.

INDUSTRIAL DISEASES IN 1922.

DR. T. M. LEGGE, H.M. Senior Medical Inspector of Factories, contributes as usual a chapter on industrial diseases in the Annual Report for 1922 of the Chief Inspector of Factories and Workshops, which has just been published (H.M. Stationery Office; price, 5s. net).

The Effects of the New Chemical Works Regulations.

It might perhaps be mentioned that the general report comments upon the new Chemical Works Regulations as follows: These Regulations, which did not come into force until October 1, 1922, supersede the old Special Rules for Chemical Works (made nearly 30 years ago), the Regulations for Nitro- and Amido- Derivatives of Benzene, those for Chromate and Bichromate of Potassium or Sodium, and embody the Voluntary Code for the Distillation of Tar. The difficulties met with so far in administration have been few and there is good reason to anticipate that compliance will be secured without serious difficulty. In a code of this character, dealing with a varied class of industry ranging from the manufacture of pharmaceutical preparations on the one hand to large alkali works on the other, the need for power of exemption, to meet the varying conditions under which the processes are carried on, is evident. Certificates of exemption have so far been granted in a few cases only, other claims, dealing more particularly with the manufacture of sulphate of ammonia and with the dehydration of tar in gas works, are at present under consideration.

Experiments are being made by the Chemical Warfare Committee of the War Office to determine what class of self-contained breathing apparatus can be sanctioned for use in gas contaminated atmospheres, such as occur in some chemical works, and the conditions under which their use can be allowed. Meanwhile no authority to use self-contained breathing apparatus has been sanctioned, and occupiers have been advised to rely upon a face mask provided with a tube passing to the outside air.

As the Regulations have been in operation for so short a period, it is not possible to give any detailed account of their observance. The preliminary reports which have been received, more particularly from Mr. Brothers (Warrington) in whose area a large proportion of the more important works are situated, are entirely satisfactory, and suggest that in many works a full measure of compliance has already been secured. Certain difficulties of interpretation are foreshadowed, as regards, for instance, whether there is or is not a "liability to explosion" in individual cases such as to necessitate the precautions against naked lights and fires required by Regulation 4, and whether or not dangerous gas or fume is "liable to escape" under particular circumstances, and so necessitate the provision of rescue apparatus required by Regulation 6. With past experience to serve as a guide, there should not be serious difficulty in meeting objections of this kind.

The Regulations contain important provisions, making it obligatory, before any person enters any place where there is reason to apprehend the presence of dangerous gas, for a responsible person, specially appointed for the purpose, personally to examine such place, and to certify in writing that it is isolated and sealed from every source of gas or fume, and is free from danger.

Industrial Processes and the Primary Respiratory Diseases.

Reverting to Dr. Legge's report, the Inspector states that during the year Dr. E. L. Middleton completed his inquiry into the grinding of metals and cleaning of castings. He made physical examinations of 1,153 workers employed in the grinding, glazing, finishing, etc., of edge tools, textile machinery components, needles and hackle-pins, and in the dressing of castings in the Midlands, Sheffield, Lancashire and Scotland. His main conclusions are that these industrial processes are associated with the occurrence of three primary respiratory diseases, namely, pulmonary fibrosis, bronchial catarrh, and bronchitis.

Below is the table of notifications under Section 73, 1901, arranged under slightly different headings in some industries from those that have appeared since 1899.

Disease and Industries.	Reported Cases.*										
			Average.								
	1922.	1921.	1918-1920.	1915-1917.	1912-1914.	1909-1911.	1906-1908.	1903-1905.	1902.	1901.	1900.
LEAD POISONING	247^{26}	230^{23}	198^{20}	349^{21}	522^{33}	576^{35}	619^{30}	601^{23}	629^{14}	863^{34}	1058^{38}
1. Smelting of metals	9^{2}	25^{4}	28^{3}	44^{2}	39^{4}	49^{4}	45^{2}	31^{1}	28	54^{3}	34^{1}
2. Plumbing and Soldering	25	14	13^{1}	21^{1}	32^{3}	30^{1}	21^{2}	24^{2}	23^{1}	23	9
3. Printing	11	12^{1}	9^{1}	15^{2}	27^{1}	29^{2}	24^{2}	16^{2}	19	23^{1}	18^{2}
4. File cutting	—	—	2	5^{1}	13	12^{1}	11^{1}	19^{2}	27^{1}	46^{7}	40^{3}
5. Tinning	2	1	2	3	11	17	18	13	11	10	5
6. Other contact with molten lead	15	7^{1}	10^{1}	24	23^{1}	24^{2}	24	22	24	25	30^{1}
7. White and red lead	22^{2}	17^{1}	18	37	32^{1}	47^{2}	94^{3}	114^{2}	156^{1}	203^{7}	377^{6}
8. Pottery	42^{17}	35^{11}	19^{7}	21^{6}	57^{11}	77^{7}	115^{8}	99^{3}	89^{4}	113^{5}	210^{8}
9. Vitreous enamelling	3	8	1	4	8	14	6	3	3^{1}	9	11
10. Electric accumulators	32	35	37^{1}	45^{1}	41	27^{1}	24	29	16^{1}	49^{1}	33
11. Paints and colours	14^{1}	13^{1}	8	15	21	26^{1}	32	43^{1}	46	56	56^{1}
12. Indiarubber	3	4^{1}	6	8	5	5	2	2	2	1	1
13. Coachbuilding	15^{1}	20^{1}	12^{2}	31^{2}	71^{4}	90^{6}	75^{4}	60^{4}	63^{1}	65^{4}	70^{5}
14. Shipbuilding	12^{1}	4^{1}	9^{1}	21^{2}	32^{3}	28^{3}	21^{1}	35^{1}	15^{1}	28^{1}	32^{2}
15. Paints used in other industries	23^{2}	12	11^{1}	19^{1}	45^{2}	50^{1}	44^{2}	41^{2}	44^{1}	61	50^{5}
16. Other industries	19	23^{1}	13^{1}	37^{3}	64^{3}	51^{2}	63^{4}	51^{2}	63^{2}	97^{5}	82^{4}
PHOSPHORUS POISONING	—	—	1	3	—	1	1	1^{1}	1^{2}	4	3
ARSENIC POISONING	—	1	3	11^{2}	4	7	12^{1}	4	4	1	22^{3}
MERCURIAL POISONING	6^{1}	—	7	14	14	10	7	6	8	18	9
TOXIC JAUNDICE	3	1^{1}	14^{5}	132^{34}	—	—	—	—	—	—	—
EPITHELIOMATOUS ULCERATION	32^{3}	32^{2}	45^{1}	—	—	—	—	—	—	—	—
CHROME ULCERATION	42	29	126	—	—	—	—	—	—	—	—

* The principal numbers relate to cases, the small figures to deaths. Fatal cases not reported in previous years are included as both cases and deaths.

Lead Poisoning.

A glance at the table shows how in the pottery industry not only is the number of deaths to cases out of all proportion to those in the other industries on the list, but also the difference shown in this respect in the pottery figures themselves since the Workmen's Compensation Act, 1906, came into force, which, rightly, grants compensation to relatives for deaths due to the sequelae, such as chronic Bright's disease. A signal service in the prevention of lead poisoning was rendered by Mr. C. A. Klein, chemist to the Brimsdown White Lead Company, who worked out a method of incorporating dry lead compounds in rubber and other materials, in such a way as entirely to free certain processes from danger, thereby exempting employers from the onerous task, under the Indiarubber Regulations, 1922, of providing locally applied exhaust ventilation, periodic medical examination, and other precautions. The method is capable of extension in other directions—*e.g.*, in the glass industry. In this industry red lead, sometimes to the extent of 25 per cent., is mixed with the other ingredients, and every year cases of lead poisoning arise from this cause. Mr. Klein has prepared a fritted lead of low solubility to take the place of the crude red lead. Dr. Bridge visited premises following on a case of lead poisoning for collecting finely divided metallic lead. Analysis of the sample in the Government Laboratory showed that it contained 14 per cent. of soluble lead—a matter of interest, demonstrating that metallic lead, if in sufficiently fine state of division, is soluble and may cause poisoning. Dr. Henry, from Manchester, has given considerable attention to the occurrence of lead poisoning

in the manufacture of paints and colours, the heading of yarn, scrap lead melting, electric accumulators, and the painting of safes.

Mercury and Phosphorus Poisoning.

Four of the six cases of mercurial poisoning were caused by the accidental mixing of mercury with lead borings which were being melted. They all resulted from only one day's work at the process. The two other cases (1 fatal) occurred in the making of thermometers. No case of phosphorus poisoning was reported. Under the heading toxic jaundice are included two cases of poisoning by T.N.T., one a slight case in the melting and filling of shells, and the other severe in the breaking down process, in which T.N.T. is boiled out of shells and accidentally splashed over on to the buckets used near the tanks; from these it was absorbed in handling.

Chrome and Epitheliomatous Ulceration.

Of chrome ulceration 42 cases were reported—10 in the manufacture and 32 in the use of bichromate of potassium or sodium. The duration of employment per case where use was in question averaged 11 years, and in manufacture 4 years. The production of cancer by specific forms of irritation was a subject somewhat fully discussed at the annual meeting of the British Medical Association in July,* and served to show how important are the figures now available from the notification of epitheliomatous ulceration from pitch, tar, mineral oil, and paraffin, in their bearing on the experimental work now being carried on by several observers in this and other countries. Notification of epitheliomatous ulceration has now been required since 1920, and the number of attacks so reported is as follows:—

	1920.	1921.	1922.	Total.
Pitch	32	24^{2}	23^{1}	79^{3}
Tar	10^{1}	8	4^{1}	22^{2}
Paraffin	3	—	5^{1}	8^{1}
Total	45^{1}	32^{2}	32^{3}	109^{6}

Industrial Dermatitis.

More and more time has to be given by Medical Inspectors to the investigation of complaints of dermatitis, as to which generally in the industries of the country knowledge is wanted. Dr. Bridge sends me a brief account of some of his inquiries: *Celluloid Substitutes.*—As these substitutes contain formaldehyde, irritation of the skin produced by them can be readily understood. The rash affected the forearms, and was characterised by a vesicular papular eruption. At one factory the amount of formaldehyde present in the debris from the polishing machines, was found to be 0.015 per cent. of the total weight. *Shellac Varnish.*—Two works were visited in connection with inflammation of the skin of the hands and forearms, due to the use of shellac varnish. Where septic infection had not supervened, the cases quickly cleared up when removed from the work. In one instance the varnish was examined for the presence of arsenic, with a negative result. Irritation is primarily produced by the effect of the alcohol on the skin, but in one individual was undoubtedly mainly due to the active steps taken to remove the varnish from the hands before washing. *Sugar Dermatitis.*—In two large sugar refineries where over 4,000 persons are employed, particulars of 12 cases which had occurred within the last five years were obtained. From the history of the cases, the site of the onset of the dermatitis would almost invariably appear to be between the fingers, and the workers I was able to interview all stated that it commenced as a dry scaly condition, spreading along the inside of the fingers, and then to the back of the hands. It subsequently becomes moist, though rarely assuming the appearance of a true eczema. The conversion of the sugar lodging on the skin into butyric or lactic acid by the sweat has been suggested as the cause of this form of dermatitis. Though it has been difficult to demonstrate any actual injury to the skin by the sugar particles, I think this action plays some part in the production of the dermatitis.

Dr. Henry investigated cases of dermatitis from teak wood, and found dermatitis in four workers coming in contact with "accelerene" (para-nitroso-di-methyl-anilin), an accelerator used in the vulcanisation of rubber. Other evidence of dermatitis he found from lubricating oil, from shellac, and from sesqui-sulphide of phosphorus.

* See *Chemical Trade Journal and Chemical Engineer*, Dec. 29, 1922 (p. 789).

Poisoning by Fumes and Gases.

Below is a comparative table of the number of cases of gassing reported as having entailed absence for one day:—

	1913.	1914.	1917.	1918.	1919.	1920.	1921.	1922.
Carbon monoxide	59^{7}	62^{9}	99^{18}	54^{13}	85^{12}	56^{9}	77^{14}	111^{14}
(*a*) Blast furnace	20^{3}	20^{6}	22^{6}	17^{3}	33^{6}	20^{5}	18^{2}	28^{4}
(*b*) Power	21	21	32^{8}	21^{3}	19^{1}	16	27^{3}	37^{7}
(*c*) Coal	9^{4}	7^{1}	20	10^{4}	10^{4}	9^{3}	19^{4}	32^{1}
(*d*) Other	9	14^{2}	25^{4}	6^{3}	23^{1}	11^{1}	14^{5}	14^{2}
Carbon dioxide	12^{1}	3^{1}	1	5^{5}	3^{1}	—	5^{4}	1
Sulphuretted hydrogen	8^{1}	22^{3}	11^{4}	7^{1}	3	13^{4}	3	12^{3}
Sulphur dioxide	1	1	2	1	7	2	5	7
Chlorine	1	2	3	4	9	8	3	11
Nitrous fumes	—	9^{2}	62^{5}	27^{7}	5^{2}	9^{3}	—	8
Ammonia	3	4^{1}	4^{1}	6^{1}	8	—	9^{1}	8^{1}
Benzol, naphtha, anilin	6^{2}	4^{2}	4^{2}	7^{4}	9^{3}	12^{1}	10	25^{1}
Arseniuretted hydrogen	2	1^{1}	12^{3}	2	3	5^{3}	1^{1}	1
Tetrachlorethane	—	25^{4}	—	—	—	—	—	—
Other (ether, acetone nickel carbonyl, carbon bisulphide)	—	—	4	1	3	9	3	10^{1}

Comparison of one year with another presents difficulties, especially in the case of carbon monoxide, as an escape of gas may affect several persons at the same time, and markedly increase the number for one particular year. Of 28 cases, with 4 deaths, due to *blast furnace gas,* 8 occurred in charging the cupola, 8 (1 fatal) in repairing furnaces and flues, 6 (1 fatal) from cleaning flues without efficient disconnection, 4 from leakage from underground flues, brickworks, etc., and 2 (both fatal) from leakage from valves. Of the 37 cases, with 7 deaths, from producer and suction gas, 12, with 1 death, occurred in connection with the charging, stoking, etc., of the generating plant, and 1 from starting the suction gas engine; 18, with 5 deaths, from the escape from the exhaust pipe into workrooms, in one case affecting 12 persons.

Of the 32 cases, with 1 death of coal gas poisoning 4 (1 fatal), occurred in gas works, the remaining 28 from distribution in workrooms as the result of defective fittings and inadequately ventilated gas stoves. Thus, an escape from the gas rings under the glucose pans in a sweet factory penetrated through the ceiling, and affected 13 persons. Again, 7 cases were due probably to escape from a flueless gas radiator in an ill-ventilated workroom. Other cases of carbonic oxide poisoning include 4 at lime kilns; 5, with 1 death, from the use of coke fires for heating rivets.

Seven cases of sulphuretted hydrogen poisoning, with 2 deaths (1 a rescuer) occurred in cleaning tar stills or tanks, and 2 in cleaning the oxide of iron purifying chamber.

Of the 10 cases of chlorine poisoning, 6 occurred from the increasing use of cylinders of chlorine gas in the bleaching of flour. Dr. Bridge, with Mr. McNair, visited several of these plants. Fortunately the makers are alive to the danger and issue instructions when installing them. As in the case of refrigerating plants, as far as practicable they should be outside the workroom. As a general rule they are placed in a small compartment off the main room.

With regard to *nitro and amido derivatives of benzene,* of the 19 cases, 11 occurred in the manufacture, 4 in packing the products, 3 from aniline (1 through wearing defective gloves and 2 others from boiling over of the liquid).

Death from Nickel Carbonyl Poisoning.

Six cases of nickel carbonyl poisoning, with 1 death, were reported, the symptoms being shortness of breath and bronchitis, following on deposition of the nickel in a fine state of division over the immense area of the respiratory surface. The poisoning was due to a leak of nickel carbonyl which escaped through a joint of a blank which had been inserted to isolate a gas filter and volatiliser. The men were employed for about two hours on repairs to the filter, situated a few feet above the volatiliser. Every apparent precaution was taken at the works in question to prevent escape of gas, and no case of any importance had occurred for 19 years.

Dr. Bridge made an inquiry into the conditions of the stoves in which sulphur is used for the bleaching of hosiery, following on a request from the Superintending Inspector of the Eastern Division. Considerable discomfort is caused to the men who light the sulphur and who empty the stoves, but there is no doubt a large number of the men become acclimatised to the conditions of work. A conference with the manufacturers is being held in the early part of this year to consider the matter as a whole.

SAFEGUARDING OF INDUSTRIES ACT.

COMPLAINT AS TO ROCHELLE SALT UNDER PART I.

ON Tuesday, July 31, Mr. Cyril Atkinson, K.C., held an inquiry into a complaint that Rochelle salt has been improperly included in the Board of Trade List of dutiable articles under Part I. of the Act. The complainants were the Chemical Merchants and Users' National Vigilance Committee, which was represented by Mr. Kenneth Swan and Mr. R. Lambert Parry, the opponents being Messrs. Howard and Sons, Ltd. and Messrs. May and Baker, Ltd., represented by Sir Arthur Colefax, K.C., and Mr. Stafford Cripps. The Board of Trade also resisted the complaint, and were represented by Mr. Trevor Watson.

Point Should be Ruled by Tartaric Acid Decision.

Mr. Kenneth Swan, in stating the case for the complainants, said that a good deal was heard of Rochelle salt during the hearing of the cream of tartar and tartaric acid case, and if the case of Rochelle salt had been heard at the same time, there would have been very little difficulty in disposing of it on the same lines as the cream of tartar case. (The referee decided that cream of tartar, tartaric acid, and citric acid are heavy chemicals). In the case of Rochelle salt the Board of Trade contended that it was a fine chemical and also an analytical reagent. In order to show the close relationship between tartaric acid, cream of tartar and Rochelle salt, Counsel handed in the respective formulæ, adding that in the case of cream of tartar one of the hydrogen atoms in tartaric acid had been replaced by a potassium atom whilst in the case of Rochelle salt, the other hydrogen atom was replaced by a sodium atom. Rochelle salt appeared in the List of dutiable articles as such, as also as sodium potassium tartrate and potassium sodium tartrate and the application was to have all three struck out of the List, because they were three names for the same thing.

Uses of Rochelle Salt.

Counsel recalled that in the cream of tartar case two processes for the manufacture of that substance were mentioned, one, known as the St. Thibery process, in which argols was treated with calcium carbonate, and the other, known as the Rochelle-salt process, in which they proceeded, *via* Rochelle salt, to obtain tartaric acid and cream of tartar. In the latter case the argols was treated with sodium carbonate. The French people for the most part used the St. Thibery process, although there was one French factory where the Rochelle-salt process was used. In the cream of tartar case the English manufacturers pressed the point that their process was a fine chemical process *via* Rochelle salt, and one of the firms which used Rochelle salt as the intermediate or transitional body in the manufacture of cream of tartar was Messrs. Kemball, Bishop and Co., Ltd.

Apart from the use of Rochelle salt as an intermediate in the manufacture of cream of tartar and tartaric acid, the other uses of it were extremely small. It might be said that there was only one substantial use and that was in the preparation of health salts, such as Seidlitz powders and analogus products. Some years prior to the war, the importation of Rochelle salt into this country was restricted by agreement between the manufacturers here and the potential importers abroad, and for that reason he was not able to controvert the figures given by the Board of Trade as to imports. He would say, indeed, that the importation of Rochelle salt into this country was negligible under an agreement which might be temporary or permanent according to the will of the parties concerned. As to the reasons why the Board of Trade had included Rochelle salt as a fine chemical, the evidence would show that there was a very small amount of trade custom in this case, but in view of the close relationship between Rochelle salt and cream of tartar it seemed to him impossible to hold a different view from that expressed in the judgment in the cream of tartar case. He personally could not separate Rochelle salt from cream of tartar or tartaric acid. Indeed, he would go further and say it would be preposterous to hold that the intermediate product in the manufacture of cream of tartar —which latter had been decided to be a heavy chemical— was a fine chemical.

A Border-Line Case.

Counsel then proceeded to argue that Rochelle salt is one of the border-line cases, and contended that the onus was upon the Board of Trade to convince the referee that it should not be treated as a border-line case and given the benefit of the doubt. In this case there was no evidence, as far as he had been able to discover, that Rochelle salt had definitely been classified by the trade as a fine chemical, and in these circumstances he claimed that it could not be included in the Schedule as a fine chemical, and taxed.

The referee said he was not sure that that necessarily followed. He had been impressed very much by what Mr. Ballantyne had said in the calcium carbide case, that if it were found that a chemical had not been definitely classified, then one should look at the general attributes of fine chemicals and see whether the particular substance came within them.

Mr. Swan suggested that that would only apply in the case of a new chemical.

As to Rochelle salt being an analytical reagent, Mr. Swan said he placed it on the same basis as formaldehyde. None of the text books included it as an analytical reagent, nor did any of the catalogues, although it might be found so described in one or two encyclopœdic books. It was used, as the Board of Trade said, as an analytical reagent in Fehling's Solution, but Rochelle salt itself was not an analytical reagent.

Evidence of Mr. E. Parry.

Mr. E. Parry, who was the only witness called for the complainants, said he had not heard or seen Rochelle salt defined anywhere as a fine chemical. It was very rarely quoted in the trade reports, but it was more often than not referred to as a pharmaceutical chemical, if it was referred to at all. Witness was then taken through a number of catalogues and lists in none of which was Rochelle salt referred to as a fine chemical. These included Lists by R. W. Greeff and Co., Sparks, White and Co., lists of research and fine chemicals issued by the Association of British Chemical Manufacturers, and a list by Messrs. May and Baker. In all these cases Rochelle salt was classified under either general chemical or pharmaceutical chemicals. As a matter of fact, Rochelle salt was made by only one or two firms and did not come on to the market in the usual way. Therefore there were no market quotations for it. It almost invariably went from the manufacturers to the users, such as Eno's or Lamplough's or the wholesale druggists. In the case of the manufacture of cream of tartar, the Rochelle salt would not be separated. Of the quantity which was sold, 95 per cent. was used for the preparation of salines and health salts. According to the B.P., the purity must be not less than 98 per cent. Dealing with the use of Rochelle salt as an analytical reagent, Mr. Parry said it was a question of degree. He only knew of its use in this connection in two ways; either in Fehling's solution for the determination of sugar, or direct for the determination of quinine. Referring to the fine chemical point, witness said he had not been able to find a shred of evidence to support the Board of Trade contention that Rochelle salt is a fine chemical. It was handled by people who made and dealt in both fine and heavy chemicals.

The Analytical-Reagent Difficulty.

Cross-examining, Sir Arthur Colefax pointed out that in British Drug Houses, Ltd. List, citric acid and oxalic acid, which were not more used as analytical reagents than Rochelle salts, appeared, so that the lists did not carry matters very far. Mr. Parry admitted that he would not like to have to make up his mind whether Rochelle salt, used in a Fehling's solution, was an analytical reagent or not. He agreed that in Sutton's "Volumetric Reagents" there are 14 specific uses of Rochelle salt as a reagent, but 12 of them were never used, and substantially it was only used in the two ways he had pointed out.

After further discussion on these lines, the referee said he did not see how the complainants were going to get away from the fact that Rochelle salt is an analytical reagent. He asked Mr. Swan to speak to the point as to how it is possible to say that a substance used in a regular manner as an analytical reagent, as agreed by Mr. Parry, as Rochelle salt apparently was, should not be classified as such.

Mr. Swan said the matter was to be regarded from two points of view. In the first place Rochelle salt was used as an ingredient in a Fehling's solution and therefore, he contended, could not be said to be the reagent any more than the distilled water or other individual ingredients of the Fehling's solution. The other was that Rochelle salt was used to an extremely small extent by itself as a reagent in connection with the determination of quinine. If it were to be decided that because an infinitesimal portion of the output of a substance could be used as an analytical reagent

—the remainder having important commercial uses, for example,—then the whole of that substance was to be made dutiable, it would mean the inclusion in the List of a great many substances that were not now there. The words of the Act did not say "substances that can be used as analytical reagents" but "analytical reagents."

The Case Against the Complaint.

Sir Arthur Colefax, K.C., in opening his case for the opposition to the complaint, said that Rochelle salt was made by two firms in this country and curiously enough these two firms did not make cream of tartar, whilst the firms who made cream of tartar did not make Rochelle salt. His case was that Rochelle salt was a fine chemical because it was made in this country by firms who were essentially fine chemical manufacturers. Moreover, 95 per cent. of the Rochelle salt made here was used for pharmaceutical purposes and as such had to be of an extremely high degree of purity. With regard to the point as to Rochelle salt being an analytical reagent, his contention was that the quantity used for this purpose was immaterial for the purpose of the Act. In the B.P., Rochelle salt was listed as a reagent and it could not be said that because it was used in a Fehling's solution as one ingredient of that solution, it was any the less an analytical reagent.

The referee: I quite frankly agree that I think it is an analytical reagent.

Mr. Trevor Watson, for the Board of Trade, contended that from the mere fact that it had been admitted that Rochelle salt is an analytical reagent with a definite use——as stated by Mr. Parry—then the purposes of the Act were fulfilled and Rochelle salt was rightly included as an analytical reagent. It was not necessary for the referee to inquire whether a substance had any other use than that of a chemical reagent.

Mr. Swan replied that if the proposition just propounded were true and sound, then tartaric acid and cream of tartar, which it had been decided were heavy chemicals, would have to be included in the list as analytical reagents because they could be used for this purpose, and thus all the cream of tartar and tartaric acid coming into the country would have to be taxed. It was clear that consideration must be given to the other uses of a substance in deciding whether it should or should not be included as an analytical reagent.

Evidence from Messrs. Howard and Sons.

Mr. David Lloyd Howard, managing director of Messrs. Howard and Sons, Ltd., said he had been acquainted with the manufacture and sale of Rochelle salt for many years, and confirmed the statement already made by Sir Arthur Colefax that it is known in the trade as a fine chemical. The manufacture of Rochelle salt in this country was in the hands of four or five firms only who sold direct to the users and not through merchants. In order to obtain the degree of purity laid down in the B.P., it was necessary to have skilled supervision at every stage. The actual purity would be higher than the 98 per cent. laid down in the B.P., because the remaining 2 per cent. would be largely moisture. The high degree of purity coupled with the large use of Rochelle salt in pharmacy made it, in his opinion, a fine chemical. It was also a well known analytical reagent.

In cross-examination, witness said that from time to time some Rochelle salt came into this country from the Continent, chiefly Germany, but generally the home production was sufficient for our purposes, the consumption here being about 500 tons per annum. His firm never made cream of tartar and gave up making tartaric acid some years ago. Asked why, if the degree of purity of cream of tartar and Rochelle salt is practically the same, they both should not be fine chemicals—cream of tartar having been held to be a heavy chemical, witness said he did not manufacture cream of tartar and could not give an answer. Sir Arthur Colefax suggested that the B.P. requirements for cream of tartar are far less stringent than for Rochelle salt.

Certain references in the literature were then put to witness by Mr. Swan in further cross-examination, and the question was asked why, if Rochelle salt was a well known reagent, it was not included as such in the literature. The reply was that the catalogues and lists were compiled with great looseness, and, especially in regard to the book "Where to Buy Everything Chemical." Witness pointed out that in the case of sodium potassium tartrate, two of the largest manufacturing firms had been omitted from the list of such manufacturers. Moreover, sodium potassium tartrate was classified under "General Chemicals" in this book and was wrongly so classified, in his opinion.

Answering further questions on the fine chemical point, Mr. Howard said that he employed qualified chemists to do the analytical work, and the works directors, who were also qualified men, supervised the works processes. Four or five fully qualified chemists were employed; there were four trained chemists on the Board and there were also junior chemists employed in the works.

Further Trade Evidence.

Mr. P. Blenkinsop, director of Messrs. May and Baker, Ltd., manufacturers of Rochelle salt confirmed the previous evidence, and added that he did not consider cream of tartar a fine chemical on account of its large industrial use. Moreover, cream of tartar and Rochelle salt were handled by entirely different sections of the trade. The present price of Rochelle salt was £80. per ton. In his works about one-third of the time of a skilled chemist would be devoted to the work of supervising the manufacturing processes in connection with Rochelle salt, and the salary of the chemist in question was about £500. per annum.

Mr. Edmund White, managing director of Messrs. Hopkin and Williams, Ltd., the fine chemical branch of Messrs. Howard, said that Rochelle salt would be found in use in some form as an analytical reagent in every chemical laboratory for educational work and also for general analytical work. He also considered Rochelle salt a fine chemical, for the reason that it was produced under careful control and skilled supervision and with a high degree of purity.

The referee said a point which was worrying him was where they had a chemical which had an enormous industrial use and also some use as an analytical reagent of a very definite nature. He was wondering whether that had been contemplated by the framers of the Act. Sir Arthur Colefax said he could not think of a substance which would fall within this suggestion. Mr. Trevor Watson (for the Board of Trade) suggested that this was not the case here.

Conclusion of the Hearing.

Mr. Swan then briefly replied on the whole case. He had previously put his point with regard to Rochelle salt being an analytical reagent, and on the question of it being a fine chemical he pointed to the absence of any reference by the other side to the literature in which Rochelle salt was so described. The onus was on the Board of Trade to satisfy the referee that Rochelle salt is a fine chemical and was properly included in the List as such. The Board had failed to discharge that onus, and he claimed that he had succeeded on the point that Rochelle salt had been improperly included in the List as a fine chemical.

The referee's decision will be given in due course.

INDIAN MARKET FOR BRITISH HEAVY CHEMICALS.

THE United Kingdom supplies over two-thirds of India's chemical requirements, but Germany's share in the total trade has shown a striking increase and may offer strong competition in the future. Official statistics covering the fiscal year 1921-22 show that the total value of chemicals imported into India declined from Rs. 2,66 lakhs in 1920-21 to Rs. 1,91 lakhs, due to smaller quantities as well as lower values. Imports of sodium carbonate decreased slightly from Rs. 41 lakhs to Rs. 39 lakhs, of bleaching powder from Rs. 36¼ lakhs to Rs. 15½ lakhs, partly owing to increased local production, and of sulphuric acid from Rs. 2¾ lakhs to Rs. 1½ lakhs. The imports of all acids fell from Rs. 14½ lakhs to Rs. 5¾ lakhs. Alum was imported to the extent of Rs. 7 lakhs, and aluminous sulphates Rs. 4½ lakhs, half the value of the previous year. Magnesium chloride was imported to the value of nearly Rs. 4½ lakhs, as compared with Rs. 8¼ lakhs in 1920-21. Potassium compounds decreased from Rs. 7½ lakhs to Rs. 6 lakhs. Other prominent imports included caustic soda Rs. 13 lakhs (Rs. 16½ lakhs), sodium bicarbonate Rs. 11 lakhs (Rs. 7½ lakhs), and sodium bichromate, which remained stationary at Rs. 8 lakhs. Chloride of zinc decreased slightly from Rs. 5½ lakhs to Rs. 5 lakhs. Total imports of sulphur fell from Rs. 22½ to Rs. 11 lakhs, and marked a further decrease in Japan's share of this trade which amounted to only 1 per cent. or 90 tons. The chief sources of supply were the United States (2,900 tons), Italy (1,900 tons), and the United Kingdom (620 tons). The United Kingdom's share of the total trade in chemicals during 1921-22 was 71.4 per cent., as compared with 75.6 per per cent. in the previous year.—*Chamber of Commerce Journal.*

BRITISH ASSOCIATION OF CHEMISTS.

"Take my advice. Unite! Hold high the standard of chemistry and chemical industry."—Lord Moulton.

Hon. General Secretary: Mr. I. Boodson, Bedford House, 108, Baker Street, London, W. 1.
Hon. Registrar: Dr. David Bain, The Woodlands, Crescent Road, Crumpsall, Manchester.
Hon. Treasurer: Mr. H. E. J. Cory, Bedford House, 108, Baker Street, London, W. 1.
Hon. Editor: Mr. R. Brightman, 69, Devonshire Street, Higher Broughton, Manchester.

NOTICES.

Full information regarding the Association may be had on application to the Hon. General Secretary, to whom all applications for membership should be sent.

It is particularly requested that all changes of address be notified promptly to the Hon. General Secretary.

A register of members seeking appointments is kept at the registered offices of the Association. All inquiries should be addressed to the Hon. General Secretary.

Short articles, letters, etc., on matters of general interest are invited from members of the Association. These, together with all reports of meetings, should be sent to the Hon. Editor.

The annual general meeting of the Association will be held at Birmingham on Saturday, October 27, 1923.

PROCEEDINGS OF THE ASSOCIATION.

THE COUNCIL.

The Council met in London on March 17, and in Manchester on May 12 and July 7.

Unemployment Benefit Committee.—The Special Purposes Committee, in a report submitted to the January Council meeting, recommended that members compulsorily insured under the Unemployment Act should be exempted from the Fund so long as they were subject to the provisions of the Act. This, and a further recommendation that members on University staffs, or holding similar appointments, contributing to superannuation funds, should not be exempted from the Association's Fund, were adopted by the Council. The Council also decided that it was impossible to grant exemption to members compulsorily subscribing to Work's Benefit Funds. At the following Council meeting a case was brought before the Council of a member who, having paid six months' subscription to the Fund in advance, had become unemployed in the second month. The committee had decided that the member according to the rules was ineligibile to contribute while unemployed, and consequently was not eligible for benefit until he had been contributing as a member in employment for a further four months.

The report submitted to the July Council meeting by the Special Purposes Committee marked the end of the first year's working of the Fund, but, owing to the fact that during the first seven months nucleus funds were being accumulated and no benefits paid, the actual figures cannot be taken as representing a normal year's working. The data available, however, are of value in forming a more accurate estimate of the probable working of the Fund during the next year or so. They show the Fund to be financially sound and justify the optimistic forecast of its originators.

Subscriptions received during the year amount to £1,399. 3s., and benefits paid to £388. 2s. 6d. Administrative charges, including printing, postages, stationery, etc., amount to £30. 18s., and an additional amount of £101. 10s., being apportionment of rent and salaries is payable to the General Funds of the Association during the present quarter. The working expenses thus amount to less than 10 per cent. of the subscriptions received. The balance standing to the credit of the current account at June 30, subject to the apportionment charge already mentioned and to an amount of £89. payable for benefits accrued, is £492. 4s. 9d., £750. of 3½ per cent. Conversion Loan having been purchased at a cost of £608. 10s. 9d. Individual benefits paid during the past six months range from £4. to £95., the former representing 4 weeks at one unit, the latter 19 weeks at 5 units. That members appreciate the help given by the Fund is shown by the following letter recently received, which involves a voluntary foregoing of six weeks benefit:—"I start work in my new appointment on July 1. As this will naturally improve my financial position, and as I desire to show my appreciation of the help that the B.A.C. Unemployment Benefit Fund has been to me during the past few months, will you kindly consider that no further benefits are payable?"

Organisation of Research Associations.—The question of the organisation of various Research Associations, particularly in regard to the Government Grants and the benefit accruing directly to the public was brought before the Council by several of the local sections. Dissatisfaction with the Councils of certain existing Research Associations was freely expressed. On these Councils the chemists or other scientific workers directing the researches had no representation and very unsatisfactory programmes of research had been drawn up. It was agreed to request the local section committees to obtain further definite information concerning the activities of these Associations with a view to taking suitable action in co-operation with other bodies.

N.U.Sc.W. Negotiations.—Two further joint Council meetings with the N.U.Sc.W. have been held, and in connection with these negotiations the following members have been nominated to serve on joint committees:—Joint Publications Committee: Messrs. W. E. Kay, R. Brightman, E. H. Rodd. Joint Financial Proposals Committee: Messrs. H. E. J. Cory, S. R. Price and E. R. Redgrove.

Appointments and Resignations.—At the January Council meeting Mr. S. R. Price was obliged by pressure of other work to tender his resignation as Hon. General Secretary of the Association, but agreed to hold office until the next Council meeting. The Council accepted this resignation with deep regret. At the March meeting Mr. I. Boodson was unanimously appointed Hon. General Secretary to serve until the next annual general meeting. The Council has also received with regret the resignation of Mr. R. Brightman as Hon. Editor of the Association as from the end of the present year.

Other Business.—Considerable time was devoted to the consideration of the work of the Association during the ensuing year. It was agreed that a propaganda campaign should be inaugurated, working by means of special literature, an advertisement campaign in the Press and a series of rallies in the local sections, to be addressed by the Officers of the Association. It was further decided that consuls should be appointed to districts in which the Association is not already represented.

The attention of the Council was directed to two cases in which very inadequate salaries had been offered to chemists applying for posts, one being with a Corporation Gas Department and the other with a large electrical company. In the latter case a salary of £4. a week was offered for a man with at least two or three years work's experience and a thorough knowledge of both organic and inorganic chemistry. The letter addressed to the Association suggested that the chemist should also have had three or four years experience with a consultant analyst. The General Secretary replied stating that in view of the very low salary offered, he was unable to recommend any member of the Association to apply, and pointed out that a chemist with the qualifications desired was entitled to a commencing salary of at least £350. per annum.

MANCHESTER SECTION.

The annual general meeting of the section was held on March 28. In the course of his address the chairman, Dr. J. L. Hankey, referred to the activities of the section in connection with the Manchester Chamber of Commerce, on which the Association is represented by Mr. W. E. Kay and Mr. C. W. Carpenter. When the Chamber had arranged for its members to place before the local members of Parliament their views with respect to the Safeguarding of Industries Act and the Dyestuffs Act from the point of view of the manufacturer, the consumer and the merchant, our representatives had endeavoured unsuccessfully to obtain representation for the professional chemists engaged in those industries. However, it is realised that such efforts are of indirect value in bringing the Association before the notice of various important interests. After reviewing the activities of the Assocation such as the Appointments Bureau, the Legal Aid Fund, and the Unemployment Benefit Fund, Dr. Hankey discussed the question of the legal re-definition of the term "chemist." This he thought was a task that would require years for its fulfilment, but none the less he regarded the ambiguity at present attached to the designation "chemist" as one of the greatest hindrances towards a full recognition by the public of the proper status and dignity of the chemical profession. To the general public a chemist was still a man who sold or dispensed medicines, and the confusion was not removed by advertisements such as that recently inserted by the Retail Pharmacists' Associa-

tion in many important newspapers under the title "The Chemist." One well-known paper, commenting on a letter from the President of the Institute of Chemistry, expressed the opinion that it did not matter and that the context always told whether a scientist or an apothecary was meant. That was not the case and chemists desired that the word chemist should have one definite meaning and a similar professional implication in the public estimation to the words doctor, barrister, or solicitor. Only thus would the profession of chemistry secure the recognition to which it is entitled whether in industry, the Civil Service, or among the general public.

Dr. Hankey described the progress of the negotiations with the National Union of Scientific Workers, and explained the ideas underlying the joint activities contemplated. Chemists, he said, are scientific workers and all scientific workers have many common but comparatively few divergent interests. The various classes of scientific workers will of course have their own sectional interests, but these are seldom antagonistic and one might fairly say that on the whole all scientists were able to support whole-heartedly the economic and professional aspirations of their colleagues in whatever branch their work might be. Apart from this the N.U.Sc.W. included in their ranks a considerable number of chemists, who were for the most part engaged in Government service or in teaching whereas the majority of the members of the B.A.C. held appointments in industry. It was obvious therefore that if chemists were pressing for legislative or other measures in the House of Commons or elsewhere their case would be greatly strengthened if they could obtain for it the combined support of the two bodies. Advantages of this kind could not be obtained without a certain loss of independence, but in his judgment the advantages were well worth the price. However closely we might work with the N.U.Sc.W. we should retain for ourselves a sufficient measure of autonomy and the right to the distinct formulation of a programme. But without some kind of working arrangement Dr. Hankey was convinced that neither Association had any future.

In concluding, he urged that any society was what its members made it. In proportion as the members actively participated in its affairs by putting forward fresh ideas, making suggestions for the more efficient working of the society, supporting its journal by writing articles or by letters on matters of interest and by propaganda work among acquaintances so would that society be a growing and an influential concern.

LONDON SECTION.

The fifth annual general meeting of the London Section was held on Friday, April 6, at the Registered Offices of the Association, Mr. E. R. Redgrove in the chair.

After the usual business had been transacted, a general discussion on the work of the Association took place, the "B" qualification as usual being to the fore. An interesting paper on "Chemical Inspection" was then read by Mr. H. T. F. Rhodes, but the lateness of the hour prevented any discussion of the many points raised in the paper. Votes of thanks to Mr. Rhodes and to the Chairman and Officers closed the proceedings.

A very successful meeting was held by this section on June 1, in the Main Chemical Laboratory of the Royal College of Science, by kind invitation of the members of the Chemical Society of the Royal College of Science.

The speakers were to be Professor J. W. Hinchley and Mr. C. S. Garland, M.P. The former, unfortunately, was unable to appear, as he was called to Liverpool on an urgent legal case, but the latter rose to the occasion and fully justified his reputation as one of our best speakers.

His subject was "The B.A.C., what it is, what it can do, and what it cannot do." He gave a very succinct resumé of the activities of the Association, describing the work of the Unemployment Fund, the Legal Aid Department for advice upon such matters as Agreements, Victimisation, etc. He then dealt with the differences between the B.A.C. and Institute of Chemistry. Neither the Association nor the Institute were antagonistic to one another, but each had its own definite policy. Harmonious working was aimed at, and each was friendly toward the other. In its economic policy the B.A.C. was more free than the Institute, which was fettered by its Charter, while on the other hand the Institute as an examining body exercised greater influence in educational matters. It behoved every chemist to belong to both bodies if possible, so that he might partake of the full privileges of the profession. The B.A.C., of which he was one of the founders, was out to help the chemist in every direction. It was not a qualifying body and had never aimed at being such, but it was a body which had at heart the economic interests of chemists, the raising of the status of the chemist and of the plane of the profession of chemistry.

At the close of Mr. Garland's address an animated and interesting discussion arose, and a large number of the audience asked questions, indicating the great interest aroused by the address. These were adequately dealt with by Mr. Garland, and, after a cordial vote of thanks, the Chairman, Dr. H. F. Harwood, in the course of a few well chosen remarks, stated how glad he was to have been at the meeting and to have heard the elucidation of some obscure points. He was positive that everyone present had obtained a deeper insight into, and a clearer understanding of, the working of the Association and of the advantages enjoyed by its members.

THE MONTH IN ENGINEERING.

[Specially Contributed.]

The Recent Fuel Economy Congress in Paris.—There has been held in Paris, from June 8—17 last, an important Congress on "Fuel Economy and Industrial Heating," under the active Presidency of M. Walckaener, and the honorary Presidency of M. Le Chatelier. The proceedings included the reading and discussion of over 60 papers, which it is understood will be printed in one large volume (in French), which will be obtainable from the Secretary of the Congress du Chauffage Industriel, 246 Boulevard St. Germain, Paris. There was also held at the same time, from June 1—17, an exhibition of plant, machinery, and appliances relating to the business of the Congress. One of the chief features of the Congress was the attention devoted to pulverised fuel, and France is at present certainly doing more in this direction than any other country in Europe. It appears that the percentage of ash in most French coals is somewhat above the average, and as this may present some difficulties, several papers dealt with this aspect. It does not seem to have been quite realised, however, that the problem of the melting of the ash in the bottom of the furnace—that is, slagging—has now been entirely solved in America by the perfection of the water screen, combined with hollow air-cooled furnace settings throughout. A considerable amount of attention was given also to liquid fuel, in spite of the fact that this important question was discussed at great length at the International Conference on Liquid Fuels held in Paris last year.

The British contributions to the proceedings were represented by papers from Dr. C. H. Lander, who dealt with the work of the British Fuel Research Board, Dr. Marie C. Stopes, in connection with her well-known work on the constitution of coal, Professor Wheeler on his new method for determining in the laboratory the chemical re-activity of coke, and Mr. David Brownlie on the results being obtained on steam boiler plants in Great Britain, a suggestion for a new International Boiler Testing Code, and a third paper on the progress of low-temperature carbonisation throughout the world. The question of efficient steam generation in fact occupied a considerable amount of attention, another paper in this connection being that by M. Smal of Liege, who described in detail the work that is being undertaken in this direction in Belgium.

Research Professorships in Engineering.—The Royal Society have decided to establish in Great Britain a number of Research Professorships in engineering, that is to say, high grade posts in which the duties of the occupants will be research only. This is made possible by the recent gift of Sir Edward Yarrow to the Royal Society of £100,000. to be used to develop the science of engineering in any way they think fit, and the Council have very wisely decided to utilise this magnificent gift in the establishment of research on the above lines. The obvious difficulty, of course, is to find true research men, that is, as the Council of the Royal Society state themselves with regard to engineering, the men gifted with real insight and creative thought, and not those of the very numerous body who are in all essentials merely high-class mechanics capable of constructing ingenious mechanisms, devising pretty experiments, and of making accurate measurements, who in the very nature of things form the main mass of the Fellows of the Royal

Society itself. It is certainly a good sign that the Council should have delivered itself of such a disconcerting yet healthy opinion, which applies equally well to chemistry as to engineering and they are not losing any time in the matter since the advertisements regarding the vacancies have already been made public so that they may be filled in the autumn.

The Corrosion of Condenser Tubes. — The Corrosion Research Committee of the Institute of Metals, have just completed what promises to be a valuable piece of research work on the question of corrosion in condenser tubes, and a striking indication also of the important part played by the chemist in engineering. The report will be available in full very shortly, but it is understood that it will deal only with the corrosion caused by the presence of entangled air in the circulating water, which has been known to cause corrosion in condenser tubes within a few weeks, and even in less than one week in extremely bad cases. A prolonged investigation of condenser-tube corrosion undoubtedly makes the matter extremely mysterious, as the tubes are attacked in certain definite positions for no obvious reason, a striking characteristic being for example that if a given tube is attacked in one section, the next tube used for replacement is also attacked in the same place, so that the action is obviously independent of any possible flaw in the material, whilst the same applies to the material of which the tubes are composed, generally brass or other copper alloys, although certain special alloys with a high nickel content are more resistant.

It has now been proved conclusively as a result of this research, that the trouble is due to minor bubbles of air in the sea-water used as a cooling agent, and the action to some extent depends upon the velocity of the water passing over the surface of the tubes. This was determined by adding known volumes of air to sea-water and noting the effect of what may be described as the " bombardment " at different portions of the tube by the bubbles of air, the corrosion being enormously increased in proportion to the number and velocity of the air bubbles. It is not so much the total volume of air in the water that matters as the amount of sub-division of the air bubbles, and the smaller these are the more serious is the action, what may be described as " foam," consisting of a peculiarly intimate mixture of fine air bubbles with water, being much the worst. It was further noted that the addition of sulphuretted hydrogen to the sea-water added considerably to the effect, although the reason for this is not clear. As regards the methods of preventing such corrosion, it is not easy to suggest an effective remedy, since of course de-aerating sea-water is not a practical proposition if only because of the enormous volume of water handled for cooling purposes. Of course the pipe circuits and connections generally can be arranged so as to exclude as much air as possible, but the only method that seems to be available so far is the interesting one adopted by the Admiralty of treating the tubes beforehand, at a temperature of 100° F. (40° C.) for a week or two in sea-water which is stagnant, the result giving decidedly increased resistance to corrosion by air bubbles.

The " Marshall-Easton " Process of Low-Temperature Carbonisation.—The " Marshall-Easton " process is another new method suggested for the low-temperature carbonisation of coal and consists essentially in the use of a vertical retort equipped with two internal screw propellers, the heating being chiefly internal by means of the sensible heat of water gas. Internal heating using a hot neutral gas practically free from oxygen is extremely efficient from the point of view of heat transfer, much more so than any external method, whether at high or low termperatures, but one of the drawbacks, is that the final gas is of extremely low quality, the rich low-temperature gas evolved being mixed with the low grade heating gas. This new method is really a modification of the existing complete gasification processes. Messrs. Marshall and Easton contend that one of the practical difficulties of this method of gasification—irrespective of the temperature of carbonisation of the coal in the top vertical retort—is to ensure that coal will travel through the retort, as there is a frequent tendency to " jambing," whilst at the same time the heat transfer is very poor because the vertical retort is on the externally heated principle. The " Marshall-Easton " installation consists of a water-gas plant together with a vertical retort, but this latter—instead of being externally heated—has the blow gases, in which the combustion has been completed, passed up inside the body of the retort itself, although a certain amount of external heating is also included. Further the difficulty of the travel of the coal downwards is claimed to be overcome by the invention of the double vertical screw travelling in the body of the coal, and forcing it slowly downwards mechanically. The idea, of course, of an internal screw propeller is a very old one and has been adopted by numerous inventors, one of the earliest and best-known being Del Monte.

The inherent objection to all internal screw propellers is that as the coal softens during carbonisation it tends to block up the propellers, causing " jambing " in the retort. Some time ago Mr. Easton devised a method in which he used two screw propellers side by side, one screw working inside the other. It is contended that this simple and ingenious invention overcomes entirely the difficulty of jambing, since no matter how thick or pasty the material may be, it will not stop up two propellers working in this way one inside the other, as one propeller tends automatically to keep the other free. It is claimed that by this principle and the use chiefly of internal heating, using either the blow gases or the water gas itself that it is possible to work the combined process so as to obtain any desired quality of mixed gas suitable for household consumption from 260-550B.Th.U.'s per cubic foot, whilst at the same time recovering all the valuable low-temperature oils and obtaining from the vertical retort a continuous supply of low-temperature smokeless fuel. The water-gas plant can also be worked in any desired way, either using part of the low-temperature fuels that might be available, and the method should possess considerable interest to the gas industry as a variation of the existing water-gas plants.

The Trade Position.—The general position of acute depression in the engineering and allied industries has continued during the past month, the gist of the situation being that buyers are holding off as much as possible and that orders are coming in very slowly. The position with regard to the near future is giving rise to a considerable amount of uneasiness, and unfortunately there seems every prospect of a bad winter. At the present time the situation as regards pig iron is particularly depressing, and it appears certain that a number of blast furnaces will have to be closed down, whilst as regards steel, the position on the London Iron and Steel Exchange—almost approaching stagnation—can be said to apply practically universally, although perhaps one encouraging sign is that the severity of Belgian competition is diminishing. Shipbuilding remains in a disastrous condition, the matter being further complicated by the continued trouble with the boilermakers. The recent shipbuilding returns of the Liverpool Register for the quarter ending June show, however, that Great Britain has still an enormous lead in this section, having at the present time under construction 1,337,759 tons, as compared with the next competitor, Germany, with 352,405 tons. The amount under construction in the United States is actually only 133,600 tons, an incredible figure, especially as it was confidently expected that America would sweep the world with shipbuilding as soon as the war was over. The point is, however, that British shipbuilding, although retaining such a lead, is being undertaken at practically no profit because of the high price of steel.

General engineering is also very slack all round, and even the textile machinery portion is beginning to get a little anxious with regard to future orders, although still booked up for a considerable time to come. Fortunately, however, municipal work is engaging a considerable amount of attention, and the building of locomotives and rolling stock for railways is quite brisk, a number of large orders having been secured—especially in the Glasgow area—during the past few weeks. It is believed there is some extensive scheme on foot by the London Midland and Scottish Railway with regard to a proposal to electrify the main line between Carlisle and Preston, which would of course be of enormous benefit to engineering generally. The coal trade continues as in the previous month, with very big shipments, but also with some anxiety as regards the future. In the first six months of 1923, the total amount of coal shipped from Great Britain was 39,808,881 tons, which is a record for the British coal trade, being actually 12 per cent. more than for the corresponding period in the boom year of 1913. This is equivalent to 6,634,813 tons per month, as against 5,921,039 tons in the same period in 1913, and 4,530,660 tons in 1922. The influence of the Ruhr complications on the coal trade is shown by the fact that Germany, in the first half of 1923, took 8,000,000 tons as against 4,500,000 tons in 1913; France 9,500,000 tons as against 6,500,000 tons, and Belgium 3,500,000 tons as compared with 1,000,000 tons. The fuel boom due to the Ruhr seems, however, to now be coming to an end.

PARLIAMENTARY NEWS.

Smoke Abatement Bill.

In the House of Lords on Thursday, July 26, the Smoke Abatement Bill was read a second time.

Government Oil Boring.

In the House of Commons, Lieut-Colonel Lane-Fox (the Secretary for Mines) replying, on Tuesday, July 24, to Mr. Hannon, said: The approximate amount realised during the year ended March 31, 1923, by the disposal of Government buildings and plant utilised in the Government oil-boring experiments was £25,000. The amount reserved for interest on Exchequer advances and on administrative charges amounted on March 31, 1923, to £104,903. The total loss on the undertaking at that date, including such interest, was, approximately, £678,000.

German Reparation (Recovery) Act.

The Financial Secretary to the Treasury (Sir W. Joynson-Hicks), replying on Wednesday, July 25, to Mr. F. Gray, said: The total amount collected by the Commissioners of Customs and Excise under the provisions of the German Reparation (Recovery) Act, up to June 30 last, inclusive, was £13,264,282.

British Dyestuffs Corporation.

Mr. Collison, on Thursday, July 26, asked the President of the Board of Trade whether he is aware that an export inquiry for the price of 20 tons of Indigopur was recently offered by the official distributors for the British Government at 7s. 1d. per lb., against the price of the same article for home consumption at 8s. 6d. per lb.; and, in view of the fact that this shows a difference of £3,173. 6s. 8d. on this order in favour of the foreign buyer, will he give instructions to the official distributors to discontinue such discrimination against the home user?

Viscount Wolmer: I presume that by official distributors the British Dyestuffs Corporation, Ltd., is meant, and I am informed that no such offer as is mentioned in the question has been made by the Corporation in respect either of any reparation indigo or of indigo of their own production. If the hon. member has definite evidence to the contrary, I shall be glad to consider it.

British Dyestuffs Industry.

On Thursday, July 26, the Board of Trade Estimates were further considered in the House of Commons. In the course of the general debate on trade, Mr. H. H. Spencer drew attention to the dyeing industry of the country, and complained that the British dyestuffs manufacturer was given an undue preference by the prohibition of importation under certain conditions. He denied that the dye-making industry is necessary to the textile trade, or has been of advantage to that trade. It was established, he said, solely because of the danger of war, and it was not just that the colour user should, as he was at the present time, bear the whole cost of the industry. Further, he stated that goods produced in his own factory, and dyed with a colour identically the same as that used by a foreign competitor, were 1d. to 2d. per yard dearer in London than the foreign imported material. Mr. Spencer also considered that the colour users did not approve of, but only accepted the Dyestuffs Act, and expressed strong disapproval of the Licensing Committee.

Sir Thomas Robinson (chairman of the Dyestuffs Licensing Committee) said: As chairman of the Licensing Committee, I think it my duty to point out one or two things. The Act was approved by the dye users. On December 3, 1920, it was submitted to a meeting of dye users, and practically unanimously approved. The Bill was examined in every line and every paragraph, and assent was given. The Government were notified of that assent, and the dye users supported the Bill through all its stages, so there can be no doubt about it that this Bill has had practically unanimous support of the colour users of this country.

At the present time approximately 94 per cent. of the applications for licences have been dealt with within four days of the application being received; 62 per cent. have been dealt with on the same day. I am very glad to say that we are receiving very few complaints. If we are told by the experts that certain colours must come in, we endeavour to satisfy the applicants. In some cases we do not grant leave for the full quantity applied for, but we are mindful in such cases to license a quantity to keep the industry running. There are in the country, I believe, a number of purchasers who are what we term middle-men. Some of them during the war made pretty large fortunes. Some of them make a fair living dealing with dyestuffs. It is quite true that some of these people have suffered. The trouble is this—and there is evidence for it—that France, Belgium, and Italy are taking in reparation colours in larger volume than they can consume, or ever have consumed, and they sell the surplus outside to dealers.

Lieut.-Commander Astbury: It has been said by several hon. members that the textile industry of this country is being ruined by the present scheme. Really to those of us who are consumers of dyes, and have been consumers in some cases for 25 or 30 years, the whole thing is too absurd to answer. I have given figures to this House time after time, and I am going to give them over again this afternoon. When I tell the House that on the production of 150 yards of cloth the total cost of the dye in the production of that cloth is only 3 per cent. of the whole, what folly is it to come forward and say that this licensing scheme is ruining the textile industry! If there were no licensing whatever the cost of the printed and dyed cloth would not come down one brass farthing.

Now, where are the complaints coming from with regard to people not being able to get these dyes from abroad? When the war broke out nearly every alien in this country bought up all the colours he could, and these men, who had only a few shillings to bless themselves with before the war, sweated us in the price of these colours, and we shall never forget it. Complaints are coming now from the same agents that they cannot make a profit for themselves so long as they cannot import the colours here and sell them to us at an increased price. Those are the men who are complaining that they cannot get the colours. Only last night an hon. member showed me a letter from a firm complaining of the way the Licensing Committee was operating. The letter stated that they were ruining the textile industry of this country. I looked at the heading of the letter, and I said that that firm was only a small firm of agents in Manchester who were selling this colour before the war. They want to get hold of the surplus colours which are at present in foreign countries in order that they may undersell our colours in this country. What is going to happen now if you allow Germany free access to this market? To-day the colours that we cannot produce in this country the Germans are selling at sweating prices in France. The Germans are charging us to-day 8s. 6d. per lb. for colours which we cannot manufacture here, and the colours which we have been manufacturing here they are dumping at any price.

Mr. Pringle: Why do we not take these colours in reparation?

Lieut-Commander Astbury: Because if we take these colours from Germany we shall be ruining our own colour works here.

Mr. Pringle: But you do not make them.

Lieut.-Commander Astbury: You cannot make here every colour that a country has been making for the last 50 years in six months' time. You have to allow a reasonable time to make them. For all the colours we cannot produce Germany is sweating this country and they wish to undersell us in regard to the colours we are making, and then she will bring down with a crash the dyeworks of this country, and once she has done that she has the trade in her hands as before the war, and she can put up the price of the cheaper colours, and what state then will your textile trade be in?

Mr. Pringle: Why do we not take in reparation the colours which we do not make, and in regard to which Germany has a monopoly, and is selling at sweating prices?

Lieut.-Commander Astbury: We take 25 per cent. of those colours that we cannot make in this country, but that is a reparation question and does not deal with this subject. It does not deal with the business position. My argument is that if this country once again allows Germany to smash our works and get possession of our colour production your textile trade is ruined once and for all.

Silica-gel Refining Process.—The Davison Chemical Company, of America, has signed a contract with the Royal Dutch Shell Company, allowing that corporation the use of its silica-gel refining process. The arrangement is said to be practically the first one from which the Davison Company may be expected to derive signal benefits, as the holder of 49 per cent. of the stock of the Silica-Gel Corporation, which owns the patent.

ITEMS OF INTEREST.

Coal Output.—The output of coal for the week ended July 21 was 4,601,000 tons, compared with 5,041,000 tons in the preceding week and 4,390,800 tons a year ago.

Unemployment Figures.—The Ministry of Labour states that the number of persons on July 23 registered at the employment exchanges in Great Britain as wholly unemployed was 1,184,900. This was 4,239 more than in the preceding week, but 300,988 less than on January 1.

U.S. Bureau of Chemistry.—Dr. Charles A. Browne, of New York, has been appointed head of the Bureau of Chemistry, United States Department of Agriculture. Dr. Browne is at present chemist in charge of the New York Sugar Trade Laboratory, Inc., and will not take up his new duties until the autumn. Dr. Browne was formerly with the Bureau of Chemistry, resigning in 1907 to accept the position with the New oYrk Sugar Trade Laboratory.

Obituary.—We regret to record the death, at the age of 46, of Mr. E. V. Chambers, principal of the firm of Messrs. Chambers and Hammond, chemical engineers, of Halifax, who have erected the new tar distilling plant at the Mossley Gasworks, opened on Saturday, July 21. Mr. Chambers, who took part in the ceremony, was seized with a sudden illness after delivering an address, and he expired just before midnight.

Scottish Factory for Treatment of Seaweed.—It is reported that at Stromness, Orkney, a factory on a larger scale for the treatment of seaweed is to be erected which, with a suitable pier, is to cost £68,000. The seaweed will be treated for the extraction of potash, iodine, and other chemicals, and the seaweed residue, when mixed with crude oil refuse from Mexico, will be shipped to various centres for making into coal briquettes.

The Dyestuffs Act and the Irish Free State.—It is reported from Dublin that among the list of bills which the Government of the Irish Free State will introduce in the near future is one to deal with the dyestuffs question. The intention is to repeat the existing duty on German dyestuffs, and to facilitate import by granting licences to all bona-fide users. It is anticipated that very little opposition will be aroused to the measure. It is also possible that the Safeguarding of Industries Act will be modified considerably.

Science and Cacao Production.—We have received from the Publication Department of Messrs. Cadbury Brothers, Ltd., Bournville Works, Birmingham, two pamphlets prepared by A. W. Knapp, B.Sc., F.I.C., the head research chemist. The pamphlets which are both priced sixpence deal with "The Separation and Uses of Cacao Shell" and "The Application of Science to Cacao Production" respectively. They are well produced and illustrated and should make appeal not only to the chemist who does not specialise in this class of work, but also the lay public.

British Industries Fair.—The Board of Trade announce that the British Industries Fair will be held at the White City, Shepherd's Bush, from April 28 to May 9, 1924. It is stated that in selecting the date the Department appreciated that the holding of the British Empire Exhibition from April to October next year must materially affect the attendance of overseas buyers. United Kingdom firms eligible for participation in the Fair will receive forms of application for space during the first week of October, 1923. The Birmingham section of the Fair will be held from May 12 to May 23.

Institute of Chemistry Pass List.—The following candidates have passed the examination for the Associateship. In general chemistry: A. C. Anderson, J. Barnett, H. G. Beard, W. F. Bennett, W. Booth, T. H. Bott, F. J. Bubb, R. Child, W. Crombie, B. W. A. Crutchlow, R. H. Curtis, P. Faichney, A. W. Fairgrieve, A. T. Groves, A. N. Harrow, S. Hibbert, H. E. Hill, N. E. Jones, L. G. Kimmins, C. S. Kirby, W. M. Laing, P. J. Leaper, R. Lindsay, J. McGrath, A. P. Mieras, M. A. Mosley, R. B. Moyes, J. H. Oliver, D. Paul, A. Pound, J. A. H. Rosewarne, W. L. Russell, H. N. Saunders, R. Scott, C. G. Smith, Miss S. M. L. Snelus, G. D. D. W. Thacker, B. Thomas, H. Threadgold, J. D. Tully, J. Walker, W. H. Wells, A. S. Wilkie, G. E. Wilson, T. Wood, A. R. Wylie. In metallurgical chemistry: T. G. Howard. In food and drugs: J. E. Woodhead. In chemical technology: G. F. Martin. The following Associates have passed the examination for the Fellowship: N. Hackney, W. O. R. Wynn, A. Cohen, and J. E. Ritchie.

Caustic-soda Plant for Brazil.—In a report to the U.S. Department of Commerce, it is stated that the Companhia Brasileira de Productos Chimicos is receiving a loan of approximately $120,000 from the Brazilian Government to assist it in erecting a caustic soda factory in the city of Rio de Janeiro. As a guarantee for the loan, the company has pledged its present factory, which has been valued at $235,000.

Tariff Notes.—The duty leviable on copra exported from Dominica is reduced from 35s. to 20s. per ton.—Salt and ground nuts may now be imported into Zanzibar free from Customs duty.—According to a French decree dated July 16, the "coefficient of increase" of 2.5 which formerly applied to the import duties on crude iodine is reduced. This article is now dutiable at 1,600 and 400 francs per 100kilogs. under the General and Minimum tariffs respectively.

Sugar Beet in Great Britain.—A permanent Beet Committee has been set up at the headquarters of the National Farmers' Union. It is suggested that in future all contracts should be issued through the Farmers' Union, and the Committee endorses this view. Some difficulty in getting railway facilities for sending the crop away is anticipated, and negotiations on the subject are proceeding with the railway companies, in addition to which it is hoped to secure a better rate of transit for the large tonnage.

Application for Restoration of Lapsed Patent.—Notice is given that Konstantin Tarassoff and Peter Shestakoff have made application for the restoration of the patent granted to them for an invention entitled "Process for obtaining solid products of condensation from phenols, formaldehyde, and salts of sulpho-acids," numbered 102,635 (956 of 1916), January 20, 1916, which expired on January 20, 1920, owing to the non-payment of the prescribed renewal fee. Notice of opposition to the restoration must be made on or before September 11, 1923.

Cheshire Salt Deposits.—The conversion of a typical agricultural area into a centre of industry is rapidly taking place at Elton, Sandbach, says the *Liverpool Post*. A large tract of land, formerly included in the estate of the Marquis of Crewe, has been purchased by the British Soda Company. Shafts have been sunk, and works are in course of erection for the making of salt, soda, etc. Not a quarter of a mile away another firm of salt manufacturers (Messrs. Palmer and Mann) have sunk a brine shaft, and they are to start building operations immediately.

Nickelling Cast Iron.—Several American foundries are said to be experimenting with cast iron to which from 2 to 4 per cent. of nickel has been added. In the research department of the International Nickel Company of Canada, Limited, there has been developed a nickel bearing type of stainless steel said to contain from 20 to 40 per cent. of nickel, 6 to 12 per cent. of chromium, and 0.25 to 2 per cent. of silicon, which can be readily machined and fabricated. One rolled sample tested gave:—Tensile strength, 44.5 tons per square inch; yield point, 26 tons; elongation, on 2in., 20 per cent.; and reduction of area, 50 per cent.—*Engineer.*

Municipal Contract for Foreign Firm.—At a meeting of the Metropolitan Water Board on Friday last, strong protests were made against the recommendation of the Works and Stores Committee that the tender of Messrs. Christiani and Nielsen, a Danish firm with offices in London, should be accepted for the construction of eighteen concrete primary rapid filters and other works at Walton. The amount of the tender was £116,114. 19s. 2d., and the next lowest tender was that of Messrs. J. Parkinson and Sons, Ltd., Blackpool, £126,176. 14s. 3d. The recommendation of the committee was adopted with an addendum that all the labour employed in connection with the contract should be British.

Legal Intelligence.—Mr. Justice Romer, in the Chancery Division, London, on Monday, gave judgment in the action by Mr. William Watson, dyer, of Dundee, against the Organic Research Company, Ltd. and Mr. William Alfred Bromwich to recover £2,000. which he had paid for shares in the defendant company. The action against Mr. Bromwich failed, but his lordship declined to grant him costs, because the whole of the trouble was due to his carelessness. As against the company, he held that Mr. Watson succeeded. He applied to the company for unissued shares; he never intended to take shares belonging to Mr. Bromwich, and the company knew that they had no shares they could not allot him. There would be an order for repayment of the £2,000., but without interest, against the company with costs.

Australian Mining Company Ceases Operations.—It is announced that the directors of the Australian Broken Hill (Block 10) Company, Ltd., propose to discontinue operations on the property, and to take the necessary steps to dispose of the assets.

Compensation for Belfast Soap Makers.—In the Belfast Malicious Injury Claims Court on Tuesday, an award of £40,000, was made to Messrs. Shaw and Co., Ltd., Queen's Bridge Soap Works, Mountpottinger Road, in respect of damage to their premises during the disturbances of last year. The amount claimed was £57,000.

Quebec Asbestos Output.—During 1922 the asbestos sold and shipped from the mines of Quebec amounted to 160,339 tons, as compared with 87,475 tons in 1921. Lower prices prevailed, however, the 1922 output being valued at 6,053,068 lols., and that for 1921 5,199,789dols., an increase of 83 per cent. in output, but only 16.7 per cent. in value.

Imperial College of Science.—The Clothworkers' Company of the City of London have offered an annual contribution of £3,000. for the period of five years 1923-1927 to the Governing Body of the Imperial College of Science and Technology, South Kensington, to be applied towards the maintenance and development of the City and Guilds (Engineering) College.

Hull Chemical and Engineering Society.—The syllabus for the coming session, 1923-24, contains a number of interesting papers, and, as usual, covers a wide range of subjects. The Society is now 175 strong, and is in a good financial position. A library for the use of members is in course of formation for the coming session. The secretary of the Society is Mr. R. A. Bellwood, 24, Cavendish Square, Margaret Street, Hull.

Leeds University Agricultural Department.—The erection of the new building to house the Agricultural Department of Leeds University is about to be commenced in the new future. This has been made possible by a number of handsome donations from the late Mr. Walter Morrison, the late Mr. Henry Putson, Major J. W. Dent, and Mr. J. Emmanuel. A Treasury grant, through the Ministry of Agriculture, of £12,000., promised in 1914, has recently been increased to £15,000., and the Yorkshire Council for Agricultural Education have made a contribution of approximately £10,000.

Reduced Railway Rates.—The railway companies of Great Britain have given official notification that they are reducing their rates for the carriage of merchandise traffic by goods train from 60 per cent. about the rates in force on January 14, 1920, to 50 per cent. above those rates. The reductions take affect from August 7. All goods are included, with the exception of agricultural products and requisites, which are already carried at the new rate level, and of certain specified traffics for blast furnaces, or which the most important are iron ore and ironstone, these being already at 40 per cent. above the old standard. It is noted that no alteration is to be made to the flat-rate additions to the charges.

The Glowing of Phosphorus.—The glow of phosphorus, due to slow oxidation, appears when the substance is exposed to air, but very curiously disappears in oxygen under high pressure. Illustrating to the Royal Society of Edinburgh the effects of different pressures of oxygen, Dr. Elizabeth Gilchrist pointed out that some gases promote the glow, while others act as poisons to it. She found reason for concluding that reaction with oxygen occurs in two stages—phosphorus trioxide being produced in the first stage, without glowing, and phosphorus pentoxide in the second stage, with glowing. The damping effect was attributed to the production of an anti-catalyst—probably negatively charged molecules.

Electrolytic Production of Calcium Arsenate.—It is reported from America that an electrolytic method for the manufacture of calcium arsenate has been worked out with complete success. The inventor of the process is Mr. A. M. Kennedy, who commenced his experiments with the Alabama Power Company and carried them to completion in the laboratories and plant of the General Electric Company. The electrical requirements amount to something less than one kilowatt-hour of current for every pound of calcium arsenate manufactured, and it is anticipated that the material can be sold at something under 70 per cent. of its present cost. The new plant will be in full operation by the end of this year and the whole of the American cotton growers' requirements for 1924 may be met.

CORRESPONDENCE.

*** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

SOIL ACIDITY AND THE USE OF SUPERPHOSPHATES.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—In a review of a new fertiliser process the other day it was stated that because less sulphuric acid would be consumed in its manufacture the use of the new fertiliser would reduce soil acidity. I have also observed in the columns of the Agricultural Press from time to time statements to the effect that the continued use of superphosphate increases soil acidity.

It is, I think, fair to say that soil acidity is a subject on which there is much loose talk and loose writing. To the unitiated it may appear, and I believe, does appear to be inevitable that superphosphate will make a soil acid or sour, because sulphuric acid is used in the process of manufacture; but experiments have proved that this assumption is entirely erroneous. Soil acidity assumes many forms and arises from a variety of causes. The acidity apparently may be either vegetable or mineral and of the two the latter is infinitely more harmful to plant life than the former. Now whilst it is true that a substantial quantity of sulphuric acid is used in making a ton of superphosphate, what is not so generally recognised is that a very large proportion of such acid is neutralised by the lime present in the phosphate rock from which superphosphate is made, forming sulphate of lime or gypsum which well-informed French opinion regards as having of itself a considerable value as a fertiliser. Sulphate of lime is a stable compound which is not readily broken down in the soil, hence the acid so neutralised may be said to be permanently absorbed. The real fertilising value of superphosphates, however, lies in the phosphoric acid it contains which by the process of manufacture is rendered water soluble and immediately available for plant food when applied to the soil.

Experiments have demonstrated that, entirely contrary to general opinion, superphosphate, even where its use is long continued, actually reduces soil acidity. Thus in Bulletin No. 189 (1922) of the Agricultural Experiment Station of the Rhode Island State College it is demonstrated that the use of superphosphate on the College plots over many years actually reduced acidity, the soil being less acid where greater quantities of superphosphate had been applied than where the superphosphate dressings had been lighter. The "Jones" method of expressing acidity is adopted in the Bulletin which is to state the quantity of lime required per 2,000,000lb. of soil. The lime requirement of the plot where no superphosphate had been used was found by this method to be 2,700lb., whilst where the superphosphate dressing had been heavy it was 2,250lb., and where the superphosphate dressing had been lighter 2,340lb. were required.

It is probable that many of the sour or acid soils of the United Kingdom come into the mineral category, many of the clay soils for example probably contain soluble salts of aluminium, and it is generally recognised, I believe, that especially in the Midlands there is much land containing an excess of iron. The salts of iron and aluminium are very harmful to plant life, and it is, I venture to suggest, upon sour soils containing either or both of these elements in excess that superphosphate will exercise its maximum influence as a reducer of soil acidity. It is well known that phosphoric acid has an affinity for iron and aluminium bodies, with which it readily unites to form the insoluble compounds, phosphate of iron and phosphate of aluminium respectively. It has been pointed out that superphosphate supplies phosphoric acid in a water-soluble form, hence a dressing to such a soil would inevitably have a beneficial effect in reducing the contents of iron and alumina. There would appear to be a fruitful field for expert investigation in this connection.—Yours, etc.,

(For the Fertiliser Manufacturers' Association, Ltd.)
A. N. Gray (Manager).

London, E.C. 3,
August 1, 1923.

FERTILISER NEWS.

Nitrate of Soda.—Preliminary figures for the month of July indicate that production is on the increase, the estimated total of the month amounting to 162,000 tons. Exports from Chile are estimated at about 171,000 tons, leaving stocks on the West Coast in the neighbourhood of a million tons, compared with 687,000 tons at the same date (July 31) in 1914. Of the total shipments, 75,000 tons are due for Europe, 66,000 tons for the United States, and the balance of 30,000 tons for Japan and other countries. Present stocks in Europe are very low, deliveries inland from ports, at 37,000 tons, having exceeded imports by 20,000 tons. At the end of the month there was no more than 71,000 tons in importers' hands, though stocks in the possession of country dealers probably amount to a considerable quantity. This figure compares with 194,000 tons last year, 763,500 tons in 1921 (the result of the Pool's activities), and 142,000 tons in 1914. Adding the quantity afloat for Europe and Egypt, it is seen that the visible supply for this market is less than it has been for many years. Consumption, represented broadly by the figure given as "Port deliveries," is larger than for the same month of last year, which in its turn was an increase on 1921. This increase, however, may be partly attributed to the late season for beet, due to the inclement weather earlier in the year. Inquiry on this account is said to be fair, and it is reported also that the acreage available is rather larger than last year. It is significant that there is an all-round drop in consumption, every purchasing country participating in the decrease, when compared with July, 1913. Germany, of course, is the most notable in this respect, taking only 3,000 tons, against 46,000 tons in July, 1913. Deliveries in the United States were much smaller at 11,000 tons during July, against 52,000 tons in the corresponding period of 1914. Other countries reported deliveries amounting to only 1,000 tons. The total supply in sight as at July 31 last, including stocks in all the consuming markets, and in Chile, together with the quantity afloat, is estimated to amount to 1,372,000 tons, which is a much better figure than for the past two years.

Swedish Fertiliser Industry.—The superphosphate market in Sweden during 1922 was not as active as was expected. Among the causes contributing to its depression were bad weather during the summer and autumn, reduced growing of sugar-beets, and economic depression in agriculture. The domestic market was about equal to that of 1921, while exports amounted to 20,311 metric tons, against 18,382 metric tons in 1921. Most of the superphosphate was exported to Finland, Esthonia, Latvia, and Central Europe. The imports of phosphate rock amounted to 71,289 metric tons, against 70,224 in 1921. The domestic production of superphosphate was about 135,000 metric tons, or only about 55 per cent. of Sweden's full production capacity. The domestic sale of cyanamide was about equal to that of the preceding year. The export demand for cyanamide was considerable during the latter part of the year, and all plants are at present working at their full capacity. The sulphate of ammonia plants have been busy during the year, principally for export, as the domestic consumption of sulphate of ammonia is small. The demand was greater than the supply during the last months of the year. Imports of nitrate of soda amounted to 20,179 metric tons, against 26,051; and the import of nitrate of lime was 17,640 metric tons (14,938 tons in 1921). Imports of potash salts were 77,652 tons during the year, of which 3,100 tons came from France. Imports during 1921 were only 37,625 tons, the stocks on hand at the beginning of the year being large. The importation of pyrites has increased from 58,002 metric tons during 1921 to 78,067 metric tons in 1922, and the import of sulphur has also increased from 21,037 metric tons to 58,346 metric tons. The year 1922 was principally a year of reconstruction. The prospects for 1923 are rather bright, though the foreign competition is still strong.

General Notes.—Nitrate of soda continues to attract some attention in the home market. At London, nitrate of lime, which is in short supply, meets with a good inquiry, while kainit is in request for forward delivery. Basic slag attracts a fair trade at recent rates. Bone meal and steamed bone flour are not in much call, while superphosphate, sulphate of potash, and chloride of potash are inclined to be cheaper. In the North, fertilisers have been neglected, as is also the case in the Hull district, and prices continue unchanged and more or less nominal. In the West there is some inquiry for basic slag for autumn delivery.

The reports presented by two well-known fertiliser manufacturers in this country—the Anglo-Continental Guano Works, Ltd., and Messrs. W. and H. M. Goulding, Ltd.—indicate a falling off in the profits for the last financial year. In the case of the former the ordinary dividend has been passed over, while the latter have reduced the dividend from 8 per cent. to 5 per cent. There is little doubt that the great slump in agricultural produce, chiefly potatoes, during last year has considerably affected the disposition of the farmer to purchase fertilisers during the past season.

American fertiliser manufacturers have signed a contract with the German Potash Syndicate. Owing to the low prices offered by the Germans, the contract is expected to have an important bearing upon rates made by Alsatian potash producers. The prices in the new German contract are the lowest since the war and below pre-war levels.

Increased use of fertilisers in the cotton area this year as compared with last year is reported to the United States Department of Agriculture. More than 37 per cent. of the area has been fertilised, as compared with 32 per cent. last year. A number of individual States show larger increases.

Fertilisers are being used more generously in Italy than at any time since the war. One of the most important Italian fertiliser manufacturers states that in 1922 the firm supplied 541,414 metric tons of superphosphates, as compared with 501,976 metric tons in 1921, and adds that the strong demand for the spring of 1923 indicates that sales for the present year will reach 600,000 metric tons. The same manufacturer predicts a total of 1,070,000 metric tons for 1923, which would equal pre-war consumption.

The phosphoric-acid unit of the American cyanide plant, Brewster, Fla., was destroyed by fire, with estimated loss of between 400,000dols. and 500,000dols. The plant was used for experimental purposes and was controlled principally by the Virginia-Carolina Chemical Co. and J. B. Duke for the electrolytic production of pure phosphoric acid from pebble phosphate.

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REPORTS OF COMPANIES.

Anglo-Continental Guano Works, Ltd.

The annual general meeting was held in London on Thursday (July 26), Sir Archibald Mitchelson in the chair. The chairman first referred to the regretted death of Sir Ernest Clarke, a former member of the board, and then, in moving the adoption of the report and accounts, continued as follows: Your directors realise the disappointment which shareholders will experience at a reduction in the company's earnings, particularly because, when the last general meeting was held just a year ago, a decidedly more hopeful atmosphere prevailed in the fertiliser industry. Unhappily, a bad agricultural season supervened. The potato crop was a heavy one, but, owing to unrestricted and quite abnormal imports of potatoes from the Continent, the home market was swamped; prices fell below the cost of production, and growers suffered a severe loss. The price of cereals, and, in fact, of all produce, fell disastrously; there remained no bright spot in agriculture. This company, having its chain of factories to draw from, had held its own against very severe competition. We knew that where others might fail, we could hope to succeed, by reason of our lower cost of transport from factory to farm. There was good reason to hope that our foreign competitors would be tired of selling over here at a loss and would raise their prices, enabling us to obtain a reasonable return on our own sales. What we could not foresee was the disastrous further fall in the foreign exchanges, coupled with a complete demoralisation in the fertiliser markets everywhere. The conditions in which our business had to be conducted underwent a great change for the worse, and our principal difficulty, though not the only one, was the vital disparity between sterling and the Continental currencies.

Turning to 1923, we find it extremely difficult to prophesy; the state of agriculture is not yet showing clear signs of improvement. Many farmers have been hard hit; credit is somewhat shaky, and merchants are buying cautiously. The agricultural demand is mainly for the cheapest articles, whether of British or foreign manufacture. We and our subsidiary companies have sold considerable quantities of fertilisers during the spring, but the lower-priced grades predominate, and in these competition has been severe. We do not fear any ordinary competition, but I should just like to express the view here that the business we are engaged in is of such vital importance to the country, both in war-time and in peace, that, in the circumstances to which I have alluded, it becomes a very serious question whether the Government should not extend some form of protective help, at least until such ruinous competitive conditions, brought about by present rates of exchange, have passed away.

W. and H. M. Goulding, Ltd.

Net profits for year to June 30 last, including dividends from subsidiary companies and refund of excess profits duty, amount to £35,139., out of which £7,000. is set aside to cover estimated discounts on realisation of outstanding debts; £7,940. was brought in, making £36.079. available. After providing for debenture interest and preference dividend, directors recommend a dividend of 5 per cent. on ordinary shares for year, 2s. 6d. per share payable forthwith, and second 2s. 6d. per share payable December 31 next, less tax; to depreciation account, £5,000.; forward, £3,904.

Arizona Copper Company, Ltd.

According to the last issued accounts a sum of £300,000. had been recovered on account of excess profits duty, and the balance of £61,235. previously admitted is now to be repaid. The income-tax claims on both sides have also been adjusted, and after charging tax on the whole sum recovered for excess profits duty, a further sum of small amount will be repayable by the revenue. An interim dividend of 1s. per share, free of tax, will be paid on November 1 next.

Consett Spanish Ore Company, Ltd.

Report for year ended June 30 last shows net revenue of £4,994., with £526. brought in. Balance available is £5,674. Final dividend is 1s. per share, making 2s. per share, or 10 per cent. for year. As, however, distribution absorbs £5,520., sum of £526. has been taken from undivided profits account, leaving latter at £5,674.

DIVIDENDS.

English Velvet and Cord Dyers Association, Ltd.—Interim dividends for half-year to June 30 at rate of 5 per cent. per annum on cumulative preference shares, and at rate of 6 per cent. per annum on ordinary shares, both less tax.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained.

South Africa.

The Municipal Council of Johannesburg are calling for tenders for the supply of 200 Imperial gallons of aluminium paint, to be presented not later than noon on August 27, 1923 (Contract No. 108). (Ref. D.O.T. 11,706/E.D./C.C./2.)

Belgium.

A Belgian firm established at Verviers desire to get in touch with British firms manufacturing or exporting tanning extracts and other products used in the manufacture of leather. Correspondence in French. (Ref. No. 103.)

India and Straits Settlements.

The travelling representative of a well-known British firm manufacturing chemicals, drugs, etc., who visits India, Burma, Ceylon, Straits Settlements, Siam and Java annually, is desirous, with the concurrence of his principals, of undertaking the representation of one other British firm manufacturing non-competitive lines. (Ref. No. 119.)

Argentina.

The Commercial Secretary at Buenos Aires reports that the State Railways are calling for tenders, to be delivered on various dates between September 10 and October 3, for material for next year's stores, as follows: Chemicals, foundry materials, glass, paints and varnishes, etc. (Ref. 8495/F.L./G.P.)

NEW COMPANIES.

Barons, Ltd.—Private company. Capital £1,000. Manufacturing, consulting, and general chemists, etc. Office: Derby Street, Cheetham, Manchester.

Birmingham Rubber and Chemical Co., Ltd.—Private company. Capital £1,000. Office: 23, Whittal Street, Birmingham.

International Commodities, Ltd. — Private company. Capital £500. Importers and exporters of perfumery and toilet commodities, manufacturers of toilet soaps, etc. Office: 229-230, Bank Chambers, 329, High Holborn, London,

Lavoclean, Ltd.—Private company. Capital £10,000. Manufacturers of a chemical compound known as "Lavoclean." Address: Windyridge, Grays, Essex.

London Casein Works, Ltd.—Private company. Capital £2,000. Office: City Press Chambers, 148 and 149, Aldersgate Street, E.C.

Maltby's Morpowr Co., Ltd.—Private company. Capital £1,000. Manufacturers of polishes and soaps, etc. Solicitor: F. Hall, Bouverie Chambers, Folkestone.

Silloth Products, Ltd.—Private company. Capital £3,000. Manufacturers and dealers in foods and food products, etc. Office: Confectionery Works, Esk Street, Silloth, Cumberland.

Whitewall Manufacturing Co., Ltd.—Private company. Capital £6,000., in 5,000 preference shares of £1. and 10,000 ordinary of 2s. Dealers in ores, metals and minerals, tar extractors, etc. Office: 20, Grosvenor Gardens, Westminster, S.W.

Charnock Bros. and Co., Ltd.—Private company. Capital £5,000., £1. shares (1,000 preference). Oil and grease manufacturers and merchants. Office: 19-21, Scrabo Street, Belfast.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Aluminium Corporation, Ltd., London, S.W.—Registered June 30, £250,000. 2nd deb. stock (filed under sec. 93 (3) of the Companies (Consolidation) Act 1908); present issue £150,000. (ranking pari passu with £100,000. debs. dated July 27, 1920, and £150,000. debs. dated June 13, 1921).

Egyptian Central Oilfields, Ltd., London, E.C.—Registered July 9, £2,000. debs., part of £20,000.

Maitland (A.) and Co., Ltd., London, W., chemists.—Registered July 11, charge, to London Joint City and Midland Bank Ltd., securing all moneys due or to become due to the Bank.

Pastex Dyes, Ltd., London, N.—Registered July 13, £600. deb., to Central and Western Corporation, Ltd., Fitzalan House, Arundel Street, W.C.

Rushden Chrome Tanning Co., Ltd.—Registered July 11. mortgage to National Provincial and Union Bank of England Ltd., securing all moneys due or to become due to the Bank.

SATISFACTIONS.

Duckton Sulphur Copper and Iron Co., Ltd., London, E.C.—Satisfaction registered July 11, £5,800, part of amount registered March 2, 1912.

Pastex Dyes, Ltd., London, N.—Satisfaction registered July 16, £1,500., registered March 15, 1923.

PETITIONS PRESENTED FOR SEQUESTRATION.

Caledonian Chemical Co., 219, Caledonia Road, Glasgow, S.S., and **Robt. Cameron**, 80, Langside Road, Crosshill, and **Andrew Sneddon Matchet**, 13, Bute Gardens, Muirend, individual partners. July 12. (Petition for Summary Sequestration.) Agent, W. Cuthbert, 180, Hope Street, Glasgow, solicitor.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Auchinachie, P., Essex Villa, Tavistock Road, South Woodford; consulting chemist; £10. 9s. 7d. June 7.

Cope, M., 20, Cornwall Road, Harrow; chemical manufacturer; £30. 17s. 8d. June 11.

SOUTH WALES NOTES.

[Specially Contributed.]

Owing to the scarcity of orders for future delivery the tinplate workers are to have an extension of the usual holidays, current orders being near completion. The committee controlling standard prices have extended the period for which minimum prices will be available in the hope of renewing market activity. There are hopeful signs of an improvement in the demand for galvanised sheets and a better volume of business is being obtained. Manufacturers are buying more spelter, and the price of this metal reflects the anticipations of the market. At the South Wales Tinplate Industrial Council it was intimated by the employers that the 7½ per cent. concession would be continued for the next three months. In addition, they had agreed to a further rise of 3¾ per cent., making the total 11¼ per cent. above the base rate of the sliding scale. The patent fuel trade is steady and the factories are keeping up production. Nickel makers are fairly well employed, the metal being in better demand and the by-products selling well.

The imports for the week to Newport included 10 tons ferro silicon, 50 tons calcium carbide from Antwerp; to Swansea 2 tons calcium carbide from Arandore, 40 tons nitrate of soda from Christiania, and 2,400 tons zinc concentrates from Port Pirie; to Cardiff 100 tons salt from Hamburg, 20 tons cement from Antwerp, 19cwt. copal gum from Puerto Santa, 480cwt. paraffin wax from Norfolk, U.S.A.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

Every one of the trades with the exception of the coking trade is rather worse than better this week. The condition of the iron and steel industry certainly has not improved, and it was stated early in the week that even trade of the hand-to-mouth character which has been experienced during the past two months is of smaller extent, and that unless needs expand again a further restriction of production must take place. As to this, however, there was no definite information available, and it is hoped that if August can be passed without any more furnaces being damped down the most critical period of all in the year has been negotiated. But as far as Cumberland is concerned it is evident that makers of ordinary iron will have to rely on the Continent, the Midlands, Scotland and South Wales for the absorption of nearly all the output. The steelworks have few orders remaining on the books, and it may be a little time before the rail mills are working again to take some proportion of the iron that is being smelted. Of course the coking trade is not dependent entirely upon the furnaces in West Cumberland, as some of the make is now going to the Furness district, but most of the plants send their production to the Workington and Cleator Moor furnaces. In the coal as well as in the iron and steel trades there is also some depression. The local iron and steel works and iron ore mines are taking less and the house demand has fallen considerably. As to coke, the feature to be noted this week is the strong demand that is coming from the Continent. Shipments in the course of a week or two will be bigger than at any other time this year. The Continent is paying from 30s. to 40s., f.o.b., and local smelters 25s. to 33s. per ton according to carbon content. East Coast coke supplies this week are slightly over 8,000 tons. By-products and chemicals are a fair trade. Crude benzol is rather slower than usual. Sulphate of ammonia is moving away satisfactorily. Road tar is on the easy side. Creosote is being exported. Tar acids are steady.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," August 4, 1888.)

Miscellaneous Chemical Market.—Prices of soda-ash and soda crystals remain steady, and caustic soda is without change, though the tendency is rather in favour of higher prices, owing to firmness in saltcake. Chlorate of potash remains at 5¼d., and bleaching powder maintains its position at £7. 5s. on rail at makers' works. Sulphate of copper is steady at £20. per ton. Lead and litharge are dearer, with the effect of stiffening prices in nitrate and acetates of lead, though demand for the latter is much below the average, and stocks are abundant. Carbolic acids continue dull, and prices do not improve notwithstanding that crude is firmly held. Brown acetate of lime continues to move slowly at £7. per ton, and grey at £12. per ton at usual points of delivery. Acetic acid, 25 per cent., sells at 7s. per cwt. Alum and sulphate of alumina find very little outlet, and all chemicals for dyeing and calico printing are at a discount, owing to dulness of trade in these branches. Zinc chloride is in fair demand both for home trade and export. Ammonia and salts are exceedingly quiet. Muriate of ammonia, £21. 10s. at makers' works.

PUBLICATIONS RECEIVED.

The Production of Clean Milk.—By A. T. R. Mattick, B.Sc., of the National Institute for Research in Dairying, University College, Reading.—London: 1923: The Dairyman, Ltd., 43, Great Tower Street, E.C. 3. Price 1s. net.

Bulletin of the Bureau of Bio-Technology.—No. 10, July, 1923. Contributions from the laboratories of Murphy and Sons, Ltd., London, Leeds, and Nottingham. A title-page and index to Vol. 1. have now been prepared, and copies may be had upon application to Messrs. Murphy and Sons, Ltd., Cedars Laboratories, Sheen Lane, Mortlake, London, S.W. 14. The subscription to the Bulletin is 7s. 6d. per annum, post free.

Technical Advertiser.—Booklet discussing the proper display of advertisements.—The Technical Advertising Service, 44, Bedford Row, W.C. 1.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

July 16 to 21 (inclusive)

Mercury-vapour Rectifiers. Akt.-Ges. Brown, Boveri, et Cie. 18,749.
Drying China Clay. Battiscombe, C. A. 18,771.
Centrifugal Purifying and Dehydrating Apparatus. Empson, A. W. 18,817.
Highly Active Charcoal. Farbwerke vorm. Meister, Lucius, and Brüning. 18,365.
Conversion of Hydrocarbons. Forwood, G. F.; Taplay, J. G.; and United Oil Company. 18,485.
Gas-analysis Indicator. Fox, J. T.; Malone, A. J.; and Malone, J. F. J. 18,395.
Rotary Scrubbers, etc. Gas Light and Coke Co. 18,343.
Coating, etc., Metallic Materials. Herman, J. L. 18,833.
Medical Preparations Containing Arsenic. Jackson, W. J. Mellersh-(*Ostro-Products Corporation of America*). 18,573.
Paraoxymetanitrophenyl-arsenious Acid. Jackson, W. J. Mellersh-(*Ostro-Products Corporation of America*). 18,574.
Aqueous Solutions for Producing Gases. Kelly, T. D. 18,648.
Dyeing Cellulose-acetate Fibres. Kilby, W.; and Morton Sundour Fabrics, Ltd. 18,270.
Heat Treatment of Solid Carbonaceous Materials. Laing, B.; and Nielsen, H. 18,461.
Purifying Chlorine, etc. Marks, E. C. R. (*Carbide and Carbon Chemicals Corporation*). 18,362.
Halogenating Latex, etc. Naugatuck Chemical Co. 18,439.
Purifying, etc., Apparatus for Liquids. Norling, K. A. P.; and Svensson, K. J. 18,759.
Centrifugal Machine for Production of Emulsions, etc. Nyrop, J. E.; and Westenholz, T. F. 18,473.
Lustrous Threads, etc., from Cellulose Solutions. Oberlander, O. 18,486.
Aluminium Solder. Serjent, F. C. 18,394
Powder of Lead Suboxide Intermingled with Powder of Metallic Lead. Shimadzu, G. 18,552.
Lead Alloys. Siemens and Halske Akt.-Ges. 18,660.
Fireproof Bricks. Sieurin, S. E. 18,438.
Heating or Drying Apparatus. Sterling, J. R. 18,413.
Hard Condensation Products, Liquid Varnishes, Soluble Tars, etc. Tarassoff, K. 18,586.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1921.

Colloidal-chemical Processes for Purifying Substances. Bloxam, A. G. (*Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.)*). 35,062. **200,533**

1922.

Removal of Phenol and Its Homologues from Waste Waters. Possever Abwasser-und Wasserreinigungs-Ges., E. 3,931. **175,285**
Complex Arseno-stibino Compounds. Metz, H. A. 10,183 **178,824**
Pigments. Buckman, H. H. 10,387. **200,574**
Electrolysis of Water. Pechkranz, R. 10,650. **200,584**
Filtering-apparatus. Oliver, E. L. 13,804. **200,642**
Dehydrating Tar. Coke and Gas Ovens, Ltd. (*Still, C.*). 14,407. **200,651**
Extracting Tin. Clerc, C.; and Nihoul, A. 16,636. **181,722**
Storing Inflammable Liquids. Mauclere, P. A. P. V 16,945. **181,743**
Oxidising Aromatic Compounds. Eckert, A. 18,075. **182,487**
Lead Paints and Anti-corrosive Compounds. Topp, A. W. 18,732. **200,693**
Treatment of Sulphide Ores. Ashcroft, E. A. 19,422. **200,701**
Separating Gases. Naamlooze Vennootschap Philips' Gloeilampenfabrieken. 19,860. **196,560**
Intermediate Compounds. British Dyestuffs Corporation, Ltd.; and Hodgson, H. H. 20,830. **200,714**
Sulphuretted Hydrogen from Gases. Ges. für Kohlentechnik. 22,127. **186,316**
Adhesive Composition. Newton, R. 22,341. **200,726**
Mono-azo-dyestuffs. Imray, O. Y. (*Chemische Fabrik Griesheim-Elektron*). 25,232. **200,739**
Condensation Products from Urea and Formaldehyde. Goldschmidt, Dr. H.; and Neuss, O. 28,212. **187,605**
Dyeing of Cellulose Acetates. Clavel, Dr. R. 28,457. **187,964**
Alkali Thiosulphates from Solutions. Jackson, W. J. Mellersh-(*Koppers Co.*). 31,848. **200,760**
Unhairing Raw or Tanned Leather or Hides. Thuau, U.; and Massin, M. 32,908. **200,763**

1923.

Treatment of Cotton Fabrics. Textilwerk Horn Akt.-Ges. 8,008. **195,620**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

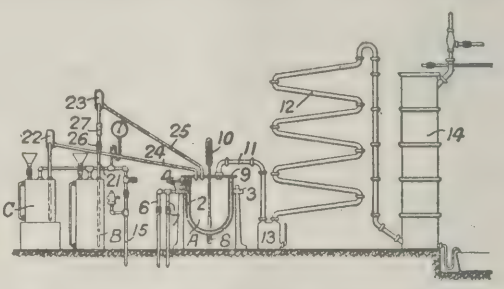
1923.

Vulcanisation of Rubber. Naugatuck Chemical Co. 2,778 and 3,544. **200,788** and **200,789**
Fire-extinguishers. Schworetzky, G.; Graaff, C.; and Werle, N. 5,109 and 5,110. **200,790** and **200,791**
Iodine Preparations. Truttwin, H. 16,943. **200,806**
Amino Benzoyl Derivatives. Chemische Fabrik Flora. 17,375. **200,810**
Cellulose Ethers. Lilienfeld, Dr. L. 17,764. **200,815**
Alkali Celluloses. Lilienfeld, L. 17,765. **200,816**
Tar and Rubber Composition. Theilgaard, A. 17,849. **200,819**
Low Water Content Alkali Cellulose. Lilienfeld, L. 18,091. **200,827**
Cellulose Ethers. Lilienfeld, Dr. L. 18,187. **200,834**
Highly Active Charcoal. Farbwerke vorm. Meister, Lucius, and Brüning. 18,365. **200,839**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Mercury Fulminate. E. A. Barnes, Oakland, California, U.S.A. British Patent, **198,287**, of 1922.

Mercury fulminate is made by a continuous process in which the reagents, mercury dissolved in nitric acid, and alcohol are fed gradually to a reaction chamber maintained at the necessary temperature. The reaction chamber A is mounted on trunnions 3, 4, and pipes 6, 7 communicate



through the trunnion 4 with a jacket 2 so that hot water or steam may be admitted for heating, or cold water for cooling the chamber. The cover 9 carries a thermometer 10 and an outlet 11 carries the fumes to a trap 13, condenser 12, and scrubber 14. A valved outlet 8 allows of drawing off the medium from the jacket. Supply vessels B, C contain alcohol and a nitric acid solution of mercury respectively, and are connected with a compressed air pipe 15 so that the liquids are forced upwards to chambers 23, 22, open to the atmosphere, from which they flow by pipes 25, 24 to the reaction chamber. The relative quantities of the liquids are controlled by a valve 26 and telescopic part 27 in the pipe 21 which supplies the chamber 23. When the reaction chamber has become sufficiently full, the feed of reagents is stopped and when fumes cease to be evolved the heating medium is shut off and the reaction chamber is cooled and then discharged. The residual liquor after the separation of the fulminate consists of glycollic acid with some excess nitric acid. It is converted into oxalic acid by evaporating to about an eighth of its bulk and cooling when the oxalic acid crystallises. The reagents in the vessels B, C may be maintained at any suitable temperature, and they may be mixed prior to feeding to the reaction chamber, but in that case must be kept cold to avoid reaction before they reach the reaction chamber.

Thioindigoid Dyestuffs. W. Carpmael, London. (Farbenfabriken vorm F. Bayer and Co., Leverkusen, Cologne, Germany.) British Patent, **198,415**, of 1922.

Thioindigoid-dyes dyeing cotton in fast brown shades from the hydrosulphite vat are prepared by condensing 2:1-naphthooxythiophene, or a nuclear substitution product thereof such as a halogen derivative, with isatin, or a substituted isatin such as a 5:7-dihalogen isatin, or a cyclic *o*-diketone containing two or more nuclei, for example, acenaphthenequinone, 1:2-diketohydrindene, 2:3-diketo-(1)-thionaphthene; *β*-naphthisatin is however excluded. In an example 5:7-dichlorisatin is used, the condensation being effected in the presence of glacial acetic acid.

Metaldehyde. J. Y. Johnson, London. (Elektrizitätswerk Lonza, Basle, Switzerland.) British Patent, **198,576**, of 1922.

Metaldehyde is produced by the action of the following catalysts on acetaldehyde at temperatures below 10° C., (1) titanium chloride, (2) a bromide of an alkali or alkaline-earth metal, such as lithium or calcium bromide, (3) a halide of an alkali metal, alkaline-earth metal, aluminium, zirconium, thorium, cerium, lanthanum, yttrium, ytterbium or titanium, in conjunction with an acid, such as hydrochloric or hydrobromic acid, an acid salt, or a compound having acid properties, such as ferric chloride, aluminium chloride, or sulphur and antimony haloids.

Synthesis of Quinoline Derivatives. J. A. Gardner and M. Williams, London. British Patent, **198,462,** of 1922.

In the synthesis of quinoline and its derivatives by the Skraup reaction or the Döbner and von Miller reaction chloropicrin is employed as the oxidising agent. In examples the use of chloropicrin in the production of the following compounds is described:—Quinoline, 6- or 8-methylquinoline, 5:8-dimethylquinoline and 8-hydroxyquinoline, from glycerol and the corresponding aromatic amine; alizarin blue from β-aminoanthraquinone and glycerol; 2-methylquinoline from aniline and paraldehyde.

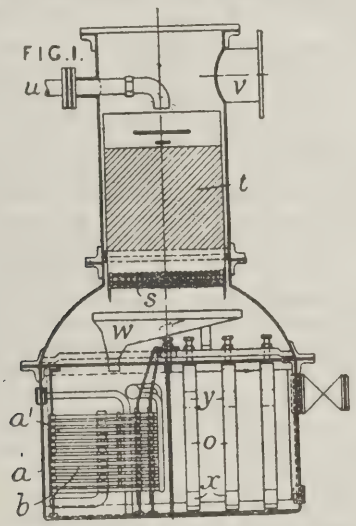
Electrolytic Production of Per-compounds. Chemische Fabrik Weissenstein Ges. and G. Baum, Carinthia, Austria. British Patent, **198,246,** of 1922.

Anodes for use in the formation of per-compounds consist of tantalum partially covered with platinum or of an alloy of tantalum with platinum. The coating when used may be effected by electrolysis or by hammering, welding, rolling or the like.

Evaporating Liquids. H. Bollmann, Hamburg, Germany. British Patent. **198,250,** of 1922.

The base of the still *a* is divided by vertical radial partitions into number of separate compartments each provided with a separate heating-coil *a'*. The vapours rise from all the compartments through a grating *s* and a filling-material *t* to an outlet *v*. The liquid to be distilled, supplied through

FIG.1.



a pipe *u* and heated by flowing over the material *t*, is directed by a collecting-pan *w* into the compartment *b* kept at the lowest temperature. The liquid flows in succession through the compartments which are kept at successively higher temperatures through pipes *o* having inlets *x* at the base and outlets *y* at the top. In treating a mixture of benzol, alcohol and water obtained in the extraction of oleaginous seeds, the first compartment is kept at 60° C., the second at 70° C., the third at 80° C., and the last at 100° C.

Formic Acid. H. Nielsen, London; and B. Laing, Hatfield, Hertfordshire. British Patent, **198,385,** of 1921.

Comprises (1) the production of formic acid by the oxidation of methane with a metallic oxide or by the interaction of carbon monoxide and water vapour in the presence of a catalyst, preferably a metallic oxide; and (2) the destructive distillation of carbonaceous material in the presence of formic acid vapour for the purpose of increasing the yield of condensible hydrocarbons. As regards the production of formic acid, methane or a mixture of carbon monoxide and water vapour is passed at a temperature of 250-800° C. over a metallic oxide, which preferably comprises an "activated copper suboxide," prepared either by precipitating copper from a solution of copper sulphate with metallic zinc, and then washing, drying and roasting the precipitate in air, or by moistening other copper precipitates from copper salts or granulated or powdered copper with dilute zinc-sulphate solution, followed by washing, drying and heating in air. After a short time the copper suboxide becomes inactive and must be reactivated by moistening it with dilute zinc-sulphate solution, washing, drying, and roasting in air. Gases such as air gas, water gas, coal gas or natural gas may provide the source of the methane or carbon monoxide; and their sensible heat, if any, may be utilised for the formic acid reaction, which is endothermic. In the destructive distillation of carbonaceous materials, which may comprise coal, lignite, peat, shale, wood, or liquid hydrocarbons, the formic acid, which may be prepared as described above, is introduced in the vapour phase into the distillation vessel. The carbonaceous material may contain a small percentage of admixed carbonates of sodium, potassium or calcium; and the distillation vessel may be heated internally by the sensible heat of the whole or a part of the air gas or water gas before conversion into formic acid. It is stated that hydrocarbon gases may be similarly treated; thus, acetylene may be converted into acetic acid.

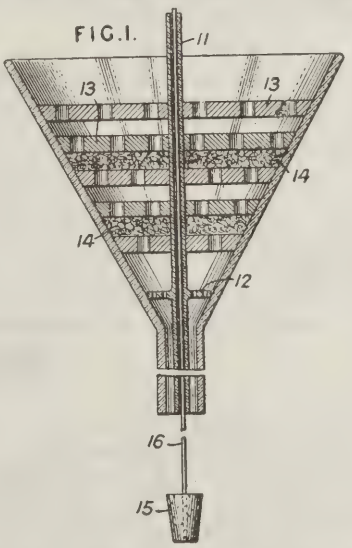
Concentrating Sulphuric Acid. I. Hechenbleikner, North Carolina; and T. C. Oliver, New York, U.S.A. British Patent. **198,545,** of 1922.

Sulphuric acid which has been used in refining petroleum and treated to recover part of the hydrocarbons is concentrated by blowing hot air through it to a point somewhat below the concentration, near 57° Baumé, at which foaming and charring of the hydrocarbons take place. The bulk of the hydrocarbons are driven off by this treatment and the acid is further concentrated in a second apparatus. The first concentration takes place in a chamber of acid-resisting brick provided with perforated earthenware pipes through which hot air can be blown. The acid enters through a tower, in which it is preheated by the escaping fumes, and which may be packed or not as desired. The partly concentrated acid, freed from the hydrocarbons, passes to an "acid egg," and thence to a second chamber like the first chamber, and provided with a preheating entrance tower.

Funnel Filters. S. A. Giacobbe, New York, U.S.A. British Patent, **198,414,** of 1922.

A funnel is fitted with an air escape tube 11, supported by a perforated disc 12, and layers of filtering-material 14

FIG.1.



between perforated discs 13. A cork 15 is attached to a wire 16 which passes through the tube 11 and may be graduated.

Fertilisers. G. W. S. Brewer, Broadstairs, Kent. British Patent, **198,242,** of 1922.

A dry or powdered fertiliser consists of peat or peat refuse, peat soil or other soil derived from land which has been under cultivation, "killed" lime or chalk, and one or more fertilising agents such as phosphates, nitrates, potash salts, ammonia salts, soot, or fish manure. The peat, soil, and lime or chalk are mixed and allowed to stand for a few days with occasional turning; the mixture is then dried, and, if necessary, disintegrated, and the fertilising-agents are added. The soil is stated to introduce nitrifying bacteria.

Disazo Dyestuffs. W. Carpmael, London. (Farbenfabriken vorm. F. Bayer and Co., Leverkusen, Cologne, Germany.) British Patent, **198,398**, of 1922.

Disazo dyes are prepared by coupling the tetrazo compound from 4:4'-diamino-diphenyl-3:3'-dicarboxylic acid on the one hand with an azo dye component which contains a sulphonic or carboxylic group or two hydroxy or two amino groups, or one hydroxy and one amino group, or a hydroxy group in conjunction with the $CH_2.CO$- group of the aceto-acetic-anilides or of the pyrazolones, and on the other hand with a pyrazolone or an acetoacetic-anilide compound. The products dye cotton in orange to red shades which by after-treatment with metallic salts, for example, copper or vanadium salts, are changed into deeper orange-brown or green shades fast to light and washing. In an example the tetrazo compound is coupled with 1-*m*-aminophenyl-3-methyl-5-pyrazolone and *m*-aminophenol: the product may be after-coppered, or diazotised on the fibre and developed with pyrazolone

Fuel Briquettes. Soc. dite l' Avébène, Paris. British Patent, **197,901**, of 1921.

Anthracite, coke, etc., in powder form is mixed with the pulverised mass obtained by concentrating bisulphite lye after complete neutralisation of sulphurous acid (free or in part combined), contained therein. Water is added if the fuel material is not sufficiently humid to form a plastic mixture. The fuel is compressed into briquettes which are baked up to about 200° C. for 20 to 40 minutes. In an example 100 parts of material are mixed with 3 to 3½ parts of solidified lixivium.

Poisonous Gases. J. W. van Meter, San Francisco, California, U.S.A. British Patent, **197,706**, of 1921.

A mixture of poisonous gases is obtained by the action of chlorine, preferably moist and under pressure, on a cyanide, with which a metal may be mixed to accelerate the reaction. The product comprises a mixture or combination of chlorine and cyanogen, together, it may be, with products resulting from the presence of the metal. Arsenic, antimony, copper, tin, lead, and iron are instanced as suitable metals, and when iron is employed the resulting gaseous mixture is stated to be suitable for orchard fumigation.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

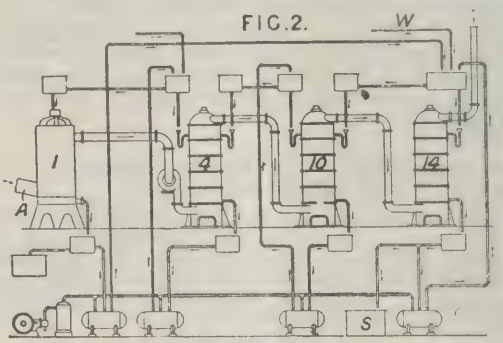
Pyrazolone-Barbituric Acid Compounds. Chemische Fabrik auf Actien (vorm E. Schering), Berlin. British Patent, **198,379**. Convention date, May 29, 1922. Addition to 158,558.

The process of the parent Specification, for melting together C.C. diethylbarbituric acid and 4-dimethylamino-2.3-dimethyl-1-phenyl-5-pyrazolone to form a new compound, is modified by substituting any C-C-derivative for the diethyl compound. Examples show the preparation of compounds using dipropyl, diallyl and phenylethyl barbituric acids respectively.

Sulphuric Acid. W. F. Lamoreaux, Isabella, Tennessee, U.S.A. British Patent, **198,332** Convention date, May 29, 1922.

In the manufacture of sulphuric acid in which sulphur dioxide is oxidised in the presence of nitrous compounds, the reacting liquids are intensively dispersed within the gas stream, and the quantity of water present is so regulated that all the sulphur trioxide produced is not absorbed in the reaction chamber. The arrangement of plant shown in Fig. 2 includes a Glover tower 1, and three gas washers of the

FIG.2.



Feld type. Gases containing sulphur dioxide and nitrogen oxides enter the Glover by a pipe A and then pass on to the washer 4 in which they come in contact with finely dispersed nitrous vitriol. The fog of sulphur trioxide produced is not condensed but passes into the second washer 10 containing acid of 59—61° Bé. which absorbs the nitrous compounds liberated in the washer 4. The sulphur trioxide is finally condensed in a third washer 14 in which 97-99 per cent. acid is circulated. This concentration is maintained by the addition of water or steam through a pipe W or by the addition of weak acid from the Glover. A portion of the condensed acid is used to supply the washer 10 in order to maintain the concentration at 59-61° Bé. Acid in excess of that which is required is stored in a tank S. The quantity of nitrous vitriol circulating through the absorber 10 which is withdrawn to supply the washer 4 is regulated according to the flow of sulphur dioxide, so that the acid leaving the bottom of the washer is almost entirely denitrated. Complete denitration is effected in the Glover tower 1, an acid of 60° Bé. being obtained. In a modified process, when a completely denitrated product is not essential, the Glover tower is dispensed with. Instead of vertical washers of the Feld type horizontal Theisen washers may be employed. When intensive production is desired additional nitrogen compounds are introduced into the washer 4 and the process may be conducted under pressure.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. WEDNESDAY.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Of the many poor months of business experienced this year there seems little cause to doubt that July has certainly been the worst. The demand throughout this market has been strictly limited to the smallest of quantities, and in some articles business seems at a complete standstill. **Acetic Acid,** 80% technical, £47. to £48.; 80% pure, £50.; 98% glacial, £60. in casks and £75. in demi-johns, ex wharf, London; the spot position keeps very steady at these prices, with business on the quiet side. **Acetone,** British Government specification, about £130. per ton, nominal, in drums; this market keeps quite steady, and there has been a fair inquiry on the market; spot supplies are now very scarce. **Arsenic,** Cornish white powdered, £72. to £73. per ton for spot lots; some offerings are being made, but business has been very limited. **Alum,** lump, £10. to £10. 10s. per ton, in casks; slightly easier rates are being quoted, with practically no demand on the market **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; business is very moderate. **Barium Chloride,** 98/100%, £15. to £15. 5s.; the few inquiries received have been only for cask or one-ton lots. **Bleaching Powder,** 35/37%, £10. to £10. 10s. per ton; dealers are offering Continental material at these figures, with very little doing. **Borax,** commercial, granulated £26. 10s., crystals £27., powdered £28., extra fine £29.; B.P., crystals £31., powdered £32., extra fine £33. per ton, for home trade only, in free 2cwt. bags, carriage paid to destination in the U.K.; British makers' quotations are unchanged at these levels; importers are offering, under similar conditions, commercial, granulated £25. 10s., and powdered £27. per ton. **Borax Glass,** lump £74., powdered

£75. per ton, in tin-lined cases; British makers' prices quoted, for home trade only, packages free, carriage paid in the U.K. **Boric Acid,** commercial, crystals £50., powdered £52.; B.P., crystals £56., powdered £60., extra fine £62. per ton, in free bags, carriage paid to destination; British makers offering at these prices for home trade only; dealers are offering at competitive rates. **Cream of Tartar,** 99/100%, 90s. to 93s. per cwt., less 2½%, in one-ton lots; the spot position keeps fairly steady at these figures, with some limited business passing. **Citric Acid,** B.P., crystals, about 1s. 6¾d. to 1s 7¼d. per lb., less 5%; this market remains rather unsteady, and business has again been poor. **Epsom Salts,** commercial quality, about £5. per ton; the few inquiries on the market have been for very small quantities. **Formaldehyde,** 40%, about £96. per ton, nominal; business in this product is still being held up by the delay in the issue of the referee's decision in the appeal case. **Glauber's Salt,** commercial quality, about £3. 15s. to £4. per ton; reports to hand state practically no inquiry being received. **Lead Acetate,** brown, about £41. to £42.; white, £42. to £43. per ton; dealers are now offering at these cheaper prices, with not much business about. **Litharge,** pure flake, British, about £37. per ton; dealers are quoting Continental material in the region of £36. per ton. **Lithopone,** 30% Continental red seal, £22. to £22. 10s. per ton; prices for this product are well maintained, and some limited business has been done. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; although the demand has been poor, these prices seem quite steady for spot stocks. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers quoting at these unchanged rates. **Oxalic Acid,** about 6d. per lb.; this item remains very flat indeed. **Bichromate of Potash,** about 6d. per lb.; dealers are finding very little business. **Carbonate of Potash,** 90/92% £28., 96/98% £31. to £31. 10s. per ton; much cheaper prices are being quoted for spot supplies; the demand remains poor. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; this item remains flat with quoted rates unchanged. **Caustic Potash,** 88/92% £32. to £32. 10s. per ton, in drums; the demand for the spot supplies available remains poor; prices are a shade easier. **Permanganate of Potash,** commercial quality, about 9¼d. to 9¾d. per lb.; business in this article has been restricted; quoted prices unchanged. **Prussiate of Potash,** yellow, about 1s. 2d. to 1s. 2½d. per lb.; a further material cut in the price of this article has been made this week; business is usually for smallish lots. **Sulphate of Potash,** 90% £11. 10s. per ton, ex ship; there is no change to record. **Mercury,** £10. 5s. to £10. 7s 6d. per bottle of 75/76lbs. net; the spot position is a little easier after a week of poor business. **Red Lead,** imported, about £36. per ton; dealers are doing some little business at about this level. **Salammoniac,** dog-tooth crystals £48. 10s. to £49., medium £43. to £44., fine white crystals £26. to £27. per ton; at these unchanged rates the spot position appears to be fairly steady despite the poorness of business. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; export, about £5 5s. per ton, f.o.b.; the market stands steady at about these levels. **Acetate of Soda,** about £25. per ton; at this slightly easier price the market is steady but quiet. **Soda Ash,** 58% light alkali £7. 12s. 6d. per ton, in bags, carriage paid to destination; British makers' quoting at this rate for home trade only; Their prices for export vary as to destination. **Soda Crystals,** about £5. 5s. per ton, in bags, carriage paid to destination; British makers selling for home trade only at about this figure; dealers are offering imported material at competitive rates. **Caustic Soda,** 70/72% £18. 10s., 76/77% £20 10s. per ton, in drums, ex wharf, shipping port; dealers prices are maintained at about these levels, but business is lacking. British makers' prices for home trade only are unchanged, from £19. to £21. 10s. per ton, in drums, carriage paid; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination; British makers' prices stated; dealers are offering at about level figures. **Bichromate of Soda,** home trade about 4½d. per lb.; export about 5d. per lb.; British makers' prices are given. **Chlorate of Soda,** crystals and granulated, 2⅝d. per lb.; the market has again been quiet. **Cyanide of Soda,** 98/100%, export, 8½d. to 9d. per lb.; home trade, about 10½d. per lb.; British makers offering at about these prices. **Nitrate of Soda,** 96% £13 7s. 6d. per ton., f.o.r. Liverpool; there is no change in the position to record. **Nitrite of Soda,** 100%, about £26. 10s. per ton; the market is steady at this unchanged price. **Prussiate of Soda,** about 6½d. per lb.; a further cut in the price of this product has been made, with the demand still poor. **Hyposulphite of Soda,** pea crystals, about £14. 10s. to £15. per ton, in 1cwt. kegs; commercial quality, about £10. to £10. 10s. per ton, in casks; dealers are offering at these prices on a slow market. **Sodium Sulphide,** 60/62% solid, £14.; ditto, broken, £15. to £15. 10s. per ton, in drums; 60/65% concentrated, £15. per ton, in casks; business has been poor, but quoted prices are about the same. **Sulphate of Copper,** about £26. per ton for spot parcels; cheap offerings are coming to hand from the Continent. **Tin Crystals,** about 1s. 4d. per lb.; this market shows no change on the week. **White Lead,** imported, about £43. per ton; limited orders have been booked by dealers at about this figure. **Zinc Oxide,** B.P., about £50.; white seal, about £42. 10s. per ton.; 99.5%, about £37. per ton, f.o.r., makers' works; British makers are quoting at slightly easier rates.

Pharmaceutical Chemicals.—There is no improvement in business to record. The market generally is very sluggish and the tone unsteady. Some prices are already at slightly easier rates. **Acetanilid,** crystals and powder, about 1s. 5d. per lb.; prices quoted are unchanged, with business very poor. **Acetyl-Salicylic Acid,** B.P., 3s. to 3s. 1d. per lb.; inquiry has been small during the week, but rates are level. **Benzoic Acid,** B.P., about 2s. 3d. per lb.; there is no movement, and quoted prices are unaltered. **Diethylbarbituric Acid,** B.P. (barbitone), about 21/- per lb.; practically no interest shown, though quoted rates seem steady. **Salicylic Acid,** B.P., about 2s. 2d. to 2s. 4d. per lb.; the market keeps up to these figures with the demand small. **Tannic Acid,** leviss, 3s. 3d. per lb.; very little interest shown in spot offers in the region of this figure. **Amidopyrin,** about 14s. to 14s. 6d. per lb.; Continental prices keep this spot figure up on a slow market. **Ammonium Bromide,** 7d. to 8d. per lb.; the tone of this product is very flat and prices are again somewhat easier. **Benzonaphthol,** about 5s. per lb.; nothing doing here, and quoted rates unaltered. **Benzaldehyde 03,** about 3s. per lb.; no business reported, with quoted prices the same as last week. **Betanaphthol,** resublimed, about 1s. 10d. per lb.; inquiry has been poor, and dealers' prices are unaltered. **Calcium Lactate,** 1s. 9d. to 1s. 10d. per lb.; easier rates are being quoted here on a dull market. **Chloral Hydrate,** duty paid, about 4s. per lb.; this product is seldom in request, and spot values are steady. **Creosote Carbonate,** about 8s. 6d. per lb.; no further fall in spot values, but business very quiet. **Creosote,** B.P., about 2s. 2d. per lb.; the market is so far maintained at this level, but business is dull. **Guaiacol Carbonate,** about 8s. 3d. per lb.; the market is unchanged, with very little doing. **Hexamine,** about 3s. 10d. per lb.; spot parcels are offering at this rate; Continental offers seem to vary. **Hydroquinone,** about 3s. 6d. per lb.; the demand for this product has not been so good this week. **Methyl Salicylate,** 2s. 5d. to 2s. 6d. per lb.; the market keeps well up to these figures, with demand poor. **Methyl Sulphonal,** about 15s. per lb.; there appears to be no interest in offers at about this figure. **Paraformaldehyde,** 3s. 9d. to 3s. 11d. per lb.; slightly easier rates are being quoted on a dull market. **Paraldehyde,** about 1s. 5d. per lb.; offers seem plentiful, with business very limited. **Phenacetin,** about 6s. 3d. to 6s. 6d. per lb.; the market holds fairly well at these figures, despite the lack of business. **Phenazone,** about 7s. 3d. to 7s. 6d. per lb.; no further falls in values are recorded, and market flat. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; at these rates the market seems to be quite steady. **Piperazine,** about 4s. 6d. per oz., in kilo lots; the market remains very quiet; spot goods offering. **Potassium Bromide,** B.P., crystals and granular, 6½d. to 7d. per lb.; the demand for the spot goods on offer continues on the small side, and prices are not at all steady. **Potassium Permanganate,** B.P., 10d. to 10½d. per lb.; matters are not so brisk in this product, and prices as quoted seem steady. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; no further fall in quoted values is recorded, with market flat. **Salol,** 2s. 8d. to 2s. 9d. per lb.; offers are being made at these rates, with little buying taking place. **Sodium Benzoate,** about 2s. 6d. per lb.; nominal; no life in the market. **Sodium Bromide,** B.P., crystals and granular, 7d. to 7½d. per lb.; this product is still in good supply on spot, with little moving off, and prices are rather weak. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; the market is maintained at last week's cheaper level, but business is lacking. **Sodium Salicylate,** powder 2s. 4d. per lb., crystals 2s. 6d. to 2s. 8d., phys. pure flake 2s. 10d. per lb.;

the spot position keeps very steady at these rates, and Continental rates are much dearer **Sulphonal,** about 14s. 6d. per lb., nominal; the market has been inactive. **Terpin Hydrate,** about 1s. 9d. per lb.; spot offers are being made at about this figure, but very little business has been on the market. **Thymol,** about 15s. per lb.; quoted at this level with not much doing.

Coal-tar Products, Intermediates, Etc.—Like the other markets, this section has experienced a poor week of business, and the only alterations in prices have been in buyers' favour. **Aniline Oil,** about 9d. to 9¼d. per lb., drums free; this market is steadier after the drop in price recorded last week. **Aniline Salt,** 9½d. to 10d. per lb., casks free; the market keeps steady but quiet at these levels. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; very little business is reported; quoted rates are unchanged. **Benzol,** 1s. 4d. per gallon, f.o.r., makers' works, in buyers' packages; a considerable reduction has been made here, but business still hangs. **Toluol,** 1s. 9d. per gallon, f.o.r., makers' works, in buyers' packages; with benzol this product has dropped threepence a gallon during the week; this change was not unexpected. **Xylol,** pure 2s. 3d., commercial 1s. 6d. per gallon, drums extra; quoted rates are unchanged on a flat market. **Naphtha,** about 1s. 5d. per gallon; things are still very sluggish here, and prices as quoted are none too steady. **Solvent Naphtha,** 90/160, 1s. 5d. per gallon, drums extra; business still poor, and market unsteady and tends to weaken. **Heavy Solvent Naphtha,** 90/190, 1s. 4d. per gallon, drums extra; the tone is unsteady, with a tendency to slightly easier rates. **Special Oil,** for Diesel and motors, 10d. per gallon, barrels free; dealers are quoting at unchanged rates on a dull market. **Burning Oil,** crude, No. 3 8½d., No. 2 8d. per gallon, barrels free; prices are unchanged on the week, with business very dull. **Creosote Oil,** 10d. per gallon, in bulk supply, f.o.b.; dealers' prices are unaltered on the week; very little doing. **Carbolic Acid,** crystals, about 1s. 2d. per lb., f.o.b.; some inquiry continues, but actual business is small; at this rate the market seems steady enough. **Naphthalene,** £20. per ton; the demand is slow; quoted rates are steady; crude £7. to £13., crystals £21., powder about £17., balls £24, tablets £28., candles £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; a fair inquiry has been received, and prices seem steady. **Pyridine,** 19s. per gallon; at this higher price the spot position appears to be very firm. **Hexamethylene,** 4s. to 4s. 3d. per gallon; these rates govern a very steady market. **Pure Methyl Alcohol,** £100. per ton, ex wharf, London; at this price the spot position keeps very steady, but business has been limited. **Pitch,** about 135s. per ton, in London; there is no change in this market to record; business, so far as spot is concerned, is very little.

SWANSEA MARKET REPORT. Wednesday.

There was no alteration in quotations for **Tinplates,** the market being quiet at £1. 3s. 1½d. per standard box. **Galvanised Sheets** had an improved tone, with larger turnover, on the basis of £17. 12s. 6d. per ton f.o.b. **Copper,** firmer, with prices slightly higher, at £65. 5s. 9d. per ton prompt, and £66. 2s. 6d. three months. **Tin,** irregular, prompt £184. 7s. 6d., and three months £185. 7s. 6d. **Lead,** firmer, at £24. 7s. 6d. per ton prompt, and forward £24. 10s. for foreign; English £25. 12s. 6d. **Spelter** ruled firm at £31. 12s. 6d. per ton prompt, and £31. 15s. three months. **Zinc Sheets,** dearer, at £39. 7s. 6d. per ton. **Sulphate of Ammonia,** dull, at £14. 15s. to £13. 12s. per ton. **Sulphate of Copper,** quiet, £26. 7s. 6d. per ton, less 5%. **Nitrate of Soda,** dull, with prompt at £13. 12s. 6d. per ton. **Bonemeal,** in little demand, with Indian, prompt, at £8. 17s. 6d. per ton. **Oxalic Acid,** in poor demand and cheaper, at 6¼d. per lb. on rail. **Pitch,** steady, at £6. 12s. 6d. per ton ex ship. **Arsenic** remains dull, with small supplies of Cornish; white powdered at £71. 12s. 6d. per ton, f.o.b. **Turpentine,** quiet, with American, prompt, at £3. 17s. 3d. per cwt. **Copperas** remains dull, at £2. per ton, delivered. There is a fairly brisk demand for **Coals** of all descriptions; steam qualities are being well shipped, with best Admiralty smokeless £1. 10s., seconds £1. 8s. 6d., ordinaries £1. 7s. 6d., Monmouthshire black vein £1 8s per ton, all f.o.b. **Anthracite** in fair demand, with unchanged quotations. **Patent Fuel,** quiet, with no alteration. **Cokes,** firm; export £2. 14s. 9d. per ton, f.o.b., foundry £2., and furnace £1 10s. per ton on rails at ovens

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £64. 17s. 6d. to £65., cash; £65. 12s. 6d. to £65. 15s., three months; electrolytic, £72. to £72. 10s. **Tin**: Standard, £183. 15s. to £184. cash; £184. 15s. to £185., three months; Straits, £187. 5s.; English, £184. 10s. **Lead,** soft foreign, £24. 7s. 6d., prompt; English, £25. 10s.; chemical sheet, 33s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £31. 7s. 6d.; hard £25. 5s. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110. c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £10. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 13s. per unit, c.i.f., United Kingdom or Continent. **Zinc Dust,** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. Wednesday.

There is no improvement to report in the demand for heavy chemicals, and values generally continue in buyers' favour. For **Alkali** products prices are maintained at recent rates, and makers' output is fairly well engaged. Some cheap supplies of **Caustic Soda** and **Bleach** are offered from the Continent. **Chlorates** and **Bichromates** are quiet and unchanged at recent rates. There is a steady export demand for **Saltcake,** but the home trade is quiet at £4. 10s. per ton, carriage paid. **Sulphate of Copper** only moves off slowly, and price nominal, at £26., f.o.b. **American Sulphur,** firm, at £5. 5s. on rails. **Phosphate** and **Hyposulphite of Soda** are in small request and values easy. **Nitrite of Soda,** steady, at £26. 10s., basis 100%, ex store. Concentrated **Sodium Sulphide,** 60/62%, dull, at £15. per ton. White powdered **Arsenic,** firm, at £70. on rails, Cornish works. Yellow **Prussiate of Potash,** dull, at 1s. 2½d. per lb. **Soda,** lower, at 6½d. per lb. **Carbonate** and **Caustic Potash** are in short supply and values maintained. **Acetic Acid** and **Acetate of Soda,** firm, and supplies short. **Formaldehyde,** 40%, scarce, and price higher, at £98. per ton. Grey and brown **Acetate of Lime,** unchanged in position. **Lead Salts** have an upward tendency; white **Acetate,** £41.; brown, £43.; and **Nitrate,** £43., delivered. **Barium Chloride,** dull, at £15. per ton. **Copperas** is in good request. **Oxalic Acid,** slow of sale, at 6d. per lb. **Permanganate of Potash,** 9¾d. per lb.

LIVERPOOL CHEMICAL MARKET. Wednesday.

A steady business, though on a moderate scale, continues to be done in the heavier chemicals on home-trade account. The industrial situation is more settled, and conditions for manufacturers are somewhat easier, so that an improvement in trade is looked for. This, if occurring, will mean a larger consumption of chemicals. In the export branch, shipments have gone on more briskly. **Bleaching Powder** has been in fair demand, and is £10. to £11. per ton for use in the United Kingdom, and £11. per ton for export. **Calcium Chloride** has been more inquired for, and is £5. 17s. 6d. per ton. **Caustic Soda** continues in quietly steady demand on home-trade account and has been shipped freely on export account; it is £20. 7s. 6d. to £21. 7s. 6d. per ton for 76%, carriage paid, for use in the U.K., and £20. 10s. per ton for export. **Bicarbonate of Soda** has been in fair request for home-trade uses and has had an active shipment for export; it is £10. 10s. per ton, carriage paid, for use in the U.K. **Soda Crystals** have been in quietly steady demand and are £5. 5s. per ton for home-trade uses. **Nitrate of Soda** has had a moderate sale, and is £13. 5s. to £13. 10s. per ton. **Borax** has been rather more in request; commercial crystals are £27. per ton, and powdered £28.; higher grades are, crystals £31. per ton and powdered £32. per ton, carriage paid in the U.K. **Saltcake** has had a fair sale, and is £4. 10s. to £5. per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has been quiet, and is 4½d. per lb., c.i.f. to usual ports. **Ammonia Alkali** has sold with some freedom for use in the U.K., and has again been in good demand for export; the price is £7. 12s. 6d. per ton for home-trade uses, and £8. per ton for export. **Hyposulphite**

of Soda continues in very fair request, and is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £16. per ton, in 1cwt. kegs, for photographic. **Sulphide of Soda** has had a slow sale; solid is £16. per ton, and crystals £10. 10s. to £11. per ton. **Chlorate of Soda** continues quiet, and is 3d. to 3¼d. per lb. **Phosphates of Soda** has been inactive, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been in moderate demand, and is 7d. to 7½d. per lb. **Yellow Prussiate of Potash** has been in quietly steady demand, and is 1s. 3d. to 1s. 3¼d. per lb. **Red Prussiate** has been rather more in request, and is 3s. 3d. to 3s. 6d. per lb. **Carbonate of Potash** has sold more readily, and is £25. to £32. per ton., according to quality. **Nitrate of Potash** has been in fair demand, and is £33. to £35. per ton for refined. **Chlorate of Potash** has been very quiet, and is 4d. to 4¼d. per lb. **Caustic Potash** has had a somewhat freer inquiry, and is £32. to £33. per ton. **Permanganate of Potash** has been rather more in request; it is 10d. to 10½d. per lb. **Bichromate of Potash** has been quieter, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in quietly steady demand; first quality is £63. per ton, second quality £60., and third £57. **Sulphate of Ammonia** has had a very limited inquiry for use in the U.K., but has had a fair shipment on export account; neutral is £14. 15s. per ton, and ordinary £13. 12s. per ton, to the end of August. **Carbonate of Ammonia** has been steadily called for, and is 4d. per lb. **Muriate of Ammonia** has been rather more in request, and is £32. to £33. per ton. **Magnesia** has sold with some freedom; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. per ton. **Alum** has had a moderate inquiry, and is £12. per ton for the home trade, and £11. 10s. to £12. per ton for export. **Sulphate of Alumina** has been rather more in request, and is £8. to £11. per ton, according to quality. **Sulphur** has again been in very fair demand; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s. per ton, and American £5. to £5. 10s. per ton. **Tartaric Acid** has sold rather freely, and is 1s. 3d. to 1s. 3½d. per lb. **Cream of Tartar** has been steadily called for, and is £4. 12s. to £4. 15s. per cwt. **Boric Acid** has been quieter; commercial crystals are £52. per ton, and powdered £58., £2. per ton more being charged if in casks. **Citric Acid** has sold more readily, and is 1s. 9d. to 1s. 10d. per lb. **Oxalic Acid** has been inactive, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** has had a moderate inquiry, and is £42. to £43. per ton. **Sulphate of Copper** has been quiet both on export account and for the home trade; it is £26. to £26. 5s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been but little called for; white powdered is £72. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

The demand for chemicals on home-trade account has been rather restricted on account of the holidays. Export inquiries also continue to be limited. Prices are easier in certain lines, but otherwise nominal quotations still hold steady. The following prices are at Glasgow, unless otherwise stated:—**Alum,** little doing, and in small demand; prices have been reduced and now stand at £12. 5s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; it is quoted on spot at £77. net. **Barium Chloride** remains very quiet, despite the recent reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation still stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax,** granulated, is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride,** 70—75 per cent. solid, £5. 12s. 6d. per ton. **Citric Acid** is a declining market, with the price reduced to 1s. 7½d. per lb., less 5%. **Cupper Sulphate** is but little in request at last week's figure of £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar,** easier, with better inquiry, at £4. 8s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in quieter demand; brown steady at £40. 10s. per ton, net, and white better at £40. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid** at 6¼d. per lb. **Paraffin Wax** experiences a fair export trade at 2¾d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the rather easier figure at 1s. 4d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 11s. per ton, but business is nominal. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic,** 43—44%, in fair request at 1s. 1½d. **Tartaric Acid** still shows a quieter tendency at 1s. 2¾d. per lb.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	Hf. pps.	Half pipes.			lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Bgs.	Bags.	Chts.	Chests.	Kgs.	Kegs.	Sks.	Sacks.		
Btls.	Bottles.	Cylds.	Cylinders.	Oz.	Ounces.	Slbs.	Slabs.		
Bdls.	Bundles.	Drms.	Drums.	Pkgs.	Packages.	Tcs.	Tierces.		
Bskts.	Baskets.	Djns.	Demijohns.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		
Bxs.	Boxes.	Frkns.	Firkins.						

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending July 28.

BARYTES—
Antwerp, 200 bgs.

BASIC SLAG—
Antwerp, 100 bgs.

BORAX—
Los Angeles, 6,088 bgs.

CALCIUM CARBIDE—
Gothenburg, 900 drms.

GLUE—
Antwerp, 130 pkgs., 43 bls.

LITHOPONE—
Antwerp, 50 brls., 20 cks.

MAGNESIUM SULPHATE—
Antwerp, 50 pkgs.

PARAFFIN WAX—
New York, 386 brls.
Rangoon, 704 bgs.

POTASH SALTS (*otherwise undes.*)—
Antwerp, 1,000 bgs.

RED LEAD—
Genoa, 65 cks.

SOAP—
New York, 1,000 cs.

SODIUM ACETATE—
Antwerp, 38 cks.

STEARINE—
Montreal, 86 bxs.
New York, 72 brls.

SULPHUR—
Antwerp, 27 cks.
Catania, 34 brls., 500 bgs.

TALLOW—
Dunedin, 287 cks.
Lyttleton, 14 cks.
Wanganni, 100 cks.
Wellington, 150 cks.

TANNING MATERIALS—
Chestnut
Leghorn, 150 brls.
Myrabolans
Bombay, 2,000 bgs., 4,000 pkts.
Quebracho
Buenos Aires, 8,806 bgs.
Sumac
Palermo, 250 bls.

TARTARIC ACID—
Palermo, 31 cks.

WHITE LEAD—
Genoa, 38 cks.; N. York, 92 cks.

ZINC OXIDE—
Antwerp, 12 brls.

GOOLE.

Week ending July 28.

CAUSTIC POTASH—
Hamburg, 4 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 2 cs., 1 drm.
Hamburg, 1 drm.

DEXTRINE—
Amsterdam, 50 bgs.

MAGNESITE—
Amsterdam, 140 bgs.

MAGNESIUM CHLORIDE—
Amsterdam, 15 drms.

SODIUM NITRATE—
Hamburg, 25 pkgs.

SODIUM PERBORATE—
Bremen, 5 cks.

ULTRAMARINE—
Bremen, 2 cs.

GRANGEMOUTH.

Week ending July 28.

CALCIUM ACID PHOSPHATE—
Rotterdam, 325 kgs.

FERRO MANGANESE—
Antwerp, 150 cs.

MAGNESITE—
Rotterdam, 63 bgs.

MANGANESE DIOXIDE—
Rotterdam, 5 cks.

OXALIC ACID—
Rotterdam, 6 cks.

ZINC OXIDE—
Rotterdam, 25 cks.

GRIMSBY.

Week ending July 28.

BARYTES—
Antwerp, 100 bgs.

CELLULOSE—
Hamburg, 63 bls.

LITHOPONE—
Rotterdam, 8 cks.

SALT—
Ostend, 500 brls.

HULL.

Week ending July 28.

CHEMICALS (*otherwise undescribed*)
Bari, 4 t. 10 c.; Copenhagen, 1 t. 10 c.; Dunkirk, 4 c.; Genoa, 30 t.; Hamburg, 7 t.; Naples, 6 t. 10 c.; New York, 2 t.

FERRO CHROME—
Gothenburg, 34 t.

FERRO SILICON—
Cruz, 150 t.

MAGNESIUM SULPHATE—
Rotterdam, 10 t.

ROSIN—
Jacksonville, 62 t. 8 c.
Savannah, 122 t. 10 c.

SOAP—
Genoa, 5 t.
Hamburg, 2 c.
Marseilles, 2 c.

SULPHUR—
Catania, 45 t. 10 c.

LEITH.

Week ending July 28.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 22 brls.

BARYTES—
Bremen, 34 cks., 150 bgs.

CREAM OF TARTAR—
Rotterdam, 30 cks.

CRYOLITE—
Copenhagen, 200 bgs.

DEXTRINE—
Amsterdam, 10 bls.

GLUE—
Antwerp, 100 bls.
Hamburg, 20 bgs.

LITHOPONE—
Amsterdam, 100 cks.

MAGNESITE—
Rotterdam, 25 bgs.

ROSIN—
Bremen, 100 brls.

SALT—
Hamburg, 750 bgs.

SOAP—
Odense, 2 cks.

LIVERPOOL.

OFFICIAL AMENDMENTS.

To return for week ending July 14, Add—

LITHOPONE—
Hamburg, 20 cks.

From return for week ending April 21, Deduct—

ACETIC ACID—
Montreal, 45 brls.

Week ending July 28.

ALUMINA—
Marseilles, 1,000 bgs.

ANTIMONY REGULUS—
Shanghai, 200 cs.

ARSENIC—
Lisbon, 40 cks.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 13 cks.

BARYTES—
Tarragona, 80 brls., 200 bgs.

BONE BLACK—
Philadelphia, 1 brl.

BORIC ACID—
Leghorn, 120 brls.

CALCIUM CARBIDE—
Amsterdam, 280 drms.

CARBON BLACK—
New Orleans, 100 cs.
New York, 150 cs.

CAUSTIC POTASH—
Antwerp, 19 drms.

CHEMICALS (*otherwise undes.*)
New York, 22 cs.
Rotterdam, 20 cks.

COAL TAR PRODUCTS—
Tar Oil
Gothenburg, 2 cks.

CREAM OF TARTAR—
Amsterdam, 116 kgs.
Marseilles, 74 cks.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 100 bxs.
Singapore, 500 bgs.
Logwood
New York, 78 cks.

FERRO CHROME—
Genoa, 7 cks.
Gothenburg, 13 cks.

FERRO SILICON—
Sarpsborg, 574 brls.
Skien, 434 drms.

FERTILISER (DRIED BLOOD)—
Zarate, 676 bgs.

FULLER'S EARTH—
Hamburg, 100 bgs.

GLUCOSE—
Amsterdam, 50 cks.
New Orleans, 165 brls.
Norfolk, 360 brls.

GLUE—
Havre, 6 bgs.

KIESELGUHR—
Cartagena, 2 bgs.

LACTIC ACID—
Hamburg, 30 cks.

LEAD ORE—
Tarragona, 131 mts.

LITHOPONE—
Rotterdam, 40 cks.

MAGNESITE—
Amsterdam, 250 bgs.

MAGNESIUM SULPHATE—
Hamburg, 500 bgs.
Rotterdam, 50 bgs.

MANGANESE OXIDE—
Hamburg, 21 cks.

METHYL ALCOHOL—
Gothenburg, 16 brls.
Philadelphia, 40 drms.

MOLYBDENUM ORE—
Galveston, 10 sks.

OCHRE—
Alicante, 500 bgs.
Barcelona, 88 cks.
Marseilles, 46 cks.

PARAFFIN WAX—
Baltimore, 555 brls.
New York, 330 brls.
Philadelphia, 306 brls.

PHOSPHATE—
Tunis, 3,450 t.

PHOSPHATE ORE—
Bombay, 1,000 t.

PHOSPHATE ROCK—
Boca Grande, 2,860 t.

POTASSIUM CARBONATE—
Hamburg, 47 cks.

POTASSIUM CHLORATE—
Gothenburg, 600 cs.

POTASSIUM HYDRATE—
Hamburg, 32 cks.

ROSIN—
Bordeaux, 21 cks.
Gothenburg, 115 brls.

SALTPETRE—
Hamburg, 44 kgs.
Rotterdam, 20 bgs.

SOAP—
Genoa, 180 cs.
Marseilles, 256 cs.
New York, 1cs.
Singapore, 99 cs.
Valencia, 20 cs.

SODIUM ACETATE—
Antwerp, 40 kgs.
Hamburg, 30 cks.

SODIUM PHOSPHATE—
Antwerp, 13 cks.

SODIUM PRUSSIATE—
New York, 37 brls.

STEARINE—
New York, 72 bls.
Trinidad, 1 pkg.

SULPHUR—
Catania, 200 bgs.

TALLOW—
Baltimore, 170 brls.; Campana, 710 cks.; Fredriksstad, 5,315 brls., 199 drms.; New York, 100 brls.; Zarate, 344 cks.

TANNING MATERIALS—
Chestnut
Genoa, 130 cks.
Leghorn, 160 brls.
Gambier
Singapore, 862 cs.
Myrabolans
Bombay, 3, 900 pkts.
Sumac
Palermo, 450 bgs.
Valencia, 504 bgs.
Wattle
Durban, 23,559 bgs., 16,439 bls.
Unspecified
Bordeaux, 346 cks.

TARTARIC ACID—
Amsterdam, 60 kgs.

TUNGSTEN ORE—
Shanghai, 3,920 bgs.

WAX (*otherwise undescribed*)—
Hamburg, 20 bgs.
New Orleans, 996 brls.
New York, 6 cs., 724 brls.

WHITE LEAD—
Amsterdam, 69 cks.
Rotterdam, 77 cks.

ZINC ASHES—
Galatz, 819 cs.

ZINC DUST—
New York, 448 bxs.

ZINC OXIDE—
Antwerp, 70 brls.
Rotterdam, 25 cks.

LONDON.

OFFICIAL AMENDMENT.

In Return for week ending July 21,

ACETIC ACID—
Germany, 741 pkgs.

Should read—

ACETIC ACID—
Canada, 741 pkgs.

Week ending July 28.

ACETONE—
Brit. India, 25 t. 9 c. Yugo-Slav. Exp.
Italy, 14 3 V. Blagden

ANTIMONY—
Germany, 2 t. Cookson

ANTIMONY OXIDE—
China, £400.

ANTIMONY REGULUS—
China, 10 t. Hoare Wilson

ARGOLS—
France, 92 pkgs.
Italy, 119
Spain, 307
,, 92 Morison, Pollexfen & Blair

ARSENIC—
B. E. Africe, 2 c.

ARSENIOUS ACID—
Portugal, 56 pkgs. Coverley, Wall & Westray

BARYTES—
Brit. India, 8 bgs. H. Johnson
Belgium, 100 Felton & Crepin
Germany, 150 bgs. W. Harrison
Germany, 33 cks. Harrison
,, 36 Greeff
,, 47 D. M. Henderson
,, 34 Felton & Crepin
,, 750 bgs. Pallister, Luck
Spain, 4 t.

BEESWAX—
Anglo-Egypt. Sudan, 43 pkgs.
B.W.I. 1 ck.
French Somaliland, 40 pkgs.

BENZOIC ACID—*
——— £100.

CARBON BLACK—
U.S.A., 56 brls.

CASEIN—
Argentine
Rep., £1,601. S. Rogers
Brit. India, £757. ,,
France, £100. Jones, Moore
,, £1,275. Guesdon

CHEMICALS (*otherwise undescribed*)
Brit. India, £250.
Canada, £32. R. D. Storey

CHEMICALS (*otherwise undes.*)—*
——— £1,021.

CITRIC ACID—
B. W. I., 42 pkgs. L. Rose

COAL TAR PRODUCTS—
Naphthalene
Belgium, £228.
Tar
Finland, 6 cks. Major
Holland, 57 H. Knight

COCAINE HYDROCHLORIDE—*
——— £234.

COUMARINE—*
——— £244.

CREAM OF TARTAR—
France, 60 pkgs. R. Warner
Italy, 20 Leach
,, 100

DEXTRINE—
Germany, 14 t. 15 c. K. J. Mulder

DYESTUFFS (ARTIFICIAL)—
Unspecified
Germany, 6 pkgs.
,, 11 Greeff

DYESTUFFS (NATURAL)—
Fustic
U.S.A. 20 pkgs. W. Burton
Tumeric
Brit. India, 62 pkgs. Litchfield & Saundy

FERTILISERS (*otherwise undes.*)—
Canada, 27 t. S. H. Lock

GELATINE—
Belgium, £90.
Holland, £10.
N.S.W., £550.
Switzerland, £720. Europe & Gen. Exp.

GLUE—
Belgium, £105. Soc. des Prod. Chimiques
,, £365.
France, £147. A. J. Malicet
,, £10.
Germany, £10. Eurpoe & Gen. Exp.
Hungary, £350. H. Smart
Holland, £439.
Italy, £596. Union Glue & Gel.

ISINGLASS—
Burmah, 2 cs. Dunlop
,, 36
France, 2 bls. J. L. Lyon

KIESELGUHR—
Germany, 5 t. R. Baker
France, 19 14 c. P. Le Brun

LITHOPONE—
Holland, 120 cks. F. T. H. Nye

MAGNESIUM SULPHATE—
Germany, £12. Braes-Halliday
Holland, £15. H. Batten
,, £30. C. H. Haigh

METHYL SALICYLATE—*
——— £170.

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 3 cks. J. S. Holt & Moseley
Italy, 14 Jenson & Nicholson
,, 12 brls.
,, 1 cks. Colthurst & Harding
Spain, 14 brls. E. Dechaine

PARAFFIN WAX—
Burmah, 200 t. Candler
,, 5 Burmah Oil
,, 25 Asiatic Pet.
,, 50
Poland, 29 11 A. C. E. Garnham
U.S.A., 70 Anglo-Amer. Oil
,, 200 S. Bramwell
,, 19 7 A. C. E. Garnham
,, 25 Gerhard & Hey

* Entered under the Safeguarding of Industries Act.

PLUMBAGO—
Ceylon, 662 bgs. A. Bramwell
France, 27 cks. G. T.
,, 10 bgs. Symons
,, 50 A. Bramwell
Germany, 42 W. Hall
Madagascar, 12,089

POTASH ALUM—
Germany, 184 pkgs. Brown & Forth

POTASSIUM CARBONATE—
Germany, 26 pkgs. Barber & Kent

POTASSIUM NITRATE—
Germany, 1,243 pkgs. Stott & Hotopf
,, 1,500 bgs. Nobel Industries

POTASSIUM PRUSSIATE—
Holland, 6 cks.

RED LEAD—
Italy, 30 cks. Dexters

ROSIN—
Germany, 1 cs.

SHELLAC—
Brit. India, 121 t. 4 c. Litchfield & Saundy
,, 1 7 A. Faber
,, 27 4
,, 1 Weber, Smith & Hoare

SOAP—
Belgium, £93. S. Kalisky
France, £7. Butler & Crispe
,, £30.
,, £1,725. P. Le Brun
Germany, £21.
,, £16. Braes-Halliday (Glasgow)
U.S.A., £,1574. Knight & Morris
Victoria, £3,000. L. F. Smith

SODIUM SALICYLATE—
France, 5 t.

STEARINE—
Holland, 67 bgs.
N.S.W., 58 cks.

SULPHUR (FLOWERS)—
Italy, £37. G. W. Wheatley

SULPHURIC ACID—
Holland, 20 cks.

TALLOW—
N.S.W., 7 t.
N.Z., 14 7 Thornett & Fehr
,, 185 18
,, 40 10 J. H. Rayner
,, 36 3 H. Hill
,, 7 Fairclough, Dodd & Jones
,, 82 10 Weber, Smith & Hoare
,, 473 3 Lever
,, 40 11 Goad, Rigg

TANNING MATERIALS—
Myrabolans
B. India, 8,000 Wills
,, 2,500 J. J. Williamson
Sumac
Switzerland, 4 pkgs.
Unspecified
Natal, 22 t. Page & East

TAR (*otherwise undescribed*)**—**
Finland, 50 brls. Smith & Moeller
Latvia, 62 Russian Prod.
Sweden, 100 Smith & Moeller

TARTARIC ACID—
Italy, 160 pkgs.

ULTRAMARINE—
Germany, 6 cks. Stancourt & Muir

WAX (*otherwise undescribed*)**—**
Germany, £26.

WHITE LEAD—
Belgium, 3 cks. T. & W. Farmiloe
,, 100 brls. L. Walford
Austria, 20 cks. Grosseurth & Luboldt

ZINC OXIDE—
Holland, 250 cks. F. T. H. Nye
,, 25 M. Ashby

ZINC SULPHATE—
Poland, £9. H. Keller

MANCHESTER.

Week ending July 28.

ACETIC ACID—
Amsterdam, 22 cks.
Montreal, 755 brls.

CALCIUM CARBIDE—
Amsterdam, 400 drms.

CARBON (DECOLOURISING)—
Amsterdam, 207 bgs.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 1 drm.

DEXTRINE—
Hamburg, 100 bgs.

FORMALDEHYDE—
Montreal, 56 brls.

FORMIC ACID—
Amsterdam, 39 djns.

GLUCOSE—
Amsterdam, 10 cks.
Newport News, 300 brls.

MAGNESIUM CHLORIDE—
Hamburg, 31 drms., 2 cks.

NAPHTHA (WOOD)—
Hamburg, 25 cks.

OXALIC ACID—
Amsterdam, 6 cs.

PARAFFIN WAX—
Philadelphia, 991 brls.

PHOSPHORUS—
Montreal, 188 drms.

POTASSIUM PERMANGANATE—
Hamburg, 100 drms.

ROSIN—
Mobile, 250 brls.

SOAP—
Valencia, 35 cs.

SODIUM NITRATE—
Hamburg, 200 cks.

TANNING MATERIALS—
Unspecified
Baltimore, 75 bxs.

TARTARIC ACID—
Amsterdam, 30 cks.

NEWCASTLE-ON-TYNE

Week ending July 28.

BARIUM SULPHATE—
Bremen, 518 cks. and sks.

BARYTES—
Bremen, 34 cks.
Hamburg, 150 bgs., 142 cks.

CHEMICALS (*otherwise undescribed*)
Bremen, 9 cs.

OXIDE (*otherwise undescribed*)**—**
Malaga, 536 cks.

PHOSPHATE—
Antwerp, 2,403 bgs.

POTASSIUM NITRATE—
Hamburg, 300 t.

SODA CRYSTALS—
Hamburg, 9 cks.

TANNING MATERIALS—
Sumac
Malaga, 123 sks.

ZINC OXIDE—
Rotterdam, 50 cks.

N. & S. SHIELDS.

Week ending July 28.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending July 28.

ALUM—
Calcutta, 3 t. 1 c.

AMMONIUM CARBONATE—
Aalesund, £18.; Rangoon, 4 c.; Singapore, 18 c.

AMMONIUM SULPHATE—
Hong Kong, 975 t. 12 c.

ANTIFOULING PAINT—
Hong Kong, £261.

CALCIUM CHLORIDE—
Lyttleton, 2 t. 1 c.

CALCIUM PHOSPHATE—
Santos, 2 t.

CARBON BLACK—
Dunedin, 6 c.

CHEMICALS (*otherwise undescribed*)
Antwerp, 5 pkgs.; Auckland, 711 pkgs.; Bahia, 3 pkgs.; Batavia, 110 pkgs.; Benkoelen, 300 pkgs.; Brisbane, 22 pkgs.; Calcutta, 194 pkgs.; Callao, 5 pkgs.; Colombo, 25 pkgs.; Coquimbo, 90 pkgs.; Gothenburg, 10 pkgs.; Hamburg, 1,298 pkgs.; Hong Kong, 110 pkgs.; Kobe, 630 pkgs.; Lyttleton, 33 pkgs.; Montreal, 950 pkgs.; Melbourne, 128 pkgs.; New York, 1,040 pkgs.; Mombasa, 510 pkgs.; Penang, 5 pkgs.; Pisco, 2 pkgs.; Pt. Swettenham, 9 pkgs.; Payta, 25 pkgs.; Padang, 50 pkgs.; Rio de Janeiro, 200 pkgs.; Pt. Adelaide, 26 pkgs.; Rouen, 433 pkgs.; Santos, 10 pkgs.; Singapore, 357 pkgs.; Stavanger, 25 pkgs.; Sydney, 181 pkgs.; Tientsin, 3 pkgs.; Wellington, 92 pkgs.; Yloilo, 1 pkg.

COAL TAR PRODUCTS—
Creosote Oil
San Antonio, 113 t.

COAL TAR PRODUCTS—
Tar
Antwerp, 4 t. 7 c.; Calcutta, 1 t. 6 c.; Colombo, 68 t.; Dunedin, 10 t. 19 c.; Hamburg, 1 t.; Helsingfors, £219.; Kilindini, 3 t.; Palembang, 5 t.; Penang, 20 t.; Pt. Said, 2 t.; Pt. Swettenham, 56 t. 3 c.; Rangoon, 5 t.; Singapore, 30 t. 5 c.; Samarang, 47 t.; Sourabaya, 22 t. 5 c.
Unspecified
Antwerp, 11 c.; Singapore, 3 t. 17 c.; Hamburg, 10 t. 6 c.; Hong Kong, 16 c.; San Antonio, 95 t. 15 c.

DYESTUFFS (NATURAL)—
Logwood
Dunedin, 3 t. 10 c.

GELATINE—
Montreal, 2 t.

GLUE—
Rangoon, 5 c.; Singapore, 2 c.

HYDROCHLORIC ACID—
Mombasa, 4 c.
Rangoon, 1 t.

MAGNESIA—
Madras, 2 t. 2 c.

MAGNESIUM CHLORIDE—
Rangoon, 2 t. 19 c.

MAGNESIUM OXIDE—
Montreal, 5 t.

PARAFFIN WAX—
Hamburg, 5 t.; Hong Kong, 34 t. 13 c.; Melbourne, 10 t.; Rangoon, 1 t. 1 c.; Singapore, 4 t.; Sourabaya, 20 t. 3 c.

POTASSIUM BICHROMATE—
Constantinople, 10 c.; Dalny, 7 t. 6 c.; Hong Kong, 2 t. 10 c.; Kobe, 12 t. 2 c.; Tientsin, 6 t. 14 c.; Yokohama, 3 t. 3 c.

SHEEP DIP—
Bahia Blanca, 14 t. 5 c.
Punta Arenas, 5 t. 17 c.

SOAP—
Antwerp, 11 c.; Auckland, 13 c.
Hong Kong, 1 t.
Iquique, 11 c.
Valparaiso, 16 c.

SODA CRYSTALS—
Calcutta, 5 c.

SODIUM BICHROMATE—
Dunedin, 1 t. 2 c.; Hamburg, 51 t. 6 c.; Rouen, 3 t. 3 c.; Tientsin, 1 t. 10 c.; Wellington, 18 c.

SPERMACETTI WAX—
Hamburg, 11 c.

SULPHUR—
Dunedin, 3 t.

TALLOW—
Gibraltar, 4 c.
Gothenburg, 1 t. 12 c.

TAR (STOCKHOLM)—
Mombasa, 3 c.
Shanghai, 18 c.
Singapore, 1 t. 16 c.

WAX (*otherwise undescribed*)**—**
Batavia, 2 c.
Singapore, 740 lb.

GRANGEMOUTH.

Week ending July 28.

AMMONIUM CARBONATE—
Trondhjem, 16 c.

COAL TAR PRODUCTS—
Pitch
Christiania, 10 t.
Christiansand, 50 t.

PARAFFIN WAX—
Bordeaux, 8 t. 12 c.
Nantes, 7 t. 2 c.
Rouen, 2 t. 10 c.

POTASSIUM BICHROMATE—
Dunkirk, 3 t. 3 c.

SODIUM BICHROMATE—
Rouen, 11 t. 17 c.

HULL.

Week ending July 24.

ALUM—
Melbourne, 28 brls.

AMMONIUM SULPHATE—
Amsterdam, 607 bgs.
Rotterdam, 100 bgs.

CASEIN—
Hamburg, 36 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 4 cs., 1 ck., 20 drms.
Antwerp, 2 cs., 2 pkgs., 3 drms.; Christiania, 3 cs., 471 slbs.; Copenhagen, 50 drms.; Gothenburg, 104 cs., 324 drms.; Reykjavik, 2 drms.; Rotterdam, 17 pkgs., 52 drms., 10 cks., 4 cs.; Trieste, 4 cks.

COAL TAR PRODUCTS—
Benzol
Hamburg, 585 drms.
Creosote
Buenos Aires, 460 drms.
Naphtha
Christiania, 10 drms.
Rotterdam, 8 drms.
Pitch
Baltimore, 275 brls.; Dunkirk, 145 t.; New York, 104 brls.; Palermo, 1 cs.

DISINFECTANTS (*otherwise undes.*)
Bombay, 100 drms., 128 cs.
Christiania, 50 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiania, 1 cs., 1 ck., 8 kgs.
Karachi, 2 cs.

GLUE—
Antwerp, 40 bgs., 1 cs.; Christiania, 11 bgs.; Gothenburg, 100 bls.; Harlingen, 20 bgs.; Helsingfors, 40 bgs.; Reykjavik, 8 bgs.

GLYCERINE—
Amsterdam, 96 drms.

GLYCERINE—
Hamburg, 106 drms.
Rotterdam, 98 drms.
Stockholm, 11 drms.

MINERAL WHITE—
Antwerp, 20 bgs.

PLUMBAGO—
Dunkirk, 2 cs.

SALT—
Amsterdam, 254 cs.
Karachi, 25 cs.
Montreal, 55 cs.

SOAP—
Amsterdam, 500 cs.; Christiania, 2,114 cs.; Copenhagen, 9 cs.; Ghent, 5 cs.; Hamburg, 1 cs.; Reykjavik, 63 cs.

TURPENTINE—
Antwerp, 65 cks.
Copenhagen, 8 cks.

WOOD PRESERVATIVE—
Christiania, 60 drms.

LEITH.

Week ending July 28.

COAL TAR PRODUCTS—
Naphtha
Rouen, 45 drms.

ETHYL ALCOHOL—
Rotterdam, 30 drms.

GLUE—
Rouen, 3 t. 2 c.

SOAP—
Klaksvig, 5 c., 1 cs.; Thorshavn, 6 c.; Trangjsvaag, 2 c.; Vestmanhavn, 2 c.

SODA—
Thorshavn, 3 c.

TALLOW—
Newfairwater, 43 cks.

ZINC ASHES—
Antwerp, 22 cks.

LIVERPOOL.

Week ending July 26.

ALUM—
Delagoa Bay, 1 t., £10.
Monte Video, 1 t. 1 c., £11.
Stockholm, 12 t. 17 c., £235.

ALUMINIUM SULPHATE—
Buenos Aires, 100 t. 7 c., £700.
Durban, 40 t. 3 c., £310.
Kotka, 20 t., £134.

AMMONIA—
Para, 3 c., £19.

AMMONIUM CARBONATE—
Bahia, 1 t., £45.
Bordeaux, 1 t., £38.
Rio de Janeiro, 2 t. 9 c., £169.

AMMONIUM CHLORIDE—
Alexandria, 4 t. 18 c., £206.; Athens, 5 c., £10.; Constantinople, 1 t. 19 c., £82.; Christiania, 15 c., £24.; Salonica, 1 t., £41.

AMMONIUM SALTS (*otherwise unden.*)
Aarhus, 4 t. 18 c., £153.
Bilbao, 10 c., £15.
Hamburg, 4 t. 18 c., £140.

AMMONIUM SULPHATE—
Barbados, 71 t., £1,420.; Las Palmas, 160 t., £2,480.; St. Kitts, 5 t., £74.; Teneriffe, 10 t., £155.

ANTIFOULING PAINT—
Auckland, 5 c., £22.; Melilla, 6 c., £14.; Talcahuano, 2 t., £147.; Teneriffe, 6 c., £22.; Valparaiso, 1 t., £231.

ARSENIC—
Riga, 10 c., £35.

ARSENIOUS ACID—
Adelaide, 18 c., £85.

BITUMEN—
Buenos Aires, 9 c., £13.

BLEACHING POWDER—
Auckland, 2 t., £26.; Amsterdam, 5 t. 9 c., £49.; Calcutta, 45 t. 2 c., £442.; Dunedin, 4 t. 19 c., £60.; Iquique, 2 t. 3 c., £35.; Lisbon, 18 c., £12.; Oporto, 9 t. 16 c., £109.; Para, 1 t. 1 c., £13.; San Antonio, 10 t., £120.

BOILER COMPOSITION—
Antwerp, 10 c., £20.

BORAX—
Alexandria, 1 t., £28.; Bilbao, 1 t. 5 c., £36.; Cartagena, Col., 5 c., £7.; Constantinople, 2 t., £57.; Christchurch, 1 t., £30.; Greymouth, 8 c., £12.; Helsingfors, 10 c., £10.; Oporto, 2 t. 9 c., £67.; Rio de Janeiro, 5 t. 8 c., £154.

BORAX GLASS—
Auckland, 1 t., £75.

BORIC ACID—
Amsterdam, 10 c., £26.
Bilbao, 4 c., £11.
Christchurch, 10 c., £29.
Famagusta, 1 c., £14.
Greymouth, 2 c., £6.
Iquitos, 2 c., £12.
Riga, 6 c., £19.
Rio de Janeiro, 1 t., £52.

CALCIUM CARBIDE—
Calabar, 2 c., £13.

CALCIUM CHLORIDE—
Auckland, 5 t. 3 c., £32.; Brisbane, 9 t. 19 c., £57.; Dunedin, 1 t. 18 c., £18.; Durban, 11 t. 14 c., £78.; Havre, 13 t. 1 c., £69.

CHEMICALS (*otherwise undescribed*)
Auckland, 1 t., £20.; Alexandria, 6 t. 19 c., £195.; Abo, 25 t., £56.; Dunedin, 1 t., £28.; Gefle, 5 t. 10 c., £154.; Galatz, 6 c., £18.; Lisbon, 2 t., £54.; Montreal, 10 t., £22.; Mollendo, 1 t., £31.; Sierra Leone, 1 c., £15.; Welling ton, 8 t., £129.

CHLOROFORM—
Auckland, 1 c., £12.

CHLORSULPHONIC ACID—
Switzerland, 1 t., £30.

CITRIC ACID—
Barcelona, 1 t., £170.
Para, 1 c., £15.

COAL TAR PRODUCTS—
Aniline Salts
Switzerland, 10 t. 19 c., £919.
Carbolic Acid
Genoa, 4 t. 18 c., £735.
Hamburg, 12 t. 3 c., £1,212.
Monte Video, 1 c., £11.
Switzerland, 6 t. 5 c., £981.
Creosote
Gothenburg, 4 t. 19 c., £124.
New York, 8 c., £12.
Stockholm, 19 c., £22.
Dichloraniline
Bordeaux, 1 t. 1 c., £229.
Dinitrochlorbenzol
Rotterdam, 5 t. 3 c., £410.
Mirbane Oil
Oporto, 4 c., £15.
Naphthalene
Lagos, 15 c., £33.
Tar
Accra, 1 t. 15 c., £24.; Duala, 2 t. 1 c., £20.; Lagos, 6 t. 8 c., £84.; Manaos, 1 t. 18 c., £26.; Oporto, 6 t., £66.; Pt. Harcourt, 1 t., £10.; Sierra Leone, 1 t. 4 c., £25.
Unspecified
Beira, 13 t. 8 c., £350.; Bluefields, 4 c., £17.; Reval, 13 t. 12 c., £643.; Hamburg, 24 t., £2,211.; Switzerland, 5 t. 16 c., £1,777.

COPPER SULPHATE—
Auckland, 2 t., £52.; Beira, 4 c., £5.; Callao, 1 t., £27.; Calabar, 10 c., £13.; Champerico, 10 c., £13.; Dunedin, 1 t., £26.; Los Angeloes, 18 t., £458.; Monte Video, 17 t. 4 c., £437.; Napier, 5 c., £6.; San Francisco, 49 t. 18 c., £1,232.; Wellington, 13 c., £17.

DISINFECTANTS (*otherwise undes.*)
Beira, 1 t. 8 c., £78.; Bathurst, 3 c., £10.; Bombay, 1 c., £11.; Buenaventura, 2 t. 8 c., £217.; Iddo, 1 c., £12.; Lagos, 15 c., £18.; Manaos, 2 c., £10.; Malaga, 1 t., £48.; New York, 49 t. 8 c., £3,317.; Porto Velho, 1 t. 17 c., £40.; Para, 11 c., £33.; Pt. Harcourt, 17 c., £58.; Opobo, 2 t. 16 c., £136.

DYESTUFFS (ARTIFICIAL)—
Alizarine
New York, 3 c., £70.
Unspecified
Barcelona, 5 c., £330.; Boston, 2 qr., £50.; Bluff, 10 c., £201.; Dunedin, 4 c., £211.; Havre, 5 c., £83.; Iquitos, 13 lb., £16.; Montreal, 13 c., £154.; Rio de Janeiro, 2 c., £100.

DYESTUFFS (NATURAL)—
Cudbear
New York, 1 t. 8 c., £58.
Hematine
Auckland, 3 c., £12.
Unspecified
Boston, 1 t. 3 c., £29.
Rotterdam, 1 t. 3 c., £57.

FATTY ACIDS (*otherwise undes.*)—
Stockholm, 9 t. 19 c., £303.

FERTILISERS (*otherwise undes.*)—
Baltimore, 100 t., £600.
Charleston, U.S.A., 200 t., £1,200.
Jacksonville, 1,500 t., £7,500.

FORMIC ACID—
Arica, 4 c., £19.
Valparaiso, 11 c., £57.

GLYCERINE—
Copenhagen, 2 t., £135.
Delagoa Bay, 97 t. 17 c., £8,309.
Lyttleton, 5 c., £24.

HYDROFLUORIC ACID—
Bahia, 3 c., £18.

IODOFORM—
Abonema, 11 lb., £15.
Pt. Harcourt, 8 lb., £10.
Sapele, 11 lb., £15.

MAGNESIA—
Para, 4 c., £18.

MAGNESIA (CALCINED)—
Buenos Aires, 4 c., £19.
Panama, 5 c., £49.
Guayaquil, 10 c., £62.

MAGNESIUM SULPHATE—
Barranquilla, 10 c., £5.; Bombay, 18 lb., £7.; Calcutta, 1 c., £2.; Famagusta, 1 c., £1.; Grand Bassam, 2 c., £2.; Half Assinee, 1 c., £2.; Manaos, 5 c., £5.; Saltpond, 3 c., £4.; Sekondi, 1 c., £2.

PHOSPHORUS (AMORPHOUS)—
Kingston, 3 c., £32.

PHOSPHORUS SESQUISULPHIDE
Gijon, 10 c., £101.
Pasages, 10 c., £101.
Seville, 5 c., £50.
Valencia, 15 c., £150.

PLATING SALTS (*otherwise undes.*)
Barcelona, 3 c., £28.

POTASSIUM BICHROMATE—
Alexandretta, 1 t., £48.

POTASSIUM CHLORATE—
Paramaribo, 1 t., £41.

POTASSIUM IODIDE—
Abonema, 215 lb., £207.
Calabar, 1 c., £123.
Duala, 47 lb., £51.
Pt. Harcourt, 38 lb., £36.
Opobo, 2 c., £300.
Sapele, 23 lb., £22.

POTASSIUM SILICATE—
Havre, 19 c., £17.

SALTCAKE—
Kotka, 1,852 t. 1 c., £9,260.

SALTPETRE—
Lagos, 12 c., £25.

SHEEP DIP—
Buenos Aires, 7 t. 9 c., £283.; Guayaquil, 1 t. 18 c., £56.; Manaos, 5 c., £19.; Pto. Colombia, 5 c., £19.; Santa Cruz, 23 t. 9 c., £875.; Talcahuano, 2 t. 2 c., £100.; Valparaiso, 6 t. 11 c., £230.

SODIUM HYDROSULPHITE—
Montreal, 2 c., £15.

SULPHURIC ACID—
Antifagasta, 14 t. 9 c., £230.
Arica, 2 t. 1 c., £37.

TANNING MATERIALS—
Unspecified
Auckland, 5 t. 4 c., £152.
Christiania, 4 t. 8 c., £64.

TAR (*otherwise undescribed*)—
Iquitos, 9 c., £16.

TARTARIC ACID—
Callao, 9 c., £70.
Para, 1 c., £18.
Rosario, 10 c., £68.

TIN OXIDE—
Sydney, 3 c., £44.

TITANIUM CHLORIDE—
Boston, 5 c., £16.

VANILLIN—
Genoa, 3 c., £412.

ZINC CHLORIDE—
Hobart, 10 c., £17.

ZINC OXIDE—
Havre, 31 t. 1 c., £1,309.

Week ending July 27.

CALCIUM CHLORATE—
Montreal, 47 drms.

CAUSTIC SODA—
Alexandria, 20 drms.; Arica, 24 pkgs.; Bahia Blanca, 118 drms.; Bari, 55 drms.; Barbados, 3 drms.; Bombay, 25 drms.; Bourgas, 60 drms.; Brisbane, 12 drms.; Buenos Aires, 224 pkgs., 300 cs.; Calabar, 8 pkgs.; Cartagena, S.A., 30 pkgs.; Ceara, 95 pkgs.; Cienfuegos, 3 drms.; Con-stantinople, 40 drms.; Copenhagen, 17 drms.; Corral, 15 cs.; Delagoa Bay, 3 pkgs.; Fremantle, 72 drms.; Genoa, 82 drms.; Hamburg, 651 drms.; Kobe, 4,320 drms.; Lisbon, 1,011 drms.; Mazatlan, 50 drms.; Lyttleton, 12 drms.; Monte Video, 82 pkgs., 50 drms.; Manaos, 41 pkgs.; Naples, 30 drms.; Para, 154 drms.; Piraeus, 200 drms.; Pt. Alegre, 80 drms.; Pt. Louis, 20 drms.; Pto. Cabello, 56 drms.; Rangoon, 80 drms.; Rio de Janeiro, 3,060 drms.; Rockhampton, 30 drms.; Salonica, 49 drms.; San Antonio, 83 drms.; Santos, 874 cks.; Shanghai, 168 drms.; Sydney, 50 drms.; Talcahuano, 5 cs.; Townsville, 10 cs.; Vancouver, 60 drms.; Varna, 50 drms.; Victoria, B.C., 15 drms.; Wellington, 25 drms.; Zanzibar, 33 drms.

FERRO CARBON TITANIUM—
Havre, 1 t.

FERRO COBALT—
New York, 10 c.

FERRO MANGANESE—
Antwerp, 20 t.; Hamburg, 100 t.; Los Angeles, 15 t.; Montreal, 5 t.; New Orleans, 146 t.; San Francisco, 115 t.

GLUE, SIZE AND GELATINE—
Barbados, 6 bgs.; Boston, 110 cks., 457 bgs.; Buenos Aires, 3 cs.; Las Palmas, 10 pkgs.; Melbourne, 10 cks.; New York, 100 bgs.; Melbourne, 2 pkgs.; Montreal, 15 bgs.; Riga, 10 bgs.; Shanghai, 60 cks.

MANGANESE ORE—
Trondhjem, 4 t.

PARAFFIN WAX—
Venice, 1,200 bgs.

SALT—
Aalborg, 107 t.; Abonema, 20 t.; Accra, 4 t.; Bergen, 69 t.; Buenos Aires, 10 t.; Burutu, 115 t.; Christchurch, 175 t.; Christiania, 50 t.; Christiansund, 55 t.; Cotonou, 9 t.; Duala, 107 t.; Drammen, 116 t.; Ghent, 150 t.; Halifax, N.S., 56 t.; Havre, 6 t.; Iddo, 220 t.; Lagos, 50 t.; Melbourne, 110 t.; Montreal, 282 t.; New Orleans, 150 t.; New York, 125 t.; Opobo, 60 t.; Pt. Harcourt, 34 t.; Pto. Barrios, 30 t.; Quebec, 100 t.; Rangoon, 1,000 t.; Reval, 40 t.; Rio de Janeiro, 30 t.; St. Johns, N.F., 33 t.; Sapele, 102 t.; Sav la Mar, 5 t.; Sekondi, 26 t.; Sierra Leone, 184 t.; Skien, 150 t.; Sekondi, 12 t.; Trondhjem, 37 t.; Vancouver, 31 t.; Warri, 1,026 t.

SOAP—
Abonema, 50 pkgs.; Accra, 50 bxs.; Alexandria, 9 cs., 262 pkgs.; Amsterdam, 12 brls.; Antwerp, 30 bxs.; Antigua, 40 pkgs.; Auckland, 805 bxs.; Bahia Blanca, 120 cs.; Barbodos, 50 pkgs.; Bombay, 482 bxs.; Brisbane, 1 pkg.; Buenos Aires, 415 bls.; Calcutta, 53 bxs.; Cape Coast, 280 bxs.; Christchiurch, 133 bxs.; Commodora Rivadavia, 25 bxs.; Colon, 220 bxs.; Constantinople, 40 bxs.; Copenhagen, 150 cs.; Corral, 50 bxs.; Demerara, 13 pkgs.; Dominica, 100 pkgs.; Duala, 470 bxs.; Dunedin, 293 bxs.; Gibraltar, 25 pkgs.; Hong Kong, 80 pkgs.; Iddo, 52 bxs.; Kilindini, 188 pkgs.; Kingston, Ja., 49 pkgs.; Lagos, 468 bxs.; Larache, 55 pkgs.; Las Palmas, 420 pkgs.; Lyttleton, 52 pkgs.; Limon, 65 pkgs.; Lome, 25 pkgs.; Montreal, 10 cs.; Mombasa, 75 cs.; New York, 7 cs.; Panama, 501 pkgs.; Penang, 2 bxs.; Pt. Stanley, 3 bxs.; Piraeus, 50 bxs.; Pt. Sudan, 77 bxs.; Pto. Barrios, 7 bxs.; Punta Arenas, 175 bxs.; Quittah, 50 cs.; Rangoon, 631 bxs.; Rio de Janeiro, 2 bxs.; Rotterdam, 6 bxs.; St. Annes Bay, 34 pkgs.; St. Johns, N.F., 414 pkgs.; Saltpond, 30 pkgs.; Santos, 2 cs.; Sapele, 1 cs.; Sekondi, 22 pkgs.; Sierra Leone, 1 bx.; Sydney, 41 pkgs.; Teneriffe, 134 pkgs.; Trinidad, 1,107 pkgs.; Tumaco, 200 bxs.; Vancouver, 1 cs.; Varna, 40 pkgs.; Warri, 234 pkgs.; Wellington, 529 cs.; Winnebah, 52 bxs.

SODA ASH—
Auckland, 80 pkgs.; Brisbane, 18 pkgs.; Buenos Aires, 1,768 cks.; Calcutta, 1,400 bgs.; Cape Town, 250 pkgs.; Ceara, 10 pkgs.; Christiansund, 50 pks.; Colombo, 800 pkgs.; Copenhagen, 200 pkgs.; Dalny, 6,664 pkgs.; Demerara, 20 cs.; Drammen, 60 pkgs.; Dunedin, 50 pkgs.; Hong Kong, 145 pkgs. Iquique, 100 pkgs.; Kingston, Ja., 23 pkgs.; Kobe, 10,928 pkgs.; Lisbon, 1,000 pkgs.; Mazatlan, 100 bgs.; Para, 65 cks.; Perth, 20 pkgs.; Pelotas, 100 cks.; Rockhampton, 33 cks.; Rosario, 152 cks.; Rotterdam, 100 bgs., 755 pkgs.; San Antonio, 39 brls.; Stockholm, 600 bgs.; Sydney, 138 pkgs.; Tientsin, 2,296 bgs.; Vera Cruz, 2,000 bgs.; Wellington, 150 pkgs.; Yokohama, 1,125 bgs., 8,802 pkgs.

SODA CRYSTALS—
Buenos Aires, 23 kgs.; Colombo, 99 pkgs.; Demerara, 34 pkgs.; Para, 10 cks.; Pt. Stanley, 5 pkgs.

SODIUM BICARBONATE—
Aarhus, 8 cks.; Abo, 240 kgs.; Alexandria, 50 kgs.; Aden, 30 kgs.; Antwerp, 508 pkgs.; Auckland, 34 pkgs.; Barbados, 50 kgs., 20 brls.; Brisbane, 278 pks.; Colombo, 124 pkgs.; Copenhagen, 128 pkgs.; Danzig, 10 bgs.; Demerara, 135 pkgs.; Dunedin, 140 bgs., 34 pkgs.; Genoa, 161 pkgs.; Gothenburg, 20 pkgs.; Halifax, N.S., 100 pkgs.; Kilindini, 70 pkgs.; Kingston, Ja., 40 pkgs.; Kobe, 862 pkgs.; Las Palmas, 7 pkgs.; Leghorn, 170 pkgs.; Lyttleton, 701 pkgs.; Malta, 30 kgs.; Melbourne, 400 pkgs.; Naples, 120 kgs.; Newcastle, 118 pkgs.; New Plymouth, 300 bgs.; Palermo, 95 kgs.; Para, 60 kgs.; Pelotas, 30 kgs.; Pt. Alegre, 50 pkgs.; Reval, 100 kgs.; Salonica, 20 kgs.; San Antonio, 600 kgs.; Smyrna, 40 kgs.; Sydney, 326 pkgs.; St. Johns, 100 kgs.; Talcahuano, 100 kgs.; Tientsin, 420 kgs.; Trinidad, 100 pkgs.; Wellington, 594 pkgs., 60 kgs.

SODIUM CYANIDE—
Cartagena, S.A., 65 cs.
Delagoa Bay, 52 drms.,
Sekondi, 105 drms.

SODIUM SALICYLATE—
Rio de Janeiro, 30 pkgs.

SODIUM SILICATE—
Buenos Aires, 81 cks.; Cartagena, S.A., 30 pkgs.; Fremantle, 65 pkgs.; Hankow, 164 pkgs.; Mazatlan, 20 cks.; Naples, 400 bgs.; Santos, 25 cks.; Wellington, 8 pkgs.

SODIUM SULPHIDE—
Antofagasta, 100 pkgs.
Pt. Swettenham, 80 pkgs.
San Antonio, 80 drms.

STEARINE—
Constantinople, 14 bgs.

TALLOW—
Antwerp, 3 brls.; Guayaquil, 6 cks.; Hamburg, 30 pkgs.; Rotterdam, 12 brls.

LONDON.

Week ending July 25.

ACETIC ACID—
Hamilton (Ont.), 7 cs., £23.

AMMONIA—
Accra, 5 cs., £13.
Pt. Said, 4 cs., £7.

AMMONIA (ANHYDROUS)—
Rotterdam, 2 cylds., £152.

AMMONIUM CARBONATE—
Paris, 12 t. 10 c., £481.
Rouen, 10 c., £18.

AMMONIUM NITRATE—
Christiania, 20 t., £520.
Hango, 26 t. 1 c., £676.

BORIC ACID—
Punta Arenas, 3 c., £12.

CAUSTIC SODA—
Suva, 3 c., £5.

CHEMICALS (*otherwise undescribed*)
Accra, 1 cs., £9.; Antwerp, 58 pkgs., £173.; Bombay, 1 pkg. (pt.), £6.; Delagoa Bay, 280 cs., £1,050.

CHROMIUM OXIDE—
Melbourne, 2 cks., £37.

CITRIC ACID—
Antwerp, 10 c., £84.
Punta Arenas, 1 c., £8.
Rotterdam, 10 c., £84.

COAL TAR PRODUCTS—
Napthalene
Burutu, 10 cs., £14.

COBALT OXIDE—
Brussels, (F.), 1 cs., £77.
Genoa, (F.), 2 cs., £210.
Valencia, (F.), 2 cs., £146.

COPPER SUBOXIDE—
Amsterdam (F.), 10 drms., £105.

COPPER SULPHATE—
Timaru, 2 t. 10 c., £70.

CREAM OF TARTAR—
Rockhampton, 10 c., £45.

DISINFECTANTS (*otherwise undes.*)
Bluff, 17 c., £79.
Christchurch, 5 c., £24.
Pt. Said, 1 c., £7.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Calcutta, 4 cs. (pt.), £11.; Canton, 1 cs. (pt.), £8.; Lisbon, 1 kg., £28.; Switzerland, 3 drms., £28.

FERTILISERS (*otherwise undes.*)—
Antwerp, 12 t., £48.

FORMIC ACID—
Montreal, 5 crts., £20.

GLYCERINE—
Pasages, 1 cs., £5.
Punta Arenas, 2 cs., £13.

HYDROGEN PEROXIDE—
Jaffa, 3 cs. (pt.), £7.

IODINE (RESUBLIMED)—
Bilboa, 4 cs., £312.
Bombay, 1 cs. (pt.), £26.
Seville, 2 cs., £104.

POTASSIUM IODIDE—
Bilbao, 1 cs., £45.
Bombay, 1 cs., £89.

POTASSIUM PRUSSIATE—
Shanghai, 5 kgs., £40.

SALAMMONIAC—
La Guayra (F.), 2 c., £6.

SALICYLIC ACID—
Rangoon, 1 cs., £6.

SODIUM BENZOATE—
Madras, 10 cs., £117.

SODIUM IODIDE—
Bilboa, 1 c., £98.

SODIUM PHOSPHATE—
Calcutta, 2 c., £8.

SODIUM SILICATE—
Bluff, 6 c., £10.

SODIUM SULPHITE—
Sydney, 1 t., £26.

SPENT OXIDE—
Amsterdam, 185 t., £375.

SULPHITE OF LIME—
Boulogne, 3 kgs., £9.

SULPHUR—
Beira (in transit), (F.), 53 t., £480.
La Guaira (F.), 5 c., £5.
New York, 5 c., £19.

SULPHURIC ACID—
Lagos, 1 c., £8.

TARTARIC ACID—
Adelaide, 1 t., £131.; East London, 1 c., £9.; Hamburg, 10 c., £65.; Singapore, (F.), 5 c., £29.; Vera Cruz, 2 c., £15.

TIN OXIDE—
Sydney, 4 cs., £53.

Week ending July 28.

ANTIMONY REGULUS—
Wellington, 10 c.

BEESWAX—
Sydney, 2 t.

FULLER'S EARTH—
Jamaica, 8 c.
Rotterdam, 50 t.

GLUE, SIZE, AND GELATINE—
Ahwaz, 1 c.; Bombay, 1 t. 1 c.; Brisbane, 1 t.; Buenos Aires, 3 c.; Durban, 12 c.; Kobi, 10 t.; Melbourne, 1 t 1 c.; Montreal, 1 t.; Rangoon, 1 t.; Shanghai, 1 c.; Singapore, 2 c.; Sindey, 4 t. 2 c.; Wellington 3 c.; Yokohama, 30 t.

MINERAL WAX—
Brussels, 5 t.
Yokohama, qnty.

PARAFFIN WAX—
Beira, 10 c.
Pt. Harcourt, 1 t.

PLUMBAGO—
Ahwaz, 3 c.; Barcelona, 5 c.; Bombay, 2 t. 1 c.; Bilbao, 1 t. 19 c.; Helsingfors, 7 c.

QUININE—
Barcelona, 704 oz.; Bilbao, 1,380 oz.; Bombay, 5,572 oz.; Colombo, 320 oz.; Melbourne, 1,224 oz.; Shanghai, 165 oz.; Sierra Leone, 1,952 oz.; Sydney, 2,100 oz.

SALT—
Auckland, 1 t. 19 c.
East London, 1 c.
Jamaica, 1 c. .

SHELLAC—
Italy, 4 t. 5 c.

SOAP—
Accra, 5 t. 7 c.; Adelaide, 1 c.; Ahwaz, 1 t. 4 c.; Amsterdam, 7 c.; Auckland, 10 c.; Bombay, 3 t. 7 c.; Buenos Aires, 1 c.; Calcutta, 1 c.; Cheribon, 1 t. 14 c.; Christchurch, 5 c.; Colombo, 1 c.; Durban, 4 c.; Fiji Is., 1 c.; Gibraltar, 1 c.; Gisborne, 1 c.; Grande Bassam, 1 t. 5 c.; Haifa, 1 c.; Hayti, 5 t.; Helsingfors, 3 c.; Hong Kong, 3 c.; Iddo, 11 c.; Irish Free State, 3 c.; Karachi, 3 c.; Kilindini, 2 c.; Lisbon, 1 c.; Lyttleton, 9 c.; Macassar, 2 t. 6 c.; Madras, 2 c.; Melbourne, 3 c.; Perth, 1 c.; Piraeus, 2 t.; Pt. Elizabeth, 3 c.; Pt. Harcourt, 2 t.; Pt. Sudan, 2 t. 17 c.; Punta Arenas, 1 c.; Rotterdam, 4 c.; Sekondi, 21 t. 9 c.

SOAP—
Shanghai, 9 c.; Singapore, 18 c.; Sydney, 1 t. 8 c.; Trinidad, 1 c.; Vancouver, 10 c.; Warri, 3 t.; Wellington, 1 t. 18 c.; Yokohama, 1 c.

SPENT OXIDE—
Antwerp, 527 t.

SPERMACETTI WAX—
Genoa, 6 c.
Hamburg, 2 c.

STEARINE—
Sydney, 3 c.

TALLOW—
Brussels, 14 t. 14 c.
Dusseldorf, 30 t. 6 c.
Genoa, 36 t. 6 c.
Pasages, 50 t.

WHITE LEAD—
Auckland, £92.; Channel Is., £52.; Christchurch, £50.; Dunedin, £46.; East London, £3.; Irish Free State, £276.; Karachi, £361.; Lyttleton, £120.; Malmo, £173.; Melbourne, £482.; Singapore, £47.; Sydney, £350.; Trondhjem, £57.; Wellington, £1,551.

MANCHESTER.

Week ending July 28.

NIL.

NEWCASTLE-ON-TYNE

Week ending July 28.

AMMONIA—
Copenhagen, 5 cks.

ANTIMONY—
Antwerp, 1 kg., 30 cks.
Hamburg, 24 cks., 6 kgs.

BARIUM SULPHATE (BLANC FIXE)—
Antwerp, 4 brls.
Bergen, 23 cks.

BLEACHING POWDER—
Rotterdam, 115 pkgs., 81 cks.

CAUSTIC SODA—
Christiania, 69 drms.; Copenhagen, 183 drms.; Hamburg, 882 drms.; Rotterdam, 242 drms.

COAL TAR PRODUCTS—
Creosote Oil
Christiania, 6 gals.
Pitch
Christiania, 1 ck.

FERRO MANGANESE—
Christiania, 14 sks.

FERRO PHOSPHORUS—
Christiania, 3 cks.

LITHARGE—
Antwerp, 2 cks.
Christiania, 14 cks.
Hamburg, 53 cks., 58 kgs.
Rotterdam, 5 kgs.

MAGNESIA—
Christiania, 4 cs.

MAGNESIUM CARBONATE—
Antwerp, 200 bgs.

RED LEAD—
Antwerp, 1 kg., 1 drm., 30 cks.; Bergen, 14 cks.; Christiania, 73 drms.; Copenhagen, 101 cks.; Hamburg, 20 kgs., 93 cks.; Rotterdam, 320 tins., 268 cks.

SOAP—
Bergen, 12 brls., 25 cs.
Christiania, 1 cs.

SODIUM COMPOUNDS (*otherwise undescribed*)—
Antwerp, 4 cks.

WHITE LEAD—
Antwerp, 45 cks., 40 kgs.; Copenhagen, 10 cks.; Hamburg, 303 cks., 40 kgs.; Rotterdam, 42 cks.

ZINC OXIDE—
Antwerp, 12 cks.
Copenhagen, 10 cks.

N. & S. SHIELDS.

Week ending July 28.

NIL.

PRICES CURRENT.

WEDNESDAY, AUG. 1, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & Co., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	..*cwt.	24/-	&	48/-
Acetic, (Glacial, B.P.) in carboys	..*ton	66	0	0
Arsenic, S.G. 2.000	.. ton	85	0	0
Boric (crystals)	..†ton	50	0	0
Citric	.. lb.	0	1	8¼
Formic, 80/85%	..*ton	52	0	0
Hydrofluoric, 59/60%	..*lb.	0	0	7½
Lactic, 80%	.. ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	..*carboy	0	4	0
Nitric, 80° Tw.	..*ton	21	10	0
Oxalic	.. lb.	0	0	6
Phosphoric, 1,500° tech.	..*ton	33	0	0
Sulphuric (168°)	..*ton	7	10	0
Sulphuric (140°)	..*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	..*ton	4	10	0
Tannic (commercial)	.. lb.	0	1	9
Tartaric (crystals)	.. lb.	0	1	2½
COAL TAR PRODUCTS.				
Aniline Oil	..*lb.	0	0	9
Aniline Salt	..*lb.	0	0	9½
Anthracene, 40/45%, "A"	.. unit	0	0	4
Benzol, 90%	..*gallon	0	1	4
Carbolic Acid (crude 60%)	.. gallon	0	3	4
Carbolic Acid (crystals 40°)	.. lb.	0	1	3
Creosote	..*gallon	0	0	9
Cresylic Acid, 95%	..*gallon	0	2	6
Naphtha, crude, 30%	..*gallon	0	0	9
Naphtha, solvent (90/160)	..*gallon	0	1	4
Naphthalene, refined	.. ton	18	10	0
Pitch (f.a.s. Liverpool)	.. ton	7	2	6
Pyridin	.. gallon	0	19	0
Tar, crude	.. ton	4	5	0
Tar, refined	.. barrel	2	2	6
Toluol	..*gallon	0	1	9
Xylol, (pure)	..*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	..*ton	121	0	0
Alum, loose lump (delivered)	..*ton	12	0	0
Aluminium Sulphate, 17/18%	.. ton	10	10	0
Aluminium Sulphocyanide	.. lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	.. ton	7	0	0
Ammonia, anhydrous	..*lb.	0	1	4
Ammonia, .880	..*ton	22	10	0
Ammonia, .920	..*ton	14	10	0
Ammonium Carbonate (lump)	.. lb.	0	0	4
Ammonium Muriate (grey)	..†ton	30	0	0
Ammonium Nitrate	.. ton	35	0	0
Ammonium Phosphate	.. ton	60	0	0
Ammonium Sulphate, 25¾% delivered	..†ton	14	15	0
Ammonium Sulphocyanide, 95%	.. lb.	0	1	3
Antimony (Golden Sulphide)	.. lb.	0	0	9
Arsenic (Cornish White)	.. ton	71	0	0
Barium Carbonate (native), 92/94%	.. ton	5	15	0
Barium Chlorate	.. lb.	0	0	8
Barium Chloride (in casks)	.. ton	15	0	0
Barium Sulphate	.. ton	£5	to	£7
Barium Sulphocyanide, 95%	.. lb.	0	0	10½
Bleaching Powder, 35%	..*†ton	11	7	6
Bleaching Liquor, 7%	..*ton	4	5	0
Calcium Chloride	..†ton	5	10	0
Carbon Bisulphide	..*ton	28	0	0
Casein (commercial)	.. ton	80	0	0
China Clay (at Runcorn), in bulk	.. ton	50/-	to	90/-
Chromium Acetate (crystals)	.. lb.	0	0	8
Copper Sulphate	.. ton	26	0	0
Formaldehyde, 40%	.. ton	98	0	0
Glycerine (chemically pure, S.G. 1,260)	..*ton	85	0	0
Glycerine (crude), 80%	..*ton	60	0	0
Iodine	..*oz.	0	1	0
Iron Nitrate, 80° Tw.	..*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	.. ton	6	0	0
Lead Acetate (white)	.. ton	41	0	0
Lead Acetate (brown)	.. ton	43	0	0
Lead Carbonate (White Lead)	.. ton	44	0	0
Lead Nitrate	.. ton	42	0	0
Lime Acetate (brown)	..*ton	11	10	0
Lime Acetate (grey), 80%	..*ton	20	0	0
Lime Bisulphite (S.G. 1,070)	..*ton	8	0	0
Lime Superphosphate, 30%	.. ton	3	15	0
Litharge	.. ton	37	0	0
Magnesite, Calcined (delivered)	.. ton	11	0	0
Magnesite, Raw	.. ton	3	0	0
Magnesium Carbonate (light)	.. cwt.	2	0	0
Magnesium Chloride (solid)	.. ton	3	0	0
Magnesium Sulphate (Epsom Salts, comml.)	ton	4	0	0
Magnesium Sulphate, B.P.	.. ton	6	0	0
Manganese Borate, 85%	.. ton	112	0	0
Manganese Sulphate, 90%	.. ton	50	0	0
Methylated Alcohol, 64° (industrial)	.. gallon	0	2	1
Naphtha (Wood), Solvent	..*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	.. gallon	0	6	6
Potassium Bichromate	.. lb.	0	0	5¾
Potassium Carbonate, 90%	.. ton	28	0	0
Potassium Chlorate	.. lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	.. ton	18	0	0
Potassium Chloride 80%	.. ton	8	10	0
Potassium Nitrate (refined)	.. ton	32	0	0
Potassium Permanganate (commercial)	.. lb.	0	0	9¾
Potassium Prussiate (yellow)	.. lb.	0	1	2½
Potassium Prussiate (red)	.. lb.	0	3	9
Potassium Sulphate, 90% (ex ship)	.. ton	11	10	0
Potassium Sulphocyanide	.. lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	60/-	&	57/-
Sodium Acetate	.. ton	24	10	0
Sodium Arsenate, 45%	.. ton	50	0	0
Sodium Borate (Borax), Crystals	..*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	..†ton	10	10	0
Sodium Bichromate	.. lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	.. ton	15	0	0
Sodium Carb. (Alkali), 58% bags	..†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	.. lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d.	to	9d.
Sodium Hydrate (76% C. Soda), f.o.r.	..†ton	21	10	0
Sodium Hydrate (70% C. Soda)	..†ton	20	0	0
Sodium Hydrate (60% C. Soda)	..†ton	19	0	0
Sodium Hydrate (Liquid, 90° Tw.)	..†ton	8	10	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	26	0	0
Sodium Hyposulphite (commercial)	..†ton	10	0	0
Sodium Hyposulphite (photographic)	.. ton	14	0	0
Sodium Manganate (basis 25%)	.. ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	.. ton	13	7	6
Sodium Nitrite, 100% basis	.. ton	26	10	0
Sodium Perborate	.. lb.	0	0	11½
Sodium Phosphate	.. ton	15	0	0
Sodium Prussiate	.. lb.	0	0	6½
Sodium Silicate (glass), Alkaline	..†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	..†ton	9	0	0
Sodium Sulphate (Saltcake)	..†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	.. ton	4	0	0
Sodium Sulphide (conc.), 60/65%	.. ton	15	0	0
Sodium Sulphide Crystals (casks)	..†ton	8	10	0
Sodium Sulphocyanide (liquid)	.. lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	.. ton	8	5	0
Sulphur (Roll Brimstone)	.. ton	8	5	0
Sulphur (Texas Gulf)	.. ton	5	5	0
Tartar Emetic, 43/44%	.. lb.	0	1	1
Tin Crystals	.. lb.	0	1	4
Tin Perchloride fused	.. lb.	0	1	10
Titanous Chloride	.. lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	..*ton	20	0	0
Zinc Sulphate, Crystals	.. ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	.. ton	115	0	0
Antimony	.. ton	30	0	0
Copper	.. ton	65	5	0
Lead (Chemical Sheet), delivered	.. cwt.	1	13	0
Lead (Foreign Pig)	.. ton	24	7	6
Nickel	.. ton	130	0	0
Silver	.. oz.	0	2	6⅝
Tin, English Ingots	.. ton	185	10	0
Zinc (Spelter)	.. ton	31	15	0
Zinc Dust, 90/92%	.. ton	50	0	0
OILS.				
Cottonseed	..*ton	44	10	0
Linseed, Raw	..*ton	42	10	0
Stearine, 115-120° M.P.	.. ton	48	0	0
Tallow	.. ton	40	0	0
Turpentine	.. cwt	3	14	3

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
"Tolerances" on Chemical Specifications	153
Chemical Plant Manufacturers' Grievances	154
A Reasonable Request	154
British Trade with Germany	154
The Cellulose Acetates	155
Explosives in Fertiliser Plants	157
Chemical Stoneware	158
Chemical Trade of the Netherlands	159
The World's Trade in Divi Divi	160
Activated Charcoal	161
The British Chemical Plant Manufacturers Association	162
The Chinese Camphor Trade	163
Notes on the Italian Chemical Industry	164
Chemical Institute for Ireland	164
Safeguarding of Industries Act	165
Chemical Nomenclature	165
Items of Interest	166
Our Bookshelf	167
Parliamentary News	168
Correspondence	168
South Wales Notes	168
Publications Received	168
Fertiliser News	169
Cumberland Coking and By-product Industries	169
Thirty-five Years Ago	169
Reports of Companies	171
Trade Inquiries	171
New Companies	171
Gazette News	171
The Patent List:—	
Applications for British Letters Patent	172
Complete Specifications Accepted	172
Complete Specifications Open to Public Inspection before Acceptance	172
Abstracts of Latest Complete Specifications	172
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	173
Market Reports:	
London "Open Market" Report	174
Italian Chemical Market	175
London Metal Market	176
Manchester Chemical Market	176
Swansea Market Report	176
Liverpool Chemical Market	176
West of Scotland Chemicals	177
Imports of Chemical Products	177
Exports of Chemical Products	179
Prices Current	182

NOTICES.

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CURRENT TOPICS.

"TOLERANCES" ON CHEMICAL SPECIFICATIONS.

In the disputes which arise occasionally between the sellers and buyers of metallurgical products in transactions conducted upon a specification basis, the cause of disagreement is very often to be found in the interpretation of the chemical specification. The limits specified are frequently so fixed and narrow that it is not always practicable to keep within the border line, and difficulties arise from time to time through small differences between chemists' results. Analytical chemistry is a very exact science, and it is this very accuracy that has led to the stringency with which chemical specifications are drawn up, but it must not be overlooked that even qualified chemists working by identical methods on samples of the same material are liable to obtain differences in results, very slight in themselves, but at times large enough to put the material outside the limits of a given specification. That such differences in results do exist, and cannot, so far as may be judged, be obviated, has been definitely confirmed by the experience of the British Chemical Standards Movement. The organisers and committee of this movement have had prepared a number of standard samples of irons and steels and of basic slag, for the use of chemists in checking the accuracy of their methods. The compositions of the various standards, particulars of which, as they have been made available, have appeared in our columns from time to time, were in all cases checked by a large number of independent analysts. The figures obtained represent hundreds of carefully conducted estimations, and indicate conclusively that identity in the analytical figures cannot be obtained, although the amount of divergence above and below the average is approximately constant. Figures showing differences in analytical results found by the United States Bureau of Standards, and those recognised by the Iron and Steel Institute and National Physical Laboratory substantially confirm those occurring in the case of the above standards. At the annual meeting of the co-operators in the British Chemical Standards Movement, which was held at York in February, a resolution in which it was considered that the rejection of steel and cast iron is not warranted on chemical analysis alone, and in which it was requested that a list of limits or tolerances in analytical figures should be established, was carried unanimously. Acting on this resolution the committee have now prepared a pamphlet in which the

whole matter is reviewed and the suggested tolerances for sulphur, phosphorus, silicon, carbon, and manganese in the analysis of irons and steels are given. It is pointed out, for example, that in the case of a sulphur determination on a specification not to exceed a total of 0.03 per cent., figures varying between 0.030 and 0.038 per cent. may be obtained by chemists of equal status working by identical methods. Expressed briefly, the method proposed for determining the amount of tolerance is by fixing upon the average of a large number of analyses and allowing half the range of the divergence in the figures obtained as the amount of permitted tolerance on either side of the average. The pamphlet is at present being circulated amongst the co-operators and other persons interested, for the expression of their views. We ourselves are of the decided opinion that the introduction of a tolerance system on the lines and magnitude suggested would be wise and would eliminate much of the friction occurring between analysts and buyers and sellers of metallurgical products without in any way detracting from the value of the chemical specification as a guarantee of quality.

CHEMICAL PLANT MANUFACTURERS' GRIEVANCES.

It seems to be a legitimate inference from the chairman's speech at the recent annual general meeting of the British Chemical Plant Manufacturers' Association, that the relations between this body and the Association of British Chemical Manufacturers are not so closely knit as generally believed. It is, for example, somewhat surprising to learn that the B.C.P.M.A. is to take no part in the Chemical Section of next year's British Empire Exhibition, a section that, according to Sir Max Muspratt's statement a few weeks ago, is to be unique in its comprehensiveness, "a complete survey of Great Britain's services to chemistry, from top to bottom." Seeing that the B.C.P.M.A. is affiliated with the Association of British Chemical Manufacturers, this state of affairs is rather difficult to explain, especially in view of the fact that the plant manufacturers' conjoint exhibit at the last British Industries Fair aroused widespread interest and was universally judged a success. It may be deduced from Mr. Fraser's speech that the members of the B.C.P.M.A. themselves were desirous of securing representation in the Chemical Section, and elucidation of the whole position will be welcomed. With regard to the disappointment expressed by Mr. Fraser on the half-hearted way in which standardised chemical plant has been received by chemical manufacturers, or, rather, on the paucity of the demand for such plant up to the present, and his statement to the effect that he would take the matter up again with the A.B.C.M., it would be absurd to suppose that the A.B.C.M. could or should exert any form of compulsion upon its members to use the standardised jacketted pans or filter presses, but Mr. Fraser's grievance appears to be that the members are not encouraged to use such plant to the extent that the co-operation of the A.B.C.M., when the specifications were being drawn up, led the plant manufacturers to expect.

A REASONABLE REQUEST.

On another page we print a copy of the memorandum that has been forwarded by the British Chemical and Dyestuffs Traders' Association to the Treasury and Customs authorities in which it is suggested that modifications might profitably be made in the method of payment of duty under Part I. of the Safeguarding of Industries Act. From the merchants' point of view the advantages resulting from a system allowing imported goods liable to the 33⅓ per cent. duty to be bonded are obvious, and are well set out by the Association in their memorandum. Goods destined for home consumption will have to pay the duty in any case, and it was never the intention of the framers of the Safeguarding Act that chemicals to be re-exported should pay the import duty. On the latter point especially the case put forward by the Association is exceptionally strong, and it is difficult to see how the Treasury and Customs can refuse logically to meet the merchants' request. The chaotic condition of the international exchanges has reduced the real value of Part I. of the Safeguarding of Industries Act very considerably, and we cannot see how what little value it does at present possess will be jeopardised in any way by the introduction of a bonded warehouse system for the payment of the duty. On the other hand, it is, unfortunately, only too true that under the present conditions much of our *entrepôt* trade in chemicals has been lost, and with it also considerable business for chemicals that are made here, but it cannot be doubted that the proposals set out in the memorandum will, if accepted, lead to an immediate and material increase in the shipment of chemicals from this country.

BRITISH TRADE WITH GERMANY.

A summary statement of the value of trade between the United Kingdom and Germany during the first six months of 1923 has just been issued by the Board of Trade, and in view of the trend of both political and economic events in the latter country, a special interest is lent to the statement. On the whole, the trade of the period under consideration compares better than might have been expected with that of the first half of 1922, although it should be borne in mind that the economic disturbances arising out of the occupation of the Ruhr affected the trade of only a part of the six months. Expressed in values, the total imports from Germany during January to June, 1923, were £16,930,000., the exports of U.K. products to Germany were £20,854,000., and the re-exports of foreign and colonial merchandise from the U.K. to Germany were £10,391,000. For the first half of 1922 the corresponding figures were £26,524,000., £32,075,000., and £16,985,000. The principal features to be noted are the heavy increase in our exports to Germany of coal and coke, of pig iron, and iron and steel plates (except tinned plates), and a considerable falling off in the rate of exportation of most textile products. Imports of dyestuffs from Germany were valued at £270,000., against £505,000. in the first half of 1922; and of general chemicals at £848,000., as against £1,485,000.

THE CELLULOSE ACETATES.

RECENT PROGRESS IN CHEMISTRY AND TECHNOLOGY.

By "Investigator."

FIRST prepared by Schutzenberger in 1865, cellulose acetate remained more or less of a chemical curiosity until a process for its manufacture, by the action of acetyl chloride and zinc acetate on cellulose, was patented by Cross in 1894. In the intervening period, the use of sulphuric acid and other reagents as acetylation catalysts, together with the introduction of less drastic methods of acetylation, had led to the production of a less degraded and technically more valuable material.

In 1905, Miles in the United States, introduced the process of regulated hydrolysis or "ripening," by which the acetate became soluble in acetone, thus making feasible the use of a comparatively cheap and non-toxic solvent. The use of cellulose acetate as the basis of aeroplane-wing tautening compositions ("dopes") lacquers, non-flaming celluloid and allied materials, has called forth a host of patents covering the use of all classes of compounds as solvents and softeners ("camphor substitutes.") Recently there has been a great development of cellulose acetate artificial silk, first patented by Lederer in 1906, in competition with nitrate and viscose silks. Attempts to carry out the acetylation without acetic anhydride and so to cheapen the process have not met with much success.

The Partial Hydration or "Ripening" Process.

Acetates prepared from unmodified cellulose by acetylation with acetic anhydride and acetic acid in the presence of sulphuric acid—that is primary acetates—are practically non-hydrated triacetates, soluble in chloroform and some other chlorhydrocarbons, but only partially soluble in acetone. Miles found that, by heating this primary acetate with small quantities of water (partial hydration or "ripening"), it became soluble in acetone but insoluble in chloroform. Similar conversions to secondary acetates can be effected by treating the primary acetate with alkali (partial saponification), by adding alcohol to the acetylation bath, and according to H. Dreyfus, by heating with acetic acid in the absence of anhydride ("depolymerisation.") The latter prepares an acetate giving solutions of high viscosity, by controlling this "depolymerisation" process so as to obtain a product insoluble in chloroform, soluble in chloroform—alcohol, and in acetone. Thus, primary acetate syrups, after neutralising the sulphuric acid, give secondary acetates of good quality, completely soluble in acetone, by heating with a little water at 98° C. for from 24 to 96 hours. A primary acetate itself can be "ripened" by heating with 95 per cent. acetic acid, alone, or in the presence of sodium bisulphate, or by heating with aniline or phenol containing a little water. During the "ripening" process there is a slight drop in the acetyl value, but the viscosity in solution is maintained and the percentage of the deleterious combined sulphuric acid falls.

Acetylation Catalysts.

Of the large number of catalysts proposed—*e.g.*, phosphoric acid, bromine (that is bromacetic acids), zinc chloride, chlorides and oxychlorides of sulphur and phosphorus, dimethyl sulphate, chloracetic acids, the large majority are dehydrating agents, as in the case of esterifications in general. Others, such as methylamine sulphate, give rise to sulphuric acid in use. According to Ost (*Zeit. angew, Chem.*, 1919), acetylation with sulphuric acid is much more rapid than with zinc chloride. Thus, whereas a mixture of 10 parts cellulose, 45 parts acetic anhydride, 45 parts glacial acetic acid, takes several weeks to acetylate at ordinary temperatures in the presence of 5—10 per cent. of fused zinc chloride, a similar mixture will acetylate in a few hours at 35°-40° C. in the presence of 1-2 per cent. of sulphuric acid. Even with these small proportions of catalyst, however, the primary acetate still contains combined sulphuric acid. The Bayer Company acetylate in the presence of 15 per cent. sulphuric acid at low temperatures. After one day, the primary acetate retained more than 3 per cent. of this acid, but on allowing the syrups to ripen for 4 days at 25° C., this fell to 0.17 per cent., the combined acetic acid falling from 57.4 to 50.9 per cent. during the same period. The Usines du Rhône use 3 to 5 per cent. sulphuric acid and operate at about 28° C. to obtain a primary acetate (*Brit. Pat.* 146,092, of 1920).

With sulphuric acid there is a tendency for the product to char and to hydrolyse, giving rise to discoloured solutions and brittle films. The formation of aceto-sulphates is also a difficulty, as their presence affects the stability of the finished acetate. Sulphuryl chloride offers a distinct improvement over the acid, especially if the catalyst is formed *in situ* from chlorine and sulphur dioxide gases (Barnett, *J. Soc. Chem. Ind.*, 1921). Acetylation proceeds very rapidly and smoothly with good yields, the resulting solutions being quite bright and clear, while the finished products are readily soluble in a variety of solvents. The composition of the product varies with the temperature and with the ratio of SO_2 to chlorine used, a large excess of the latter giving mainly diacetate at temperatures below 65° C., while with nearly equal amounts, a triacetate product results, especially if the temperature exceeds 65° C. The enhanced activity of the catalyst, formed *in situ*, over sulphuryl chloride added as such, is attributed to its nascent condition. In the same way, Zdanowich (*Brit. Pat.* 139,232, of 1918), makes use of chloracetic acid prepared *in situ* as an initial, non-degrading catalyst, and completes the acetylation with small amounts of sulphuric acid. High viscosity acetates, soluble in both chloroform and acetone, are claimed. The syrup resulting from acetylation can be coagulated directly to form the so-called "acetose" silk, after filtering and freeing from air bubbles.

Cellulose Acetate from Wood Pulp.

Starting with sulphite pulp, an acetate product can be made by digesting a mixture of the bleached pulp (1 part), glacial acetic acid (2.8 parts), acetic anhydride (4 parts) and zinc chloride (0.2 part), for about 8 hours at 65° C. (*Brit. Pat.* 130,029, of 1917).

Some processes operate so as to prevent the acetate from going into solution, as in cellulose-nitrate manufacture, a more uniform product, at less cost, resulting. Thus, acetylation is carried through with acetic anhydride alone, or in the presence of non-solvents such as benzene and petroleum hydrocarbons (*U.S. Pats.* 1,263,119 and 1,265,216, of 1918). To induce reactivity, various methods of pre-treating the raw material have been proposed, such as preliminary treatment with acetic acid (*German Pat.* 299,181, of 1914), alcohol and acetic acid (*U.S. Pat.* 1,265,216, of 1918), alcohol and benzene (*U.S. Pat.* 1,338,661, of 1920), chlorinated acetic acid (*U.S. Pat.* 1,330,543, of 1920), and alkaline hydrogen peroxide (*U.S. Pat.* 1,379,699, of 1921). In other processes, acetylation is carried out after slightly nitrating the raw cellulose by short treatment with a mixture of nitric acid and nitrobenzene (*Brit. Pat.* 145,524, of 1920). A noteworthy procedure is that of intensive mechanical disintegration of the cellulose, before acetylation, in the colloid mill of Plauson, the cellulose gel with particles 0.8μ in diameter which results, being readily esterified (*Brit. Pat.* 183,908, of 1921).

The Cellulose Acetate Complex.

Some idea of the extent of the degradation of the original complex in cellulose acetate, can be obtained by utilising the reducing action on Fehling's solution (the so-called "copper number.") With the same object, Barnett (*J. Soc. Chem. Ind.*, 1921), has prepared phenyl hydrazones and p-bromphenyl hydrazones from solutions of acetates in a variety of solvents. These hydrazones have definite melting points, are amorphous and are somewhat soluble in hot alcohol. It is possible to obtain identical compounds from different acetate preparations using various methods of precipitation. Assuming that each triacetate complex $[C_6H_7O_5(CH_3CO)_3]_n$, contains one ketone group, the relative complexity under different conditions can be gauged by estimating nitrogen or bromine in the various hydrazones. Thus, with triacetates, values of "$_n$" from 2 to 12 were obtained, according to the original cellulose used, the solvent and the time of heating with the reagent. The most complex hydrazone ($_n$ = 12), was given by a triacetate prepared from cotton-wool, after 10 hours at the boiling point in phenol. With the bromine compound, values of "$_n$" from 7 to 36 were obtained, indicating much less degradation of the cellulose acetate by this reagent. In this case, too, phenol gave the largest molecule.

Transition from Non-Solvent to Solvent.

The chaotic situation in this field has been somewhat relieved by the systematic study of solvents for aeronautical purposes (*Aeronautical Advisory Committee, Reports and Memoranda*, 568). Nevertheless, claims continue to be put forward for many compounds without solvent action. With

cellulose acetate there is a more or less sharp transition from solvent to non-solvent, that is, on cooling a weak solution, the temperature of precipitation ("transition temperature"), is only one or two degrees lower than with a concentrated solution. Also, the volume of non-solvent necessary to begin the precipitation is practically independent of the concentration of the solution. This transition point varies with the make of acetate. Thus, in benzyl alcohol, it is 25° C. for a French acetate, 25.5° to 28.5° C. for British esters, and 40° C. for an American material. Some other values are as follow, a French variety being used:—Ethyl formate —10°, phenyl acetate, 32° C., triacetin below 0° C., methyl lactate below 0° C., methyl alcohol (under pressure) 80° C., chloroform (under pressure) 85° C., methyl ethyl ketone (under pressure) 90° C., ethyl alcohol (under pressure) 120° C., nitrobenzene 98° C., and cyclohexanol 79° C.

In the presence of certain substances, a liquid becomes a solvent at a lower temperature. In the same way, the resistance to precipitation by added non-solvents is increased; for example, water up to 6 per cent. increases the solvent power of acetone. Whereas pure methyl-ethyl ketone is practically a non-solvent below 90° C., the industrial product is a solvent at ordinary temperatures. A similar effect is observed with ethyl alcohol which, in the presence of 15 per cent. of water, will dissolve the ester at 60° C., while impure benzyl alcohol will dissolve it at a lower temperature than the pure material.

This behaviour is very pronounced with binary mixtures. Thus, chloroform becomes a solvent on addition of alcohol. Although nitro-xylol is a non-solvent at moderate temperatures (below 160° C.), the mixture with benzyl alcohol is a solvent (above —10° C.). A similar behaviour is noticed with ethyl acetate-benzyl alcohol mixtures. A mixture of ethyl acetate (80 parts) and alcohol (20 parts) both ordinarily non-solvents, becomes a solvent above 40° C., a behaviour common to binary mixtures of esters and alcohols, including water.

Solvents for Cellulose Acetate.

In many of the homologous series, there is a rapid fall in solvent power with increase in molecular weight and complexity, the first member, as is usual with other properties, being somewhat anomalous. For instance, in the formic ester series, methyl formate has a transition point of —150° C., ethyl formate —10° C., while butyl and amyl formates are solvents only in admixture with alcohol. A similar drop in solvent properties is observed in the series of aliphatic and aromatic alcohols, the values for methyl, ethyl and butyl alcohols being 80°, 120°, and 150° C., and for benzyl, tolyl, and cumyl alcohols 25°, 50° and 60° C. respectively. According to Fenton and Berry, there appears to be a relation between the dielectric constant and the solvent power (*Proc. Camb. Phil. Soc.*, 1920).

Hydrocarbons—*e.g.*, benzene and naphthalene, are non-solvents, in which connection it is noteworthy that an acetate-naphthalene composition, consisting of acetylcellulose (75 parts), naphthalene (25) and acetone (60 parts), is the subject of a recent patent. Benzene gelatinises, but does not dissolve, the ester. With chlor-hydrocarbons, the solvent power diminishes with increase in chlorine content. Thus, chloroform and tetrachlorethane are solvents with alcohol, while carbon tetrachloride is a non-solvent even with alcohol. The use of methylene chloride (b.pt. 41° C.) has been patented recently (*U.S. Pat.* 1,384,188, of 1921). The chlornaphthalenes alone are non-solvents. Nevertheless, a recent patent proposes to employ them in this connection.

Among the esters, the simpler formates and acetates are useful solvents, especially with alcohol, many being good substitutes for acetone. Phenyl, benzyl and tolyl acetates constitute good solvents in alcohol mixture; acetoacetic ester, ethyl tartrate and triacetin dissolve the acetate below 0° C., but higher esters, such as methyl oleate and fatty oils, are non-solvents. In this group, ethyl propionate, phenyl salicylate, resorcinol monoacetate (m.pt. 50° C.), the neutral tartrates and citrates of *n*-butyl, isobutyl, and isoamyl alcohols, and the neutral esters of adipic and other polybasic acids, have all figured in recent patent literature.

In the group of ethers, the members are non-solvents, but appear to have a gelatinising action. The Bayer Company claim the use of β-naphthyl amyl ether as a cellulose ester "softener," stable to light (*German Pat.* 307,125, of 1917). Aromatic nitro compounds and amines, alone or with alcohol, are generally solvents below 50° C.; aldehydes of fairly simple constitution, such as acetaldehyde (*Brit. Pat.* 131,647, of 1918), benzaldehyde and furfurol (*Brit. Pat.* 138,078, of 1920) dissolve the ester at ordinary temperatures, but oenanthaldehyde, $C_6H_{13}CHO$, is a non-solvent. Among ketones, a similar rule applies. Thus, camphor, molten or in solution, will dissolve the acetate, while no less than three patents have been granted, covering the use of cyclohexanone and its homologues. Di-alkyl sulphones are claimed as solvents by the Kodak Company of America. Generally speaking, aromatic hydroxy compounds are serviceable solvents—*e.g.* benzyl alcohol, phenols, naphthols, and eugenol. Terpineol, however, is a non-solvent. The American Dupont Company have recently patented the use of a mixture of *o*- and *p*-hydroxybenzyl alcohols. A new low boiling-point solvent is methyl cyanide (b.pt. 82° C.), prepared from acetylene and ammonia (*German Pat.* 368,476, of 1918).

Acetyl Aeroplane Dopes.

These are solutions of cellulose acetate in a mixture of low and high boiling-point solvents used for tautening and weather-proofing the linen fabric composing the wing surfaces. Owing to the slow rate of burning of the film, acetyl dopes have largely replaced those with a nitro-cellulose basis. A typical three-coat formula would be, cellulose acetate 8.5 parts by weight, acetone 50, alcohol 24, benzol 24, benzyl alcohol 2 parts by volume, and triphenyl phosphate 1.5 parts by weight, the latter serving to render the film less hygroscopic. A dope solvent of this composition will dissolve cellulose acetate at temperatures above —50° C. The simpler formic and acetic esters can replace acetone, the effect of organic acids on the tensile strength of the fabric being slight. In fact, acetic and formic acid dopes have been proposed, but practical difficulties would be encountered, especially with regard to hand-brushing.

Huebner proposes to use an emulsion consisting of cellulose acetate, acetic acid and water, stabilised by sulphonated castor oil (*Brit. Pat.* 127,027, of 1917). Such a mixture would permit of the use of water-soluble fireproofing agents. In this connection, the production of stable suspensions of acetate in water and other non-solvents by treatment in the colloid mill of Plauson, is noteworthy. By pigmenting the dope with ochre, iron oxide, zinc white, carbon black, and aluminium powder, it has been found possible to dispense with the coating of protective varnish previously necessary. Ester dopes, especially if pigmented with zinc white, tend to lose in viscosity on standing, but this thinning process can be retarded by adding a trace of tartaric or citric acids (*Brit. Pat.* 125,033, of 1917). By the addition of "borated benzol" (10 per cent. boric acid), it is claimed that triphenyl phosphate can be dispensed with, and that more non-solvent can be employed in the dope formula (*Brit. Pat.* 131,082, of 1918). To reduce the rate of water absorption, drying oils and the glycol esters of non-drying-oil fatty acids can be incorporated, the latter being more resistant to cold than the oils themselves (*German Pat.* 338,475, of 1918).

Serviceable softening agents should be good solvents alone or in presence of small amounts of the more volatile solvents. Dopes containing them should give translucent, flexible films, free from white patches and resistant to weathering. triacetin, alone and with acetanilide, lactic esters, and various liquid sulphonamides—*e.g.*, the mixed xylylene methyl ethyl sulphonamides (Dreyfus, *Brit. Pat.* 154,334, of 1919) have been used in place of benzyl alcohol.

Non-Inflammable Celluloid.

The non-flaming property of cellulose acetate has led to its use instead of celluloid, after incorporation with various "plastifiers." In sheet form ("cellon"), it has found some use for windows. Among recently suggested "plastifiers" are borneol and resorcinol monoacetate (m.pt. 50° C.), the latter enabling the celluloid to be moulded while hot. Some are materials of low inflammability, such as triphenyl phosphate, glycerol (3 per cent.), and trichlor-tertiary butyl alcohol (3 per cent.), made by condensing chloroform with acetone (*Brit. Pat.* 195,849, of 1922). To obtain uniform distribution, the ester may be kneaded with the "plastifier" to which has been added a small proportion of volatile non-solvent, such as methyl alcohol or benzene. H. Dreyfus subjects the "celluloid" to pressures exceeding two tons per square inch, in order to increase its resistance to weathering (*Brit. Pat.* 118,891, of 1917).

It is of interest to note that non-dimming glass can be made by immersion in an aqueous methyl-alcohol solution of cellulose acetate, and that the Société du Verre Triplex make a reinforced glass, by applying gelatin and cellulose acetate solution in successive layers.

Acetate Artificial Silk.

Artificial silk made from cellulose acetate should possess many valuable properties. Its high elasticity should make

it suitable for working up in high-speed looms, while its fineness, lustre, "handle" and heat-insulating properties should make it eminently suitable for articles of apparel. Compared with other forms of artificial silk, there is a much greater increase in weight on manufacture, in relation to the raw cellulose. It should prove of service in marine biological work, for after six months immersion in sea water there was no apparent mouldiness (Dorée, *Biochem. J.*, 1920). It is more resistant to water than cellulose, and absorbs much less of this than other "silks." Thus after "whizzing," acetyl silk held 35 per cent. of water on the dry weight, while viscose silk retained 90 per cent. The latter property coupled with the high elasticity of the wet fibres, should enable it better to endure the rigours of laundering. In the following table are given some comparative figures, calculated for threads of equal diameter, for dry and wet tensile strengths and percentage elasticities:—

	Tensile Strength.		Elasticity.	
	Dry.	Wet.	Dry. Per cent.	Wet. Per cent.
Degummed Italian silk	100	94	13·2	15·9
Cuprammonium silk	44	32	7·9	11·5
Viscose (3 samples)	45—38	25—17	3·0—2·8	2·2—2·0
Chardonnet (4 samples)	55—37	32—20	3·6—2·6	3·2—1·7
Acetyl silk	25	21	6·1	5·4

According to the British Cellulose and Chemical Manufacturing Company, an acetone solution of the acetate is coagulated by passing into a bath containing a "swelling agent" such as thiocyanates, acetic acid or zinc chloride, in order to impart greater strength and elasticity to the filament (*Brit. Pat.* 179,234, of 1922). The Badische Company coagulate a 4 per cent. solution of acetate in cyclohexanone, while Zdanowich prepares "acetose" silk directly from the acetate syrup, or after treatment with formaldehye.

The Dyeing of Acetate Silk.

A difficulty encountered in the commercial exploitation of acetyl silk has been that of dyeing it successfully. Owing to its ester character, it has little affinity for the direct cotton dyestuffs or for the large majority of acid dyestuffs. After swelling, however, by treatment with aqueous alcohol or with solutions of thiocyanates (5-25 per cent.), the reactivity is much improved. Thus, whereas with methylene blue, the untreated acetate was dyed to its maximum depth of shade in several months, the swollen material took only a few minutes. Acetyl silk exhibits considerable affinity for many basic dyes, especially in the presence of salts such as the chlorides of sodium, zinc and magnesium. Certain hydroxy-azo compounds such as Alizarine Yellow R (p-nitraniline azo salicylic acid), can also be used. Owing to its slight affinity for direct cotton colours, this silk is not stained by the "bleeding" of other dyed fabrics in contact with it. In order to enhance its reactivity towards these dyes, the material can be "surfaced" with a layer of regenerated cellulose. For this purpose, it is subjected to a process of partial saponification or de-acetylation with cold caustic soda (2-15 per cent.), or with readily hydrolysable salts. The process can be regulated by cooling, by the addition of alkali salts, such as the chlorides, acetates, silicates, borates and aluminates, or by coating the fibres with soap. In the last method, the threads are first passed into a soap solution and then treated with brine to precipitate the soap (*Brit. Pats.* 193,912 and 194,244, of 1921). With the less highly-acetylated materials, the alkali treatment is carried out at about 70° C. with weak solutions (0.1 per cent.). The extent of de-acetylation can be estimated by extracting the product with cuprammonium solution and with acetone, and by the exhaustion of the alkali.

Very recently, a special class of cellulose acetate colours, the Cellutyl Colours or Ionamines, have been worked out by Green and Saunders (*Brit. Pats.* 7,980, 23,543, 9,792 and 25,989, of 1922).* These are omega-sulphonic acids of amino compounds and have the general formula $XNR.CHR^1.SO_3H$, where X is a hydrocarbon nucleus and R and R^1 are hydrogen or alkyl groups. The colourless members of this group can be prepared by the action of aldehyde-bisulphite compounds on primary and secondary amines. They are readily hydrolysed in solution into amido compounds and aldehyde bisulphites or their decomposition products. Thus, the amido azo benzene compound $C_6H_5N_2.C_6H_4.NHCH_2SO_3H$, gives amidoazobenzene which is readily absorbed by the fibre, in which state it can be diazotised, coupled and developed to give a galaxy of hues and shades.

* See also *The Chemical Trade Journal and Chemical Engineer*, Nov. 24, 1922, page 636.

EXPLOSIVES IN FERTILISER PLANTS.

THE SAFE USE OF DYNAMITE.

In a recent issue of the du Pont *Magazine*, Mr. J. L. Dunn discusses the use of dynamite as an explosive in fertiliser plants. Although the detailed instructions he gives relate to the use of a special brand of the du Pont dynamite, yet the information is of so general an importance that it cannot fail to be of interest to British handlers of large quantities of fertilisers.

The following account of Mr. Dunn's article is abstracted from the *American Fertilizer*:

The use of dynamite for blasting down the hardened materials which go into the manufacture of commercial fertiliser is of comparatively recent origin. The safety and economy of this method, as proved by a few plants in which it has been in regular use, warrants it as a general practice where similar conditions and materials exist. Acid phosphate, potash and nitrate salts are stored in warehouses in bulk during the summer and autumn seasons. During this storage period they become fixed and hard. It is a slow and difficult process to dig down these mountains of solidified material by hand when the rush of the mixing season is on, and great quantities are required in the mixing machines to turn out the complete fertiliser.

Never to be Used with Ammonium Nitrate.

Fertiliser consisting, wholly or in part, of nitrate of ammonia, should never be blasted, for the reason that nitrate of ammonia itself is an explosive and there is a chance that the entire mass may detonate. Du Pont Red Cross Extra 20 per cent. dynamite can be used for this work at a great saving of time and labour during this busy season when every man and minute counts in tons of fertiliser mixed.

One or two men equipped with a du Pont No. 2 blasting machine, 250 feet of duplex lead wire, electric blasting caps, cap crimper, dynamite, and a shovel-handle for a tamping stick, can keep enough material shot down to ensure a ready supply for the mixing machines throughout the day. The main shooting should be done at the noon hour, and after the plant is closed for the day. This will encourage more careful loading and shooting, due to the absence of dust and other confusion, and it will also eliminate the loss of time resulting from idleness on the part of labourers while shooting is going on during working hours.

Charging and Firing Details.

Holes not smaller than one and one-half inch in diameter should be bored straight into the face of the bank about three feet from the floor. The depth of the holes can be from four to eight feet, or deeper, depending on the burden to be pulled down. Five to eight feet will be found about the correct depth under average conditions. The distance between the holes should be approximately the same as the depth; that is, if the holes are six feet deep, they should be six feet apart in a straight line across the face of the bank. The result to be obtained is to so place the holes and dynamite charges that the explosion will shoot out the bottom of the bank and cause the top to fall from its own weight. In some cases an overhang will be left at the top of the bank. This can be brought down usually with a single small charge loaded in a vertical hole from the top.

How much dynamite to use in each hole will depend on the material to be shot. Acid phosphate, for instance, is more gummy than the potash and nitrate salts, and breaks up less readily over a given radius from the charge. A safe rule to follow in loading the phosphate is to use one stick of 20 per cent. Red Cross dynamite, size 1¼in. by 8in., for every two feet depth of hole. Cartridges should be firmly pressed into the back of the bore hole with a wood tamping rod, the electric blasting cap being put in the last cartridge. Then the holes should be thoroughly filled and tamped, using acid phosphate or moist sand. This operation may be greatly facilitated by using du Pont tamping bags filled with sand or phosphate, or tamping bags may be made by forming stiff paper around a shovel handle or similar object.

After all holes are loaded and tamped, the electric cap wires should be connected in series to the lead wire and fired from the blasting machine. It will be found advantageous to use eight-foot electric caps to eliminate the necessity of splicing the connections and a possible cause of misfires. Lead wire can be made to give longer service if it is connected at the end of the line of holes instead of at the centre. Otherwise, it is frequently buried under a mass of

material and often has to be broken before it can be removed for the next shot. A charge of dynamite loaded in the above manner will bring down tons of phosphate, or other material, without danger to building or adjacent machinery.

However sceptical the manager may be at first about using dynamite in the plant, the necessity of keeping raw material supplies moving freely into the mill usually leads him to give explosives a trial as an emergency measure; and thereafter dynamite gets the job whenever the need for it arises.

CHEMICAL STONEWARE.*

MANUFACTURE, TYPES AND GENERAL USES.

CHEMICAL stoneware is a ceramic material made from specially selected clays and fired to the vitrification point. Properly manufactured it does not rely on a glaze, enamel, or veneer for its resistance to corrosive acids and chemicals, but the entire body throughout should be resistant. On such ware a plain salt glaze is put on for appearance, but plays no part in the wearing qualities. The salt glaze is applied by throwing salt on the kiln fires at their highest heat. This breaks up the salt, and the sodium combines with the clay on the surface of the ware to form sodium aluminium silicate, giving a smooth appearance and a neat look to the ware.

The clays as used for chemical stoneware (more than one clay is used and the clays are blended before using) are nearly pure aluminium silicate with but small traces of lime, magnesia, or iron. They should, usually, be also of the plastic type so they can be readily moulded.

Blending the Clays, Moulding and Drying.

The clays as received in the raw state are ground, washed, sieved, filter-pressed, and then blended and mixed and ground in a special machine again. The blends are then put into aging pits of concrete where they age for various periods. After aging the clays are ready for the workmen. Chemical-stoneware manufacture differs from ordinary stoneware, porcelain, or sewer-pipe manufacture in that in chemical stoneware but very little machinery is used. The work is almost entirely hand work by skilled men who must know how to read and interpret a blueprint. Machines for making chemical stoneware have been tried, but so far have not been found as satisfactory as hand production.

Orders for chemical stoneware are often accompanied by blueprints or special specifications. The job is assigned to a specific workman, who proceeds, from the clay already prepared and of the proper body, to mould the piece of ware in accordance with the specifications. The time required for moulding may be hours, days, or weeks, depending on the size and the design. When the piece has been moulded in accordance with the specified design, it is ready for the drying. Drying is accomplished in three ways—by natural air drying, in large heated rooms, and in automatic tunnel driers. Each has its specific use in accordance with the design, size, and thickness of the piece. Drying is one of the critical periods in the passage of the piece through the plant. The ware must be dried from the inside out, not from the outside in, or stresses will be set up in the structure which will later develop trouble in the firing. Also, the drying must not be too fast, for the same reasons. The clay shrinks about 5 per cent. in volume during drying, so this shrinkage has to be taken into account when moulding the piece.

Details of the Firing Process.

When the piece has been thoroughly dried both inside and out, it is ready for the kilns or firing. Firing in chemical stoneware requires two weeks, including the cooling of the kiln. The kilns used are circular with hemispherical roofs about 30ft. in diameter, and are known as periodic down-draft kilns—the fire passing downwards through the ware, through a false floor into the stack flues. The ware is piled in the kiln with the object of getting as much into the kiln as possible, consistent with getting it out again in perfect condition, and this setting of a kiln requires considerable experience on the part of the foreman kiln-setter. After the ware has been set, the openings are bricked up, and a moderate fire started in the fireplaces surrounding the kiln. The moderate fire is to drive off any remaining moisture mechanically held in the ware and to warm up the kiln slowly. The fires are gradually increased, and during this period—"the water-smoking period," as it is termed—the mechanically held moisture is driven off.

After tests made on the smoke passing through the flues to determine if further moisture is present, and none being indicated, the temperature is rapidly raised to about 1,000° F., at which temperature the water of crystallisation of the clay is driven off, the temperature being held at this and a slightly higher point for a predetermined time. (The recording pyrometers used indicate the general time.) This converts the clay into stoneware, but as far as chemical stoneware is concerned the firing is but half-completed. After the temperature for driving off the water of crystallisation has been maintained for the proper period, as mentioned above, the fires are pushed to their limit and the temperature gradually raised until it reaches the neighbourhood of 2,500° F., when complete vitrification or fusion of the body of the ware takes place. After this point is reached and held for a certain period, the fires are permitted to die down slowly, and when sufficiently low the fireplaces are bricked up and the entire kiln allowed to cool slowly by natural radiation. Thus, the ware is cooled slowly or, in other words, annealed, producing tough, strong structures which will withstand considerable rough treatment.

When the kiln is cooled off, the ware is removed from the kiln, taken to the warehouse, inspected, tested, checked, and packed for shipment.

Advantages and Limitations of Chemical Stoneware.

Of all the materials offered for use in industries where corrosive chemicals are manufactured or handled, chemical stoneware is probably the most versatile one in that it is practically immune from the attacks of every chemical except hydrofluoric acid, which acts on the silica in the clay. Of course, chemical stoneware also has its limitations and is not the Utopia in acid-resisting material, but for general all-round use there has still to be found a better material. The limitations of chemical stoneware are briefly—the limits as to size in which it can be made, tensile strength as compared to the ordinary metals, and that heating by direct flame cannot safely be done. To overcome the first limitation has been the aim of the manufacturers of chemical stoneware ever since they have been in business, with the result that every year larger and more complex pieces are produced, some reaching a capacity of 1,000gal. and over. To overcome the second, constant experiments are being conducted to improve the strength of the body, with the result that we have to-day ware that will withstand in some cases more punishment from mechanical injury than some of the compounded ferrous alloys. For the last, heating is substituted in the form of water, oil, and sand baths, or by steam injected into the solution by means of chemical-stoneware perforated pipes.

A Synopsis of Uses of Proved Value.

As to the designs in which chemical stoneware is made, it can be said that at this stage of its development almost anything mechanically possible can be and is made. In addition to the commoner forms or designs, the greater part of the manufacture of chemical stoneware is from blueprints or specifications furnished by the customer in order that the apparatus may be especially adapted for the specific process for which it is intended. As an illustration of the variety of products of chemical stoneware a few of the products in most general used are mentioned: towers and accessories therefor; tower packing; tile, brick, and blocks for construction of tanks, towers, vats, etc.; elevating apparatus for acids and corrosive liquids; receivers in the manufacture of acids; kettles, with or without stirrers; gas generators; jars; decanting jars; subliming pans; tanks; laboratory sinks; filters; coils; pipe and fittings in many styles and bores, return bends; S-pipe, vapour pipe; sleeve pipe, troughs, pipe dampers; faucets, cocks and valves; carboy stoppers; pitchers, jugs and buckets; dipping baskets, funnels, burner guards; etc. In other words, the field of requirements of the chemical and allied industries is practically covered. Specific mention may be made that chemical stoneware is used in plants manufacturing acids, alkalies, explosives, dyestuffs, pharmaceuticals, fertilisers, vinegar, foodstuffs, and mineral products, and for plating, lithographing, developing, and pickling processes.

Seven Types of Bodies.

It has been stated above that various types of bodies are produced to meet the needs of the different classes of equip-

* Paper contributed by M. A. Knight, of East Akron, Ohio, to the Symposium on Chemical Engineering Materials, held by the American Chemical Society in April. From *Industrial and Engineering Chemistry*, May, 1923.

ment. It is not to be understood that there are an indefinite number of bodies in general use, but rather that a reasonable number are employed. To be specific, the bodies employed by one manufacturer may be referred to as Nos. 1, 2, 3, 4, 5, 6, and 7.

No. 1 is a porous, open body, through which liquors will readily run, but which will hold hot acid gases. Finished unglazed, it serves for such uses as carboy stoppers, filtering plates and cups, electrolytic diaphragms, or any pieces subject to high temperatures and sudden changes.

No. 2 is a semi-porous, open, rough body, through which liquors will seep, but which is excellent for hot gases and for sudden changes in temperature. It finds use in baffle plates, heavy tile, covers and blocks for furnaces, and large pipe for hot gases. It is finished either glazed or unglazed.

No. 3 is a fine, close-grain structure, through which liquors are apt to sweat, but which is good for hot liquors and gases and uneven heat action. It is used for standpipe or fittings next to furnaces, muriatic acid sleeve pipe, boiling kettles, hot towers, burner guards, ejectors, and steam jets, and is finished smooth, bright, and glazed.

No. 4 has a tough, rugged, vitrified structure, not as close and fine a body as No. 3 or No. 5, but more vitrified and denser than No. 2. It will hold acid without seepage, and is used for large pieces of 250gal. capacity and over, for large tower pipe, kettles, and blow-cases, grillage tile, brick, heavy tanks. It is good for ordinary heat changes in temperature and is finished glazed and somewhat rough.

No. 5 has a close, dense, fine structure. This can be considered the general average body. It will withstand ordinary temperature changes, but not sudden changes. It is finished smooth with a bright glaze and is used for receivers, tanks, jars, drainage pipe, evaporating pans, condensing pipe, and sinks.

No. 6 is very fine, close, vitrified structure—closer and denser than No. 5. It will not stand heat action as well as the bodies previously described. It is used for acid pitchers, laboratory sinks, vacuum filters, funnels, flanged pipe, coils, tanks, jars, and other pieces where heat changes are small and slow. It is good for storage vessels, etching machines, chlorine pipe and fittings, etc. It is finished bright, clean, and smooth, with a heavy glaze.

No. 7 has a very fine, tight, close body, vitrified to almost a glass texture. It will not withstand changes in temperature or high temperature, but with this body there is no absorption whatever. It is used for valves, faucets, cocks, pebble-mill jars, distilled-water jars, small bore pipe and fittings, or any small pieces up to 50gal. capacity where there is very little heat action. It is finished very bright, smooth, with a glazed surface, and made up into only thin, light-weight, or small pieces.

General Characteristics.

A few words about the general characteristics of chemical stoneware are relevant. At first it was deemed necessary to make walls of apparatus heavy and thick, for mechanical strength as well as for resistant purposes. The present tendency is to make the walls as thin as possible, and it is surprising to note how thin they are made and yet combine strength and immunity to corrosion. In addition to the fact that the thinner walls make the apparatus lighter, they carry also the property of being better able to withstand the action of heat and cold and permit better radiation of heat in the case where heating is to be done or solutions are to be cooled off. It is the practice with chemical stoneware, where there is alternate heating and cooling, to avoid designs having sharp edges or corners, and to substitute rounded designs, since, inasmuch as chemical-stoneware bodies are of a crystalline nature and therefore require time for the molecules to adjust themselves to changes in temperature, the square design or sharp corners do not permit of even expansion or contraction and hence increase the liability to cracking. In this respect it should be mentioned that it is not the *degree* of heat or of cold to which the ware is subjected that has to be guarded against, but the *suddenness* with which the change from hot to cold or cold to hot is made, as well as the evenness with which heat or cold is applied.

Where chemical stoneware apparatus to an *exact* measurement is required, this is obtained by having the piece run slightly over in measurement and then grinding back to measurement. However, this is a long, tedious, and expensive operation, requiring the use of carborundum and machinery, and if exact measurements are not an absolute essential it is better to avoid this expense. Chemical-stoneware bodies are so hard and tough that nothing softer than carborundum will cut them with economy, and then only at a comparatively slow rate of speed.

Time Required for Manufacture.

The time required to manufacture chemical-stoneware apparatus varies with the size, design, and thickness of the piece, and runs from four to ten weeks. The greater part of the time is consumed in the drying and the firing of the piece, and in those two stages the time cannot be shortened with safety, no matter how necessary it may be to get the piece out faster. Hurrying the manufacture during drying or firing usually means the entire loss of the piece, with the result that the work must be started all over again from the beginning, with consequent still longer delay. It is therefore best to allow as much time as possible for manufacture when preparing plans for new installations or the repair or replacement of old.

CHEMICAL TRADE OF THE NETHERLANDS.

JUNE IMPORTS AND EXPORTS.

THE following statistics, which have been furnished by the Bureau voor Buitenlandsche Bedrijfsberichten, of The Hague, outline the import and export trade in chemical products of Holland during the month of June, 1923.

Imports of Chemical Products.

		Kilogrammes.	Florins.
Calcium acetate	Total	303,000	63,000
	Belgium	80,000	15,000
	U.S.A.	166,000	36,000
Lead acetate	Total	1,000	—
Acetone.....	Total	2,000	2,000
Methyl alcohol	Total	28,000	12,000
Soda ash	Total	4,477,000	340,000
	Great Britain .	719,000	56,000
	France.....	2,882,000	217,000
	B. E. Africa ..	513,000	37,000
Soda crystals	Total	50,000	2,000
Caustic soda	Total	1,171,000	228,000
	Gt. Britain....	455,000	94,000
	France.....	101,000	19,000
	U.S.A.	79,000	16,000
	Spain	534,000	98,000
Bleaching powder ...	Total	394,000	39,000
	Germany.....	52,000	5,000
	Belgium	78,000	8,000
	Gt. Britain....	85,000	10,000
Calcium carbide	Total	1,371,000	144,000
	Germany.....	359,000	38,000
	Sweden	42,000	5,000
	Switzerland ...	722,000	72,000
Magnesia.....	Total	2,490,000	147,000
	Germany.....	12,000	2,000
	Greece	2,438,000	134,000
Alum	Total	83,000	9,000
Boric acid	Total	44,000	15,000
	Gt. Britain....	37,000	13,000
Sulphate of iron	Total	38,000	2,000
Copper sulphate	Total	70,000	21,000
Sulphate of soda	Total	472,000	26,000
Sulphuric acid	Total	10,419,000	197,000
	Germany.....	12,000	1,000
	Belgium	10,361,000	191,000
Nitric acid	Total	29,000	4,000
Hydrochloric acid ...	Total	615,000	15,000
Liquid carbonic acid..	Total	47,000	14,000
Salammoniac	Total	6,000	2,000

Exports of Chemical Products.

Lead acetate	Total	4,000	2,000
Soda ash	Total	2,000	—
Soda crystals	Total	14,000	1,000
Bleaching powder ...	Total	3,000	—
Calcium carbide	Total	47,000	7,000
Magnesia.....	Total	1,645,000	132,000
	Germany.....	31,000	2,000
	Belgium	36,000	4,000
	Gt. Britain....	522,000	39,000
	France.....	230,000	19,000
	U.S.A.	625,000	51,000
	Norway	11,000	1,000
	Sweden	41,000	3,000
	Ireland	5,000	—
	Spain	13,000	1,000
	Switzerland ...	85,000	7,000
	Finland	5,000	—
Copper sulphate	Total	1,000	—
Sulphate of soda ...	Total	135,000	7,000
Sulphuric acid	Total	1,084,000	35,000
	Germany.....	383,000	10,000
	Egypt	23,000	1,000
	Argentina	411,000	14,000
Nitric acid	Total	5,000	1,000
Hydrochloric acid....	Total	6,000	1,000
Ldqiiu carbonic acid..	Total	24,000	7,000

THE WORLD'S TRADE IN DIVI-DIVI.*

A TANNIN MATERIAL OF GROWING IMPORTANCE.

DIVI-DIVI is the native and commercial name for the dried seed pods of *Caesalpinia coriaria*, a small tree indigenous to tropical America. This tree grows to a height of 20 to 30ft., lives approximately 100 years, and bears fruit from its seventh year, though not reaching full development until its twentieth year. A mature tree will, under favourable conditions, yield as high as 300lb. of pods a season. The pods are 2 to 3 inches long, three-fourths inch broad, one-eighth inch thick, and very smooth. While drying they become curiously curved, frequently assuming an S shape. The tannin in these pods is exceedingly astringent, containing a large proportion of ellagitannin and gallo-tannin, also a considerable amount of oily and mucilaginous matter. The tannin content ranges from 40 to 45 per cent. This tannin occurs mainly in the tissues of the pod close to the outer skin, rather than in the seeds, which contain but little. A representative analysis of the pods is: Water, 13.5 per cent.; tannin, 41.5 per cent.; non-tannins, 18 per cent.; ash, 1.6 per cent.; and insoluble matter, 25.4 per cent.

Care Required in Handling Pods and Extract.

Great care must be taken in the handling of pods for export, for, as the tannin content of the pod occurs immediately under the epidermis, in the form of a white powder, any abrasion of the skin will result in loss of tannin. It is also essential that the pods be packed in fine bags rather than in those of coarse-grained material which would permit the powder to sift through and become lost in transit. Divi-divi readily adapts itself to separation into the concentrated extract form. Owing to the presence of a large proportion of carbohydrates and the foreign substance previously referred to, both the extract and the ordinary solutions for tannin purposes are subject to fermentation. Throughout the process of fermentation a deep colouring matter is developed which imparts to leather unsightly dark stains. The problem of effectively avoiding this fermentation has yet to be solved, although the risk can be materially lessened by use of antiseptics.

Increased Utilisation of Divi-divi in United States.

The use of divi-divi in the manufacture of leather was known to the Spaniards as far back as 1769, having been first imported into Spain from Caracas in that year. It advanced steadily in European favour during the succeeding 100 years, at the close of which period its use as a tanning agent had become widely extended. It was not, however, until 1915, when tanners found it necessary to utilise all available sources of tannin to meet the war demand for leather, that the use of divi-divi in the United States could be regarded as worth while. In that year the imports of divi-divi into America were fourteen times as great as the pre-war level, advancing to fifty-two times that amount in 1916, and attaining the peak in 1919, when statistics showed that imports increased to ninety times the 1913 receipts. The marked diminution in the 1921 imports reflected the general industrial and commercial depression of that year, while the improvement in the 1922 imports over those of 1921 bespoke a revival in the tanning industry. The American consumption of divi-divi in 1919 (the latest year for which statistics are available) amounted to 4,985 tons of pods, valued at 381,689 dollars, and 12,772,793lb. of extract, valued at 511,794 dollars.

Venezuela Most Important Source of Divi-divi.

Venezuela has long been regarded as the world's most important source of divi-divi. During the period 1908-1921 Venezuela's exports of divi-divi averaged 6,610 metric tons annually. This average includes yearly exports as high as 10,902 tons in 1911, and as low as 3,956 tons in 1920, and 2,849 tons in 1921; omitting the two low years, the average of the preceding twelve years was 7,145 metric tons. Should a greater demand for this product be created among tanners, Venezuela could increase its output several fold through harvesting of full crop and systematic cultivation. At present only that part of the crop most readily available is collected in sufficient quantities to fill market requirements.

Before the war, Germany was Venezuela's best market for divi-divi, which is utilised both as a tanning agent and dyestuff. Since 1915, however, the United States has become the principal purchaser. The January-April, 1923, imports of divi-divi into the United States aggregated 3,800,982lb., of which Venezuela furnished 2,116,392lb., or 56 per cent. The high cost of transportation during the war and the desire to eliminate all possibility of waste led to the establishment of two extract factories in Venezuela, situated at the ports of Porlamar and La Guaira. At each of these plants the pure tannin is extracted from the pods—by means of a patented process into which neither heat nor the use of any chemical composition enters—and put up in pressed tablets. It is claimed that the tablets, or cakes, ready for export contain an average of 80 per cent. tannic acid and 16 per cent. tannic glucose. No export figures of divi-divi extract are available.

Divi-divi Trade of Colombia.

Colombia ranks second to Venezuela as a source of divi-divi. The estimated total annual output is 7,500 tons, the bulk of which is produced in the Goajira Peninsula and exported through the port of Rio Hacha to Curacao for transshipment. Decreased demands during the post-war industrial depression produced a general dullness in Colombian trade in divi-divi rather than lessened supplies; but, judging by recent United States imports from Curacao (the greater proportion of which came originally from Rio Hacha), Colombia must be renewing its former activity in this product.

Divi-divi Exports from West Indies.

The Dominican Republic's exports of divi-divi formerly exceeded 2,000,000lb. annually, almost all of which was produced on the arid lands of the Province of Monte Cristi. The output, however, has been seriously affected in recent years by the presence of a species of orchid, which lives as a parasite on the divi-divi tree, frequently killing it, and in every case reducing the yield of pods. Until measures are introduced to eliminate this pest no great increase in exports may be anticipated. The present annual production of the Dominican Republic and Haiti is estimated at 1,500 tons. Of the United States imports of divi-divi during the first four months of 1923 the Dominican Republic provided none in January, 54,810lb. in February, 56,000lb. in March, and 518,362lb. in April.

As a general rule divi-divi pods are leached by the tanner. If passed through a disintegrator the pods are readily broken and the rich tannin powder sifted out, which is mostly soluble in water. A liquid extract containing 25 per cent. tannin is an article of commerce. Divi-divi is rarely used alone, because the leather thus produced is strongly affected by atmospheric conditions, being soft and spongy in damp weather and lacking pliability in periods of drought. To counteract these tendencies divi-divi is usually mixed with other tanning materials. If used in strong liquors it yields a heavy and firm leather. Ordinarily it is employed as a substitute for gambier in the dressing of leather, and in the rapid drum tannage of light leathers, through means of which an excellent colour may be obtained. Occasionally its use in connection with leather is merely as a dye.

Freight Rates and Prices from South American Ports.

Freight has always constituted the dominating factor in the delivered price of divi-divi, for, owing to its bulkiness, its stowage, packed in sacks, requires 110 cubic feet to the ton, which, in times of tonnage scarcity, has rendered transportation extremely difficult. Prior to the war ocean freight on divi-divi (which was usually handled by small sailing vessels) was 8 dollars per ton; in 1919, however, it was 24 dollars per ton from Colombia to New York. Present ocean freights from Venezuela to New York are 7.50 dollars to 8 dollars a metric ton.

Previous to 1914 Germany practically controlled the tanning-material market of South America and Hamburg fixed the prices. The price assigned to divi-divi was from 1½ to 2 cents a pound according to grade and origin. In 1883 the price of divi-divi at Venezuelan ports of shipment was 23.16 dollars per metric ton of 2,204.6lb.; in 1919 it ranged from 13.51 to 19.30 dollars at Cumana, and from 21.23 to 27.02 dollars at Maracaibo. During the war prices attained a peak of 75 dollars per ton, but in the early part of 1918 divi-divi was marketed in New York at 50 to 55 dollars per ton. The general trend, however, in 1922 and the January-June period of 1923 has been toward the pre-war level, prices having fluctuated between 38 and 39 dollars per ton during that period.

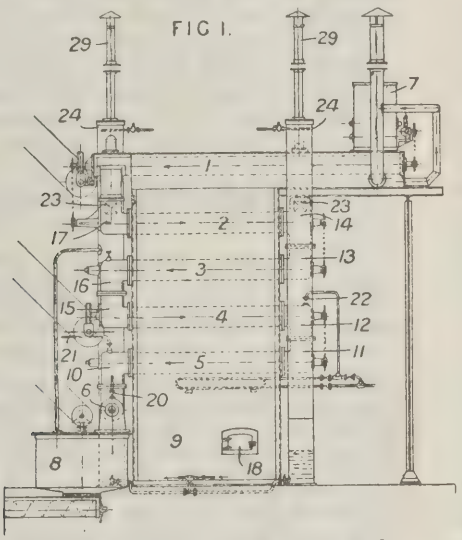
* From account by Mr. H. M. Hoar, of the U.S. Bureau of Commerce. Abstracted from *Commerce Reports*, July 2, 1923.

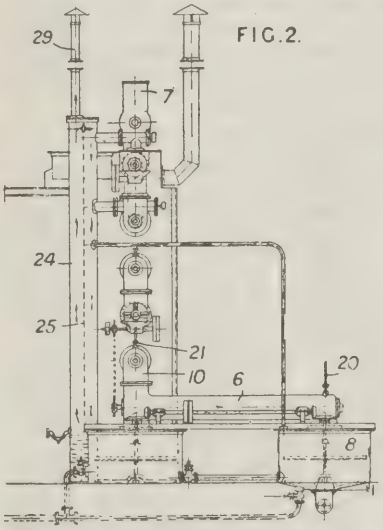
ACTIVATED CHARCOAL.

PROPOSED NEW DUTCH MANUFACTURING PROCESS AND CLASSIFICATION SYSTEM.

IN connection with the article on activated carbon which appeared in our issue of July 27 (page 99), and with the growing importance of this material as an agent for the purification of liquids and gases, the description of two patents which have been applied for, in the one case (*Brit. Pat.*, 198,328) by the Algemeene Norit Maatschappij (known as the General Norit Company, Ltd.) and the other by J. N. A. Sauer of Amsterdam (*Brit. Pat.*, 198,373) should be of interest to our readers.

The first patent deals with the manufacture of active charcoal, and is a process for producing uniformly active charcoal or for regenerating spent charcoal of the type in which a carbonaceous material is distilled in the presence of active gases and is characterised in that the raw material, which may be the less porous kinds of coal and carbonaceous materials such as brown coal, anthracite, etc., is first granulated or pulverised preferably uniformly and then agitated during the heating and action of the activating gases, the agitation being affected for example by stirring, by rotation of the retort, or by the kinetic action of gases. The raw material may be subjected to a preliminary dry distillation in which the products of distillation are quickly swept away, such as by the passage of practically inert gases. The activating gases specified are steam, carbon dioxide, carbon monoxide, air, oxygen, chlorine, hydrogen, flue gases and generator gases, and an apparatus for carrying out the process in a continuous manner consists of a hopper 7 with automatic feed mechanism, which charges the material to a trough 1 with a worm conveyer, whence it passes successively to retorts 2-6 of chamotte or a refractory alloy, all of which have worm conveyers.





Retorts 2-5 are disposed within the brick walls 9 of a furnace 18 the unions 10-17 being exposed. Gases may be blown into the retort 6 at 20, into 5 at 21, and into 4 at 22, the retort gases passing by outlets 23 to wide pipes 24, divided by partitions 25, and having water-chambers at their bases to collect suspended carbon, and chimneys 29. An example shows the production of active charcoal using already carbonised material, air preferably diluted with nitrogen being admitted to retort 6, flue or generator gases to retort 5 and steam to retort 4, the injection beginning as soon as material makes its appearance at the water-sealed or enclosed chamber 8 into which the finished product is delivered.

The Six Types of Activated Carbon.

The second patent deals with the methods of purifying liquids and gases with activated charcoal, and states that the liquid or gas to be purified is subjected to the action of a plurality of active carbons possessing different physical and physico-chemical properties, and so chosen that they supplement one another in their action. The different types of carbon may be employed in admixture with one another or consecutively. Six types of activated carbon are distinguished.

Type 1 comprises carbons produced from materials of vegetable origin and activated by means of gases such as superheated steam or carbon dioxide at a temperature of 800-1,200° C. Included in this category are the carbons sold under the names "Norit," "Eponit," "Batchite" (from coal), and "Dorsite" (from cocoanut shells).

Type 2 comprises carbons produced by dry distillation at temperatures of 200-2,000° C. of organic raw material such as peat, sawdust, seaweed, or pine needles admixed with, or naturally containing, inorganic materials such as alkalies or alkaline earths, lime salts, or sulphuric acid. The product is generally extracted, for example, with acids, leaving a carbon which is stated to have no pronounced structure and to be a poor filtering medium. Such carbons are those under the names "Carbrox" (from rice or cotton), "Kelpchar" (from seaweed), "Darco" (from lignite), and "Delclowyte" (from peat). Type 3 comprises carbons produced by calcination and subsequent extraction of a solution of cellulose, molasses, or other carbon-containing materials in a suitable solvent such as concentrated zinc-chloride solution, hydrofluoric acid, or sulphuric acid. A modification of the process consists in coking the raw material and extracting the residue with a substance such as selenium oxychloride which dissolves the coking products. Carbons of this type are stated to be very finely divided and unsuitable for filtration, but to be active absorbing agents. The carbons sold under the names "Carboraffin" (zinc-chloride carbon), "Filtchar," "Super-filtchar," "Sugar" or "Suchar," and "Sulphite-carbon," the last four of which are prepared from sulphite-cellulose liquors, are included in this category.

Type 4 comprises carbons produced by adding kieselguhr or other porous inorganic materials to the solution to be treated by the process giving carbons of type 3, or to starch and other carbohydrates which are then subjected to dry distillation. Such carbons are stated to be poor filtering and decolourising agents. The carbon sold under the name "Molaschar" is referred to in this connection. Type 5 comprises carbons produced by dry distillation at temperatures of 400-600° C. of materials, generally of animal origin, which naturally possess the property of yielding decolourising carbons, such as bones, blood, fish, and the residues from the removal of fusel oil from alcohol. Such carbons, after extraction, as with acids, are stated to be active absorbing agents but poor filtering media. They include ordinary bone charcoal, "Noir Epuré" (extracted bone charcoal), "Noir lavé en Pâte" (bone charcoal extracted with sulphuric or hydrochloric acid and sold as a paste containing 80 per cent. of water), blood charcoal, and the varieties sold under the names "Bactanat" (from fish), "Flandac," "Flaming," and "Littoral." Type 6 comprises decolourising carbon prepared from gases. They are in general poor filtering and decolourising agents.

Use of Mixtures of Activated Carbons.

The invention is illustrated by reference to the purification of sugar solutions, glycerine, oils, and fats, the treatment of wine, and the separation of one or more constituents of a gaseous mixture. The carbons employed may be treated with substances that are capable of enhancing their effect or of preventing undesired subsidiary reactions. For example,

sodium phosphate is added to active carbon for removing iron from glucose solutions. Oils and fats containing fatty acids may be treated with a mixture of active carbons, one of which has been impregnated with lime. Gelatin may be added to the carbon used in the treatment of wine, and acid to that used in the clarification of sugar solutions. The application of the invention to the treatment of gaseous mixtures is described by reference to the removal of hydrogen sulphide and benzol from illuminating gas by the use of a mixture of two kinds of active carbon. The benzol can afterwards be recovered by treatment with superheated steam or by heat, and sulphur resulting from the oxidation of hydrogen sulphide by the oxygen in the charcoal may be recovered by means of superheated steam or removed by oxidation.

THE RRITISH CHEMICAL PLANT MANUFACTURERS' ASSOCIATION.

THIRD ANNUAL GENERAL MEETING.

AT this meeting which was held at 106, Piccadilly, London, W. 1, on Wednesday, July 18, there were present: Mr. L. M. G. Fraser (in the chair) (W. J. Fraser and Co., Ltd.), Mr. E. A. Alliott (Manlove, Alliott and Co., Ltd.), Mr. F. R. Blizzard (T. and C. Clark and Co., Ltd.), Mr. H. Broadbent (Thomas Broadbent and Sons, Ltd.), Mr. J. H. Rawson (The Widnes Foundry Co., Ltd.), Mr. W. A. Sheppard (Joseph Baker, Sons, and Perkins, Ltd.), Mr. E. Cecil Watkins (W. Neill and Son, Ltd.), Mr. J. W. Wright (The Cannon Iron Foundries, Ltd.), together with Mr. W. J. U. Woolcock, Mr. A. J. Malacrida, and Mr. G. J. Alderton. An apology for absence was received from Mr. James Robinson (Mather and Platt, Ltd.).

Representation on Scientific and Other Committees.

The Chairman, in moving the adoption of the annual report, said: The number of our members is, I believe, one less than last year. The balance-sheet shows that your financial position is an increasingly sound one. We started with a balance of £177. 7s. 8d. and carry forward to next year a balance of £264. 13s. 8d. This Association does not have meetings at which theoretical papers are read and discussed, but being composed of manufacturing engineers, its purpose is the improvement of the relationship of its members to the chemical manufacturers either by propaganda, or discussion of any technical or business problems that are brought forward by its members, and its prosperity is to be judged rather by the effective aid it can give than by the number of meetings held.

An Association pre-supposes two things—energy and direction of energy. The first must be supplied by the members in general, and the second is the work of your Committee and its officers, who are ever-ready to meet and to direct the discussion on any problem sent in by members, into the best channels for solution. If we are able to apply the results arrived at by scientific men, if the laboratory experiment of to-day is to be our engineering achievement of to-morrow, we ought to be very much alive to all that is going on in the scientific world. Let us, therefore keep our vision firmly fixed on present needs, but tune our minds to the edge of the beyond.

I should like to see members of this Association invited on to the councils of theoretical and research societies and associations where their engineering knowledge would probably help in the solution of many difficulties from the mechanical science or engineering points of view, and probably rescue from failure many problems that appear almost insoluble.

Disappointing Results with Standardised Plant.

The results of the suggestion made at the last annual meeting have not been quite so effective as was hoped. This Association was incepted at the call of the chemist, and a great deal of work has been carried out by your Committee in standardising various types of plant such as jacketted pans and filter presses. The manufacturers have altered their patterns and incurred great expense for the ultimate advantage of the chemical manufacturers, and they had hoped that their advances would be better appreciated. Further this information has been published and made available to other manufacturers who have incurred neither the expense nor trouble of the work entailed. We have, therefore, again brought this subject to the notice of the Association of British Chemical Manufacturers. One suggestion I would like to make is that where a member cannot himself undertake any particular piece of work he should give other members of the Association the opportunity of doing so.

I regret to find it has not been possible to obtain sufficient support to have a section at the British Empire Exhibition of 1924, especially as the Chemical Section is going to have such a large display, and many chemists must be drawn to this exhibit, within whose precints we should have been housed.

Work of the Joint Research Committee.

The study of corrosion is one of absorbing interest, and it is not yet possible to formulate with certainty any definite principles on the subject. The absence of such definite knowledge is a source of difficulty to us as plant manufacturers. I think, however, that our iron founders can do a great deal for us in more technical research as to their mixtures, sands used, temperatures and rates of cooling, with the object of giving us a closer grained and stronger metal. In view of the fact that cast iron is composed of crystals and a matrix, it would perhaps be worth while making research in this field when we consider how small a defect will form a starting point for corrosion. The matrix being the softer becomes attacked and the formation of chemical salts starts corrosion by electrolytic action. It would perhaps be helpful if our Association were represented on the Cast Iron Research Association.

The Joint Research Committee has done a considerable amount of work under the Chairmanship of Dr. Seligman. Chromium steel was very thoroughly investigated and your Sub-Committee had many interesting and useful discussions with Dr. Hatfield, who gave a great deal of his time to us, and a very great amount of experimental work has been carried out under his care. The manipulation of this metal is difficult owing to its hardening above the critical temperature, and it has then to be annealed before further work can be carried out, with a subsequent tendency to scaling. This material is only non-resistant to certain chemicals and the scaling makes it less so, but work is being carried out in this direction which, I hope, will lead to satisfactory results.

After numerous tests of small pieces of nickel and small crucibles it was found that the results of chemical action were not consistent, and varied considerably with the composition of the nickel and the after working thereof.

The Education Problem.

This ever-present and much debated subject was brought up before your Committee, and an interim report was presented to the A.B.C.M. in which the characteristics and training of a chemical engineer were discussed. The subject is full of difficulties not only with regard to the drawing up of the curriculum to be followed, but also in persuading the authorities to change their methods so as to correspond with our ideas. I am afraid, if care is not taken, that the real point will be missed under the haze that has been raised round the term "chemical engineer," and I think this Association might well formulate their own suggestions for use at the proper time. I hope, therefore, that we shall have a member on any representative Committee that seriously takes up the question. The tendency of the present day is too intensive education, and a much broader education would be of far greater use to the great majority of men.

You have had sent to you the report of the Sub-Committee on Standardisation of Cast Iron Filter Presses. The specification there set out has been adopted by the British Engineering Standards Association, and calls for little comment from me. I would tender our thanks to the Sub-Committee, under the chairmanship of your treasurer, Mr. Alliott, for the care and thoroughness with which they have carried out this work. It has, I know, involved numerous meetings and discussions and a great deal of drawing out of plans and details. I cannot do better, and I am sure I have you with me, than endorse the letter sent to Mr. Woolcock by the Secretary of the British Engineering Standards Association in which he concludes: "The acceptance of the proposals submitted by your Joint Committee without any important alterations is a further tribute to the care and thoroughness with which the work has been carried out by that Committee."

Improvement in Railway Traffic Conditions.

Reductions in Rates.—In August last the rates were reduced from 100 per cent. to an average of about 75 per cent. plus flat rates, above the pre-war, and in May of this

year the percentage was reduced to about 60 per cent. plus the flat rate. Application is at present before the tribunal for a reduction to 33 per cent. above pre-war.

Conditions of Carriage.—In regard to the terms and conditions under which general merchandise will be carried, the conditions for "company's risk" traffic have now been settled and the most important feature about the conditions is that for the first time in the history of railways the contract will include a definite statement of the carrier's liabilities. Even in those cases where the railways are generally exempt from liability such as from the Act of God, the King's Enemies, etc., companies have still to show that they used all reasonable care and foresight in dealing with the merchandise.

Forms of Schedule.—Forms of Schedules for the new rates have been fixed by the Rates Tribunal, and the traders have been able to secure some concessions in the methods of basing rates which should prove of great advantage to the trading community generally.

Mr. Blizzard, seconded, and the accounts and report were unanimously adopted.

Election of Officers and Committee.

Mr. L. M. G. Fraser (W. J. Fraser and Co., Ltd.), Mr. F. R. Blizzard (T. and C. Clark and Co., Ltd.), and Mr. E. A. Alliott (Manlove, Alliott and Co., Ltd.), were unanimously re-elected as chairman, vice-chairman and honorary treasurer respectively for the coming year.

The following gentlemen were elected members of the Executive Committee for the ensuing year:—Mr. H. Bush (Huntington, Heberlein and Co., Ltd.), Mr. J. H. Rawson (The Widnes Foundry Co., Ltd.), Mr. James Robinson (Mather and Platt, Ltd.), Dr. R. Seligman (Aluminium Plant and Vessel Co., Ltd.), Mr. E. C. Watkins (W. Neill and Son, Ltd.), Mr. J. W. Wright (The Cannon Iron Foundries, Ltd.).

THE CHINESE CAMPHOR TRADE.*

DECLINE IN EXPORTS FROM HONGKONG.

CAMPHOR has for long been an important article of export from Hongkong. In South China camphor is produced in the three Provinces of Kwangsi, Fukien, and Kiangsi, while a small quantity also comes from the Kwangtung Province. That of Kwangtung and Kwangsi is inferior in quality to the camphor of Fukien and Kiangsi. The island of Formosa, where the Japanese Government holds a monopoly, supplies the largest portion of the world's camphor, but South and Central China are also important producers.

Owing to there being no system of replanting, the number of trees has been gradually decreasing until Fukien's supplies are nearing exhaustion. It is reported by natives, however, that there are many untouched camphor-wood areas in the Province of Kiangsi, while the more inaccessible regions of Kwangsi and Yunnan are also said to contain considerable numbers of trees.

According to the statistics issued by the superintendent of imports and exports of the colony of Hongkong, exports of camphor of the amounts shown in the following table and values left Hongkong during 1920, 1921, and 1922:

During the war and up to the time of the general world trade depression in 1920 the camphor trade was abnormally large, especially with the United States, England, and France. Since 1920 shipments to these countries have dropped off considerably, and during the year 1922 India held first place as a purchaser of camphor from Hongkong, with the United States ranking second. India has always been an important buyer of this product. Crude gum camphor is the principal kind exported from Hongkong, both the crude Fukien and Kwangsi varieties being shipped in large quantities. Refined camphor is only sold in insignificant quantities, as the native methods of refining are both primitive and expensive. Camphor oil is also only exported in small quantities, mostly to Calcutta.

Reasons for the Decline.

According to dealers there are several reasons for the decline in camphor exports from Hongkong during the past few years. The political condition in South China is one of the foremost causes, since military operations have constituted a serious hindrance to the free movement of supplies from the interior and have resulted in certain military leaders levying heavy imposts on transit goods. Another factor which has contributed to the decline of the trade in this commodity is the growing importance of Kiangsi as a producer. The industry has rapidly developed in that province, and a substantial portion of the demand which was formerly met by shipments from Hongkong is now being filled by the product of Kiangsi, exported *via* the port of Kiukiang.

* Abstract of a report by W. J. McCafferty, U.S. Consul at Hongkong, and published in *U.S. Commerce Reports*, July 23, 1923.

Exports of Camphor from Hongkong.

Countries of Destination	1920.		1921.		1922.	
	Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
	Piculs.†	£	Piculs.†	£	Piculs.†	£
United Kingdom	2,299	109,325	1,244	19,640	220	3,682
Australia	86	3,128	28	442	4	79
India	1,242	43,836	1,423	22,243	824	15,393
Straits Settlements and Federated Malay States	189	5,983	100	1,652	54	953
North China	26	1,351	17	633	5	71
Japan, Chosen, and Formosa	71	1,686	213	3,191	5	406
Netherlands East Indies	36	1,880	7	114	1	5
French Indo-China	85	2,529	64	699	59	897
Siam	71	1,943	111	1,736	142	2,529
United States	7,007	339,262	575	9,272	569	10,086
France	2,344	107,048	63	1,004	20	388
Middle China	5	171	300	4,251	14	72
Other countries	99	6,238	54	1,326	59	1,271
Total	13,560	624,380	4,199	66,203	1,976	35,632

† 1 picul = 133⅓lb.

Methods of Sale, Packing, and Prices.

The bulk of the production of camphor from Fukien and Kwangsi Provinces is shipped to Hongkong and consigned to native traders. These native traders sell to export houses, who, in turn, sell to the consuming markets. Certain firms in Europe and America have arrangements with some particular Hongkong exporting house for the purchase of their supplies. Crude camphor is generally packed in zinc or tin lined cases having a capacity of 1 picul. The usual container used in shipping this commodity measures 4½ cubic feet. Camphor oil, on the other hand, is usually exported in cases containing two old kerosene tins, which hold about 65 pounds to the case.

Sellers guarantee the merchandise to analyse 90 per cent. camphor and the oil to be of a guaranteed specific gravity upon arrival. If the analytical test shows a lower percentage, it is customary for the sellers to allow the buyers a rebate on the price of the camphor. The usual rebate is three-eighths of 1 per cent., United States currency, per pound for each unit under 90 per cent. Contracts of sale to the United States are ordinarily governed by the clause "landed net weights," that is, the sellers undertake to indemnify the buyers for any difference between the invoice weight and the weight as ascertained upon arrival. It is also the custom for the purchasers to provide the exporters with a confirmed letter of credit at 90 days for the full invoice value.

The price of Fukien and Kiangsi camphor, which is considered of the best quality, at the present time is about 160 Hongkong dollars (1 Hongkong dollar = 0.4777 American dollars at normal and 0.5221 American dollars at current rate of exchange) per picul, while the inferior grades from Kwangtung and Kwangsi are sold at about 155 dollars per picul. The better grade of camphor oil is being sold at present for approximately 26 dollars per picul, and the inferior at about 18 dollars.

German Production of Dyestuffs.—According to information supplied by Dr. Breithut, the recently appointed U.S. Chemical Trade Commissioner to Europe, the output of German dyestuffs during May of this year amounted to 7,454,092lb., made up as follows:—Alizarin red, 253,264lb.; indigo paste, 47,740lb.; vat colours, except Indanthrene Blue G.C.D., 269,526lb.; Indanthrene Blue G.C.D., 1,434lb.; alizarin colours other than red, 172,753lb.; direct colours for cotton, 2,420,202lb.; direct colours for diazotisation, 158,418lb.; acid colours for wool, 1,405,122lb.; chrome colours for wool, 712,158lb.; basic colours, 30,916lb.; sulphur colours, 1,567,896lb.; lake colours, 144,663lb.

NOTES ON THE ITALIAN CHEMICAL INDUSTRY.

(From Our Own Correspondent.)

Synthetic Petroleum and Benzine.—Consequent upon the successful production of synthetic petroleum and benzine in Germany, Italian technicians are studying the possibility of introducing these processes into Italy, using for the purpose powdered lignite. (Italy consumes about four hundred thousand tons of benzine and petroleum per year, and this quantity has a tendency to increase still further owing to the great development of motoring and aviation. Most of the requisite benzine and petroleum has to be imported and represents for Italy an expenditure of one half milliard lire per annum.) The transformation is effected by treating powdered lignite with a stream of hydrogen under a pressure of one hundred atmospheres at about 200° C. The quantity of hydrogen necessary to obtain petroleum is five per cent., whereas that required for producing benzine is ten per cent.

Italo-Austrian Tariff Convention.—This tariff convention, in its clauses relating to chemicals imported from Austria into Italy, fixes an import duty of 8 gold lire per kilogramme for compressed carbonic acid, of 2.5 gold lire for sulphate of copper, of 25 gold lire with a coefficient of increase of 0.2 for hydrogen peroxide, of one gold lira for sulphate of ammonia. Austria exempts from import duty crude Italian sulphur in blocks or sticks, ground sulphur, flowers of sulphur, mercury, crude boric acid, crude borax, crude tartaric acid, citrate of lime, superphosphates, and calcium cyanamide; and places a duty of 8 gold lire per kilogramme on refined boric acid, 24 gold lire on pure tartaric acid, 24 gold lire on pure citric acid, 1 gold lire on sulphate of ammonia to be employed as fertiliser, 7 gold lire on refined borax, 3.60 gold lire on sulphate of copper and copper-containing insecticides and fungicides, a duty of 15 gold lire on common soap, etc.

General Tariff Notes.—By the new customs tariffs approved by the Chamber of Deputies the import duty on hydrochloric acid and sulphuric acid is removed; the duty on soda crystals, is increased from one to two gold lire and the duty on calcium chloride increased from one to one and a half gold lire. To compensate for the reduction in the State revenue, brought about by lower taxes on certain imported food products, the Government have decided to raise to 140 lire the present tax on the production of alcohol. Denatured alcohol to be used for power, heating, lighting, and other industrial purposes however is free from tax.

Reduction in Sicilian Sulphur Stocks.—By a recent decree, 125,000 tons of sulphur sold to the British National Sulphuric Acid Association, will be taken entirely from the remaining stocks of the Consorzio Obliggatorio per l'Industria Zolfifera Siciliana, at Palermo. The money obtained from this sale will be devoted wholly to the payment of the debts of the said Consortium, and will allow of a reduction in the number of the debentures. It is expected that all the debentures will be repaid by the Consortium within eight years.

Italian Production Statistics.—Italian production of mercury attained about 1,530 tons in 1922, against 1,071 tons in 1921, 1,410 tons in 1920, 548 tons in 1919, 985 tons in 1915, 1,070 tons in 1914, 1,000 tons in 1912, 955 tons in 1911, and 894 tons in 1910. The production of olive oil reached 277,600 hectolitres in 1922, against 161,500 hectolitres in 1921, 203,900 hectolitres in 1920, 289,000 hectolitres in 1918, 206,200 hectolitres in 1916, 178,400 hectolitres in 1914, 95,800 hectolitres in 1912, and 138,460 hectolitres in 1910. From July 1, 1922, to April 30, 1923, Italian production of alcohol reached 360,600 hectolitres, of methyl alcohol 415 hectolitres, of acetic acid 602 tons, of glucose 7,900 tons, of soap 110,913 tons, and of seed oils 31,792 tons.

Italian Overseas Chemical Trade.—During the last fortnight of July there were imported into Genoa 912 tons of pig iron and other metals, 290 tons of copra, 15,040 tons of phosphates, 600 tons of cellulose, 1,573 tons of quebracho extract, 980 tons of caustic soda, 690 tons of other chemicals, 50 tons of colours and varnishes, 3,004 tons of burning and lubricating oils, 2,500 tons of naphtha, 240 tons of tallow, 100 tons of paraffin, 50 tons of gum, 200 tons of china clay, etc. From July 1, 1922, to June 20, 1923, there were imported 104,421 tons of petroleum, and 109,863 tons of benzine, against 94,613 tons of the former and 94,020 tons of the latter from July 1, 1921, to June 20, 1922. During the first five months of this year Italy imported chemicals, medicinals, resins and colouring matters to the value of 490,686,700 lire, against 469,871,929 lire during the same months of 1922; and exported similar materials to the value of 157,545,537 lire, against 161,678,538 lire in 1922.

Improvement in Italian Financial Conditions.—Data collected by the Associazione Bancaria Italiana, regarding the activities of limited companies during June last, show a total increase of 524,455,400 lire distributed over 115 companies. During the same period 157 new companies with a total capital of 94,387,750 lire were founded. The total capital invested reached 618,843,150 lire. There were 54 failures of limited companies to the value of 56,001,800 lire, and 39 reductions of capital to the value of 61,148,925 lire.

Fertiliser News.—Italian consumption of Chilean nitrate in 1922 fell below anticipations, only reaching 25,000 tons. The use of nitrate of ammonia amounted to only 10,000 tons, against 12,500 tons in the preceding year. At the Terni works and the Piano d'Orte works of the Società Azotati plants for the production of sulphate of ammonia starting from calcium cyanamide were put into operation. The consumption of sulphate of ammonia during 1922 was low, not more than 15,000 tons, as against a pre-war average of 35,000 tons.

Company News.—At Rome a new firm, the Società Italiana per le Applicazioni dell'Ozono, with a capital of 100,000 lire was established, for the production and application of ozone. At Castellammare di Stabia, near Naples, there has been formed the Società Commerciale G. Monti e C., with a capital of 100,000 lire, for the production of and trade in chemicals. At Montevarchi the wood distillery of Distillazione Legna S.D.L. was founded with a capital of 300,000 lire. The Fabbrica Lombarda di Prodotti Chimici of Milan, made, during its past financial year, a net profit of 292,720 lire on a capital of 3,000,000 lire. The Consorzio Produttori Soda e Cloro of Milan, at an extraordinary meeting, decided to go into voluntary liquidation owing to bad trade. The profits made by the Società Anonima Ossinitrica of Genoa on a capital of 500,000 lire have allowed this firm to make good the losses experienced in the years 1920 and 1921, and still leave a net profit of 3,794 lire. The Società Generale per la Ciannamide of Turin, as a consequence of the results of the last financial year which show a total loss of 5,569,179 lire, has decided at an extraordinary meeting, to reduce the capital from 3,750,000 to 3,00,000 lire, by lowering the nominal value of the shares from 100 lire to 20 lire.

THE CHEMICAL INSTITUTE FOR IRELAND.

GENERAL PURPOSES COMMITTEE APPOINTED.

THE decision to form an Irish professional institute for chemistry on the lines of, and with the approval of, the British Institute of Chemistry was recorded in our issue of July 6, 1923. The matter has now been carried a stage further, for a committee has been formed to put into effect the general purposes of the Chemical Institute for Ireland—namely:

Objects of the Institute.

(1) That all chemical operations in Government laboratories, or institutions, or in other laboratories supported wholly or partially by public funds, be under the direct control of a registered professional chemist.

(2) That in Irish courts of law only registered professional chemists be permitted to give expert chemical evidence in penal cases.

(3) That public analysts be registered professional chemists, and that they shall conform with all requirements of the controlling board in connection with their duties as public analysts.

(4) The maintenance of a high standard of efficiency on the part of registered professional chemists.

The committee have drafted regulations for the training of chemists desirous of becoming members of the Institute. As recorded in our earlier account, the course of training extends over a minimum period of four years, and a register will be maintained of chemists qualified to take part in chemistry as applied to industrial, analytical, and agricultural work, as well as research and teaching. According to the *Chemist and Druggist*, it is the intention of the committee to apply at an early date for formal recognition, by charter or otherwise, of the proposed Chemical Council as the authority for the registration of professional chemists. The honorary secretaries are Joseph Algar, D.Sc., and A. G. G. Leonard, Ph.D.

SAFEGUARDING OF INDUSTRIES ACT.

METHOD OF PAYMENT OF DUTY UNDER PART I.

THE British Chemical and Dyestuffs Traders' Association has just forwarded to H.M. Treasury a Memorandum on the method of payment of duties under the Safeguarding of Industries Act, 1921, Part I. Copies have also been sent to H.M. Customs. The following is a copy of the Memorandum:—

Importers of goods scheduled under Part I. of the Safeguarding of Industries Act, 1921, have to pay the duty of 33⅓ per cent. at the time the goods are landed and cleared at H.M. Customs. This procedure, it is understood, is governed by Section 39 of the Customs Consolidation Act, 1876, whereby H.M. Treasury are given power to decide whether goods liable to import duties shall be allowed to be bonded or not. The Treasury Order in respect of the Safeguarding of Industries Act, 1921, stipulated that the duties should be paid at the time of landing and clearance of the goods at H.M. Customs. During the period this Act has been in force it has been found that the present method of payment of duties as outlined above is, in many ways, having a detrimental effect on the commerce of this country. The following points are submitted in support of this view:—

Difficulties Entailed by Present Method.

1. Prior to the introduction of the Safeguarding of Industries Act and the import duties it entails, merchant importers were in the habit of holding as stocks bulk supplies of goods, and were thus enabled to meet both home and overseas demands without delay. The re-exportation aspect was then of very considerable importance, it being estimated that quite half the volume of imports now liable to Key Industry duty were, when previously allowed free import, disposed of by way of re-export sales. Careful and exhaustive inquiry has been made as to what effect the payment of import duties under the Act has had on this important branch of the chemical trade, and it has been found that:—

(*a*) The difficulties and uncertainty of obtaining "drawbacks" of duties paid at the time of importation make it impracticable for merchants to compete in overseas markets. For instance, unless a merchant holding stocks of goods on which duty under this Act has been paid can ascertain definitely and quickly whether he can recover such duty upon re-exportation he is unable to arrive at his selling price, and is thus prevented from competing for overseas business. It is certain that if he does not allow for a "drawback," his price to the foreigner would not be competitive.

(*b*) That on account of this position the volume of re-exports of goods liable to Key Industry duty has fallen away in a very deplorable manner, and merchants are continually complaining that they have lost and are still losing such business, and state that it is largely due to the disadvantages arising out of the present method of collection of duties levied under the Safeguarding of Industries Act, 1921, Part I.

(*c*) Some firms, in an endeavour to overcome this barrier to re-export trade, are now holding stocks at Continental ports and meeting demands in that way. This must entail loss of freights to the shipping interests of this country; loss of employment at the docks, in warehouses, and in various other directions. It has been found that in this way only is it possible and practicable for merchants in this country to hope to compete successfully in overseas markets.

(*d*) Claims for drawbacks usually take a considerable time to settle, and in many instances where the goods in question have, since their importation, changed hands one or more times, it has been found almost impossible to satisfy H.M. Customs as to their identity. While the merchant is attempting to overcome these difficulties the overseas business is lost.

2. As regards sales of dutiable goods in this country, merchants, in order to carry on their business as economically as possible and to fulfil their function as distributors, are in the habit of importing in bulk quantities. Such goods are gradually liquidated and in many instances the duty paid at the time of importation may not be recovered in full for twelve months, or even longer. In this way considerable amounts of capital are locked up, to the detriment of the merchant and trade in general.

B.C.D.T.A. Request That Goods Should Be Bonded.

It is submitted that, in the case of re-exports, if merchants were given the opportunity of putting goods liable to Key Industry duty into bonded warehouses at the time of importation, and thus be relieved of the immediate payment of duty and the uncertainty of obtaining drawbacks, the trade of this country in re-exports of chemicals would be materially facilitated and would undoubtedly increase in volume. In the case of sales to buyers in this country, duty would only be paid at the time they were taken out of bond for actual delivery. Under this arrangement comparatively large amounts of capital would be at the importers' disposal, instead of being locked up as is the case under the present conditions.

Consideration has been given and inquiry made as to whether there would be objection on the part of warehouse interests to accepting goods scheduled under Part I. of the Safeguarding of Industries Act, on account of their dangerous character in themselves or when stored with other goods. It appears that as these materials are packed in such a manner as to satisfy shipping lines, who accept them at ordinary rates, and, for the same reason, insurance of such goods is effected at low rates, it is believed that warehouse interests would approve of the suggested system of bonding.

It is therefore suggested that, as the present system of collection of duties under the Safeguarding of Industries Act, 1921, Part I., is doing great harm to the commerce of this country, especially in the matter of re-exports, the Order made by H.M. Treasury at present in force should be suitably amended so as to allow dutiable goods to be put into bond.

CHEMICAL NOMENCLATURE.

RULES ADOPTED BY BRITISH AND AMERICAN COMMITTEES.

THE rules that have been adopted by the Nomenclature Committee of the Chemical Society of London and that of the American Chemical Society are as follows:—

1. In naming a compound so as to indicate that oxygen is replaced by sulphur the prefix *thio* and not *sulpho* should be used (sulpho denotes the group SO_3H); thus, HCNS, *thio*cyanic acid; H_3AsS_3, *thio*arsenic acid; $Na_2S_2O_3$, sodium *thio*sulphate; $CS(NH_2)_2$, *thio*urea. The only use of *thio* as a name for sulphur replacing hydrogen is in cases in which the sulphur serves as a link in compounds not suitably named as mecapto derivatives; thus; $H_2NC_6H_4SC_6H_4NH_2$, thiobisaniline. *Hyposulphurous acid*, not hydrosulphurous acid, should be used to designate $H_2S_2O_4$.

2. The word *hydroxide* should be used for a compound with OH and *hydrate* for a compound with H_2O. Thus, barium hydroxide, $Ba(OH)_2$, chlorine hydrate, $Cl_2.10H_2O$.

3. Salts of chloroplatinic acid are *choroplatinates* (not platinochlorides). Similarly salts of chloroauric acid are to be called *chloroaurates*.

4. Hydroxyl derivatives of hydrocarbons are to be given names ending in *—ol*, as glyce*rol*, resorcin*ol*, pinac*ol* (not pinacone), mannit*ol* (not mannite), pyrocatech*ol* (not pyrocatechin).

5. The names of the groups NH_2, NHR, NR_2, NH or NR should end in *—ido* only when they are substituents in an acid group, otherwise in *—ino*; thus, MeC(:NH)OEt, ethyl im*ido*acetate; $NH_2CH_2CH_2CO_2H$, β-am*ino*propionic acid (not am*ido*propionic acid); $NHPhCH_2CH_2CO_2H$, β-anil*ino*propionic acid; $CH_3C(:NH)CO_2H$, α-iminopropionic acid.

6. Hydroxy—, not oxy—, should be used in designating the hydroxyl group; as *hydroxy*acetic acid, $CH_2(OH)CO_2H$, not *oxy*acetic acid. *Keto*— is to be preferred to *oxy*— to designate oxygen in the group—CO—.

7. The term *ether* is to be used in the usual modern acceptation only and not as an equivalent of *ester*.

8. Salts of organic bases with hydrochloric acid should be called *hydrochlorides* (not hydrochlorates nor chlorhydrates). Similarly hydrobromide and hydriodide should be used.—*The Dyer and Calico Printer.*

Gas Residuals in 1922.—A return has been issued by the Board of Trade relating to the manufacture and supply of gas by 796 undertakings in Great Britain during 1922. The residuals amounted to 10,475,155 tons of coke and breeze, 169,770,531 gallons of tar, and 113,373 tons of sulphate of ammonia.

ITEMS OF INTEREST.

British Coal Output.—The output of coal for the week ended July 28 was 5,111,700 tons, compared with 4,601,000 tons in the preceding week and 4,989,100 tons a year ago.

Change of Address.—Messrs. P. and B. Evaporators, Ltd., announce that they have removed to larger premises at 75, Victoria Street, London, S.W. 1. Telephone number: Victoria 7482.

Tariff Notes.—As from August 21 the following duties on the importation of salt into Latvia are effective: On rock salt and salt in lumps, 0.02 lats. per kilog. gross; on ground salt, sea salt, and effervescing salts, 0.0275 lats.

Personal.—Dr. L. H. Baekeland, Honorary Professor of Chemical Engineering of Colombia University, has recently been made an Officer of the French Legion of Honour. Dr. Baekeland is known as the inventor of Velox and Bakelite. He is president of the Bakelite Corporation and of the General Bakelite Company.

Legal Intelligence.—At the meeting of creditors of Parker Ward and Co., manufacturing chemists, of Windsor House, Victoria Street, London, S.W., it was reported that liabilities amounted to £1,670., with total assets £206., and net assets £69. The liquidator stated that there was no likelihood of any dividend being paid to creditors.

Chemical Traders and Railway Rates.—The British Chemical and Dyestuff Traders' Association states that it has been given a seat on the Traders' Panel (London Area) which will be represented at the forthcoming meetings of the Railway Rates Tribunal. Members who desire to raise any cases of anomalies or instances of unfair classification are invited to send particulars to the Association.

Fuel Economy and "Meldrum" Furnaces.—We are informed by Messrs. Meldrums, Ltd., of Timperley, that during the month of July no fewer than fourteen orders for forced-draught furnaces and six for destructors were received. It is also stated that the fitting of the forced-draught furnace to water-tube boilers has met with considerable success. The trouble of smoke from hand-fired W.T. boilers has long been a serious drawback, but this difficulty, state the firm, can now be definitely overcome by the "Meldrum" improved smoke-consuming system.

Preservatives in Food.—Mr. Tankard, city analyst of Hull, reading a paper on Friday (August 3), before the Medical Officers' Congress, on chemical preservatives in food, said that his own investigations had convinced him that chemical substances were used to an extent that must be harmful. He recommended that the addition of any preservative other than sugar or salt should be prohibited except in the cases of cream, potted meats, potted fish and sausages, and that in these cases the only preservative permitted should be boric acid or its sodium salt in quantities not to exceed 14 grains per pound.

Dyestuffs' Licences.—The total number of applications received by the Licensing Committee during July was 371, of which 264 were from merchants and dealers. To these should be added the 24 cases outstanding on July 1, making a total for the month of 395. These were dealt with as follows: Granted 246, of which 227 were dealt with within seven days of receipt. Referred to British makers of similar products 70, of which 66 were dealt with within seven days of receipt. Referred to reparation supplies available, 50, all dealt with within two days of receipt. Outstanding on July 31, 29. Of the total of 395 applications received, 336, or 85 per cent., were dealt with within four days of receipt.

The Dyestuffs Act and the Irish Free State.—The British Chemical and Dyestuffs Traders' Association in their Bulletin dated August 7, state: We are officially informed that, for the time being, the Safeguarding of Industries Act and the Dyestuffs (Import Regulation) Act will continue to be enforced by the Free State Customs. It is, however, likely that both these measures will be repealed by the Government of that country. No official news can be obtained as to any intention to introduce other and similar legislation in their place, but it is thought that in the case of the Safeguarding of Industries an Act will be brought forward entailing somewhat similar duties. In the case of the Dyestuffs Act, there are rumours that the Free State Government intend to allow the free import of all dyes from *all* sources. The Free State authorities have promised to advise us at the earliest moment of any changes and decisions on these matters.

Platinum in Russia.—A Reuter message from Moscow states that a decree has been issued making platinum a State monopoly.

Belgian Coal Exports Stopped.—It is reported from Brussels that the Government has made an order strictly prohibiting the export of Belgian coal.

Wages in the Dyeing Trade.—In accordance with an agreement made on November 18, 1919, a reduction has taken place in the rates of wages of dyers and finishers, dating from August 1.

White Lead Convention.—Mr. G. Locker-Lampson, replying to a question in the House of Commons last week, said that the Home Secretary hoped to be able to announce the decision of the Government in regard to the ratification of the Draft Convention on white lead when the House reassembled next November.

Confiscated German Dyestuffs Stored.—It is reported that the French occupation authorities, who recently confiscated the stocks of dyestuffs found in the German plants taken over in consequence of the Ruhr occupation, have decided to hold back, for the time being, the sale of the dyes, as it is not the desire of the French to overload the market.

Midland Glass Trade.—The continued increase in the imports of glass, and particularly illuminating glass, from the Continent is causing anxiety to British makers. The competition is acute, and it would appear hopeless to compete in many of the low-grade lines. The trade in laboratory glass, which British manufacturers are able most satisfactorily to produce, is badly affected by the over-running of the market with cheap foreign products. Stocks of high and medium quality glass are lower, and it is confidently hoped that in the autumn there may be a revival in buying.

Proposed Factories for Sugar Beet.—It is stated that negotiations are in progress for the establishment of a new beet-sugar factory at Southwold, Suffolk. A local syndicate have provisionally secured a site near the harbour, and arrangements are now being made for the supply of the necessary quantity of raw material from firms in the district. At a meeting of the Hales Owen branch of the National Farmers' Union, held on Friday of last week, consideration was given in the proposal to establish a sugar-beet factory in Worcestershire, and a resolution approving of the scheme was passed.

Death from Motor Spirit Fumes.—An inquest was held at Liverpool on Wednesday on Robert Lloyd (47), labourer, who was one of three workmen employed at a spirit distillery in Bank Hall Lane, where a new motor spirit, "Discol," recently put on the market, is stored for distribution in the Liverpool area. The tank in which it was kept was observed to be leaking into a well beneath, and the three men were sent to clear the well out. After some time Lloyd was found lying on his back, whilst the other two appeared ill. Later Lloyd died in hospital, medical evidence ascribing the death to methyl-alcohol poisoning following inhalation. A verdict of accidental death was recorded.

New American Diabetes Treatment.—The American Chemical Society announces the discovery by J. A. Willaman, associate professor of biochemistry in the University of Minnesota, of a substance derived from plants and appearing to have the properties of insulin. This material, which has been named "glucokinin," is widespread in the plant world, but its active extract is best prepared from yeast by a method which took a good deal of working out. It is claimed that glucokinin is as effective as insulin, but is much cheaper and is much less toxic. Successful results have been obtained on dogs and rabbits, but clinical tests have not as yet been made on human beings.

Bleaching Barytes. — Considering the large barytes resources of this country, and, indeed, of the British Empire, it is astonishing that more is not done to make the country totally independent of foreign supplies. The removal of colour and extremely fine grinding are the factors essential for success, and neither present any serious technical difficulty. Beyond all other opportunities, at the moment, to create employment, the intensive production of high-grade barytes at home would seem to be the most promising. A very good process which is decidedly simple to operate has been brought to our notice recently. It is the invention of a British subject resident abroad, and is, we are informed, already at work in this country bleaching china clay. We shall be glad to put barytes producers in contact with the originator.

Margarine Manufacture in Germany.—It is reported that the German margarine works, which for a great part are controlled by Dutch concerns, have decided to quote their prices and sell their products in Dutch currency.

German Lime Trade.—Germany produced 4,354,000 tons of lime in 1922, according to a U.S. Commerce Report. Of this, 239,045 tons was consumed in the manufacture of cyanamide, 315,412 tons in other chemical industries, and 544,543 tons in agriculture. The chemical industries also consumed 123,068 tons of crude calcareous products.

Canadian Chemical Developments.—According to a Board of Trade report, a prominent company at Chippewa, near Niagara Falls, proposes to enlarge its electric furnace plant by adding a furnace building to be used exclusively for the manufacture of a carbide of silicon abrasive known as Crystolon. The development will cost about 165,000dols. and ensure a 25 per cent. increase in production of this line.

Cardiff as Oil Port.—It is stated that a start is to be made shortly in laying down an oil storage plant at Cardiff Docks. The plans provide for the construction of four huge tanks on a site owned by the Great Western Railway Company close to the entrance to the Queen Alexandra Docks. Two of these tanks will have a ten-thousand-ton capacity, and the other two half that quantity. A capital of £500,000. is involved in the scheme. It is hoped to establish a large refinery for treating the crude oil at Cardiff Docks.

National Gas Exhibition.—Included in the list of exhibitors at the National Gas Exhibition, 1923, are the following: British Uralite and Callactite Works, British Furnaces, Ltd., British Commercial Gas Association, British Sulphate of Ammonia Federation, Ltd., City of Birmingham Gas Department, Consett Iron Co., Cannon Ironfoundries, Ltd., Chemical Engineering and Wiltons Furnaces, Ltd., Canning, W. and Co., Ltd., Foster Instrument Co., Ltd., Holmes, W. C. and Co., Ltd., Jackson Boilers, Ltd., Midland Tar Distillers, South Staffordshire Mond Gas Co., Ltd., Shell Mex, Ltd., Thermal Syndicate, Ltd., Woodhall, Duckham and Jones, Ltd., and the Welsbach Light Co., Ltd.

War Office and Commercial Motor Vehicles.—It is officially announced that, with a view to encouraging the use in commerce of a 30cwt. lorry, fitted with giant pneumatic tyres, the War Office will pay a subsidy of £40. a year to all purchasers of approved vehicles or chassis of British manufacture who enrol under the scheme, which entitles the War Department to purchase such vehicles in a national emergency at a price fixed by the agreement at the date of enrolment. Specifications of approved vehicles will be supplied to interested manufacturers, and copies of the subsidy agreement may be obtained from the Secretary of the War Office, Imperial House (Room 37), Tothill Street, London, S.W. 1.

Government and the Dyestuffs Industry.—The Committee of Public Accounts, in a report issued last week, states that grants amounting to £135,919. in all have been made by way of assistance to the dyestuffs industry. These payments were made under the scheme for granting State assistance to the dyestuffs industry as explained in the White Paper presented to Parliament in November, 1918. The scheme contemplated the allocation of £2,000,000. over a period of three years, partly in loans, partly in contributions in aid of extensions of plant and buildings, and partly in grants in aid of research. The Committee are informed that the total expenditure under the scheme up to date has amounted to £426,000., and they understand that the balance will not be required. In addition to this expenditure on grants and loans, a sum of £1,700,000. was invested by the Board of Trade in British dyestuff manufacturing companies in 1919-20 and previous years. The dividend on these investments shown on the Appropriation Account, 1921-22, as received in that year was only £44,496., as compared with £89,250. shown in the estimate. In the estimates for 1922-23 and 1923-24 no dividend is shown in respect of these investments.

OUR BOOKSHELF.

Catalysis in Organic Chemistry. By Paul Sabatier. Translated by Professor T. Emmet Reid. London: The Library Press, Ltd., 26, Portugal Street, W.C. 2. Pp. 406. Price 25s. net.

Organic chemists will be indebted to Professor Reid for his careful and thorough translation of Professor Sabatier's classic work. The translator himself, at present professor of organic chemistry at John Hopkins University, Baltimore, U.S.A., has made several important contributions to our knowledge of catalytic hydrogenation, and was especially fitted to undertake the task, which he has carried through very successfully. The short account of Paul Sabatier's life and work, as given by the translator in the introduction, is of considerable interest. The first chapter of the volume deals with catalysis in general, and is followed immediately by a comprehensive chapter on catalysts, which is an excellent general summary. The third chapter, dealing with the mechanism of catalysis, is theoretical in nature, and an illuminating extension has been added by the translator in the form of a section on the theory of catalysis written by Professor W. D. Bancroft, chairman of the Committee on Catalysis of the American National Research Council. Coming to the detailed section, the work deals with isomerisation, polymerisation, etc., catalytic oxidations, various substitutions in molecules, and hydrations. The all-important section on catalytic hydrogenation occupies five chapters covering 262 pages, the use of nickel as catalyst occupying, as is inevitable, the greater part of this section. Catalytic dehydrogenation, dehydration, decomposition of acids and esters of organic acids, and the elimination of halogen acids or similar molecules, are all important sections. The concluding chapter deals with the decomposition and condensation of hydrocarbons, whilst a valuable practical chapter on the hydrogenation of liquid fats, inserted as a supplement, completes the volume. For the convenience of the reader, the translator has prepared a subject index of some 7,000 entries and an author index of about 1,100 names. As a reliable translation of a classic work in chemistry the volume will be welcomed. No claim has been made by the translator that the whole of the progress made in the subject since Sabatier completed his work has been added. Thus the important recent work of Armstrong and Hilditch on the mechanism of the catalytic hydrogenation of oils in the presence of nickel is not referred to at all.

A Treatise on Chemistry. By the Rt. Hon Sir H. E. Roscoe, F.R.S., and C. Schorlemmer, F.R.S. New (sixth) edition completely revised by B. Mouat Jones and others. Vol. II., The Metals; Pts. I. and II. London, 1923: Macmillan and Co., Ltd. Pp. 1,564. Price 50s. net.

In the ten years that have elapsed since the publication of the fifth edition of this work, our knowledge of the chemistry of the metals and their compounds has greatly increased, and in our fundamental ideas of atomic and molecular structure, of valency, and of chemical affinity, and in the interpretation of the Periodic Law in particular, have great advances been made. As the amount of data that has been acquired in these newer branches of study is so enormous, the revisors have been well advised in not attempting to give a complete account of the new theories, but in maintaining the general style and character of the book. The introductory chapter on valency, the classification of the elements, atomic numbers, isotopes, atomic structure, and spectrum analysis, has been revised by Mr. L. J. Hudleston, and Mr. T. V. Barker has again dealt with the section on crystallography. Metals of Groups I. and II. have been brought up to date by Professor H. A. V. Briscoe; alkali manufacture by Professor J. R. Partington; groups III. and V. by Dr. H. F. V. Little; the rare earth metals and those of the titanium group by Professor J. F. Spencer; group VI. by Mr. A. A. Eldridge; the germanium group and manganese by Mr. C. R. Bury; group VIII. by Dr. O. R. Howell; while Professor C. O. Bannister has once more revised the metallurgical portions and Dr. Makower the section on the radioactive elements. For the purpose of convenience in handling and binding, the book has been divided into two separate volumes, but the pagination is continuous. Roscoe and Schorlemmer's treatise is too well known to demand either detailed criticism or review of contents. It occupies a unique position, in so much as it gives an encyclopædic survey of all the important facts and theories of inorganic chemistry in a manner which is at once attractive and conducive to easy reference. Possessing none of the formidableness, it is as comprehensive in vital facts as the majority of treatises of this type. This latest edition is excellently produced, and, to use the hackneyed phrase which best describes its worth, fully maintains the high traditions of the five previous editions.

PARLIAMENTARY NEWS.

Importation of Perfumed Spirits.

In the House of Commons on Tuesday, July 31, Sir W. Joynson-Hicks, replying to Mr. F. Gray, said: Under the general Customs law, perfumed spirits may be imported through the parcels and insured box posts, but not by sample or letter post. Such goods imported by the latter methods are liable to forfeiture and may be subjected to fines or returned to the country of export. The object of these provisions is to safeguard the revenue, and they are in accordance with the Regulations of the International Postal Union which are operative in all countries within the Union. Suitable action is taken by the Customs authorities in all cases of infringement brought to their notice.

Oil from Russia.

Sir P. Lloyd-Greame, replying to Captain Moreing, said: The imports of petroleum into the United Kingdom, consigned from Russia during the two years 1921 and 1922, amounted to 10,480,601 gallons, of which 9,081,555 gallons were from Batum and none from Novorossisk. I am unable to say how much of the petroleum was produced from wells owned or developed by English capital.

Merchandise Marks Bill.

Sir P. Lloyd-Greame, replying to Mr. Hannon, said: I regret that considerations of Parliamentary time have rendered it impossible up to the present to proceed with this measure. The question of a suitable time for the introduction of a Bill is at present under consideration, but I fear it will not be possible to proceed with it during the autumn session.

Sulphate of Ammonia.

Mr. Shinwell asked the President of the Board of Trade whether he is aware that sulphate of ammonia for export from the Clyde is not being weighed and checked, and that sealed samples are no longer taken; and whether, since this is contrary to custom, he proposes to take action in the matter?

Viscount Wolmer: The official control of the export of sulphate of ammonia, which was instituted during the war, is now at an end. The export is, accordingly, subject only to the ordinary Customs Regulations, and I have no reason to think that these regulations are not being observed. The hon. member appears to be referring to certain trade arrangements, over which the Board of Trade have no control.

Foreign Trade of the Irish Free State.

Mr. Hannon asked the President of the Board of Trade whether he is in a position to give the figures for the direct trade of the Irish Free State with countries other than Great Britain for the quarter ended June 30, 1923; whether any arrangement has been made with the Irish Free State for the publication of these figures, so necessary for accurate comparisons of the periodic movements of trade; and, if so, when the figures will be available?

Lieut-Colonel Buckley: It is understood to be the intention of the authorities of the Irish Free State to publish particulars of the trade between that State and other countries. I am not in a position to say when publication will begin.

Lead Poisoning in Industry.

Lord H. Cavendish-Bentinck asked the Home Secretary if his attention has been drawn to the high incidence of lead poisoning in electric accumulator works; if he is aware that the *Ministry of Labour Gazette* reports 14 cases in May and 22 in June; and whether, in view of the fact that strong regulations for the protection of workers in this occupation exist, he will consider the desirability of appointing additional inspectors to find out whether these regulations are being properly carried out and, if so, whether new regulations are required?

Mr. Bridgeman: Most of the cases in question (10 in May and 19 in June) were reported from two works at which there had been a sudden increase of orders and work had been carried on under conditions which, though not involving any breach of the regulations, were unsatisfactory. The matter has been taken up strongly with the firms, both of whom are re-organising the departments affected. The cases occurred mostly amongst workers newly engaged and, I am glad to learn, have not been serious in character. Apart from these cases, however, the Factory Department has for some time been dissatisfied with the results obtained under the existing regulations, and a special inquiry was commenced some time ago, with a view to ascertaining in what respects the regulations might require strengthening. This inquiry has now been completed and further action will be considered in the light of its results. No ground has arisen for the appointment of additional inspectors. The works in question have been regularly visited by the district staff, and a number of special visits have been paid by the technical officers engaged in the inquiry. The chief inspector is satisfied that the increase of lead poisoning cases in these works is not attributable in any way to any lack of inspection.

CORRESPONDENCE.

**** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

CARBIDE PRODUCTION IN SOUTH AFRICA.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Our attention has been called to a paragraph in your issue of July 27, headed "Carbide Production in South Africa." We would like to point out to you that the paragraph in question is not accurate in stating that the Rand Carbide, Ltd., is the present sole manufacturer of carbide in South Africa. The South African Carbide and By-products Co., Ltd., owns a factory at Ballengeich, Natal, which was completed early in 1922. It is equipped with all the most modern and up-to-date plant for the manufacture of calcium carbide, including its own power-station, and is designed for an output of some 4,000 tons per annum.—Yours, etc.,

Thomas Ogden, Secretary,
South African Carbide and By-products Company, Ltd.
13, St. Helen's Place,
London, E.C. 3,
August 1, 1923.

SOUTH WALES NOTES.

[Specially Contributed.]

Owing to the scarcity of orders for forward delivery the majority of the tinplate works ceased work for the full week, and in some cases a little longer. There is a general idea that this industry will meet with much improvement in the near future, however, and the stabilisation of selling prices has a very steady effect upon the market. Patent fuel makers find new business rather quiet, and owing to the better supply of small coals are accepting somewhat lower figures. Some of the factories were on stop only for two days. Cokes are again in strong demand, and important inquiries from Belgium and Germany for supplies over the remaining portion of the year have been received. By-products are selling very well and the outlook is considered good. Among the imports to Cardiff were 920 gallons acetic acid from Rotterdam; Swansea imports included 26 tons zinc ashes from Nantes, 3 tons calcium carbide from Dalmatia, 998 tons iron pyrites from Pomaron, and 19cwt. soda ash from Haugesund. The exports included 5 tons dynamite to La Jueira from Cardiff.

PUBLICATIONS RECEIVED.

The Manufacture of Portland Cement from Marl.—By Raymond E. Kirk. Bulletin No. 2 of the Engineering Experiment Station of the University of Minnesota, Minneapolis.

"Tolerances" on Chemical Specifications.—Pamphlet No. 50, issued for the British Chemical Standards Movement, by Messrs. Ridsdale and Co., 3, Wilson Street, Middlesbrough.

FERTILISER NEWS.

Nitrate of Soda.—Signs are not wanting, apart from the flight of the German mark, quoted at the time of writing, at 25 million to the £ sterling, that affairs in Europe are rapidly approaching a crisis. The situation, therefore, so far as nitrate of soda is concerned is of great interest, for it is difficult to foresee what effect the currency collapse in Germany may have. As things are at present, of course, the chaotic state of most of the continental exchanges precludes business of any large dimensions, and the nitrate market is very quiet. Already there is talk of the repudiation of the German currency, and the substitution of a stabilised and rational medium of exchange, which, if accompanied by a sufficiently powerful Government, might result in the re-entry of Germany as a purchaser of Chilean nitrate. This however, is but a remote possibility, and it is more likely that, so far from there being an improved demand for the Chilean fertiliser, there will be a piling up of stocks consequent on the very heavy shipments now being made to Europe and Egypt. The market in the United States is nothing like as promising as it was during last season, so that producers are looking more in this direction for further orders. The past month was disappointing in the paucity of inquiry, the Association having booked orders to the extent of 13,000 or 14,000 tons only, bringing the total sales for the current season up to about 900,000 tons. With reference to the statistics for July, it is now ascertained that actual shipments of nitrate from Chile during the month exceed the estimated figures dealt with in this column last week, and the cabled corrections show the quota for Europe to be 99,000 tons, for the United States, 71,000 tons, and for other countries not separately specified, 24,000 tons. The altered figure for exports, therefore, amounts to 194,000 tons, compared with the 171,000 tons previously estimated. A compensating fact in this connection, however, is that the production total for June has also been amended from 153,000 tons to 166,0000 tons, and when it is remembered that production is being steadily increased, it may be taken for granted that the present estimated figure of 162,000 tons for July will be rather short of the mark. This being so, the heavy stocks on the West Coast are not likely to be below the million ton figure spoken of last week.

Sulphate of Ammonia.—Despite the comparatively heavy exportation of this fertiliser during the first half of the year, the greatly increased production consequent on the activity in the iron and steel industries has led to the formation of considerable stocks. In order to work off these stocks, and taking advantage of the excellent harvest prospects in this country, it has been decided to reduce prices. Accordingly, the Sulphate of Ammonia Federation have lowered the quotation for 25¾ per cent. neutral material by 10s. per ton to £14. 5s. until the 18th inst. After that date, and until the end of September, the official price will be £14. 10s., the conditions of sale being identical with those affecting the last reduction in prices. As is only just, the Federation are refunding to buyers who have already purchased sulphate at the previously announced rates, the difference of 10s. per ton. It is declared that no further reduction in the prices for home consumers will be made, on the contrary, the usual practice of following a gradually rising scale will be adhered to. This further effort to secure the goodwill and custom of the home farmer should meet with success at a time when the prospects for British agriculture are better than for many months past. Certain it is that if the superior fertilising value of sulphate over any other nitrogenous fertiliser at present prices was only fully realised by the ultimate consumer, the home demand would become more active than ever. Production in America continues on a large scale, but most of the output is going into consumption, domestic buyers having contracted for almost the entire quantity. The labour troubles of last year not only curtailed exportation during the earlier part of the current year, but reduced stocks to vanishing point, so that up to the present time, the surplus available for export has been very small. Small quantities have gone abroad, it is true, but at a price which gives the British product a considerable advantage. In Japan, the situation is not at all clear, and the market now has a tendency to be sluggish. A correspondent in Osaka informs us that under the influence of the heavy decline in the raw-silk market, the demand for nitrogenous fertilisers has decreased considerably, while material bought early in the year at higher prices is now arriving, and tending to weaken the market. The Japanese product was quoted at 200 yen per ton towards the end of June, while foreign material due to arrive was much lower at about 185 yen. Under these conditions, consumers are awaiting further developments.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

It is satisfactory that while the iron, steel, and iron-ore industries on the North-west coast are depressed, and even the coal trade has become duller, the coke industry maintains the activity which it has exhibited during the past three months. So far, however, there has been no shading of coal prices, and it is difficult to see how any concession can be granted, except under the stress of severe competition, as it is notorious that the losses being sustained by the Cumberland collieries are still very large. Some diminution in the requirements is due to the closing down of so many iron ore mines, and that in turn has been caused by the smelting of a smaller tonnage of iron and the rolling of less railway material. It is almost impossible to estimate prospects in the iron trade, though it should be stated that there is now a feeling that the present production can be maintained and that possibly some improvement may be witnessed before the middle of October. What is wanted above everything else is a revival in the steel trade, for when the rail mills are working the local consumption of ordinary iron, in the smelting of which the local coke is used, is very large. Activity at the merchant plants has not the same value for the coke trade as at the furnaces making for the steelworks. In all the circumstances, therefore, the position as it concerns the coking industry is far from being unsatisfactory. The plants at Oughterside, Flimby, Allerdale, Lowca, and St. Helens are all getting rid of their output, and most of it, too, to the furnaces in West Cumberland, at 29s. to 33s., according to carbon content. There is a good inquiry from the Continent, at 34s. to 40s. per ton, f.o.b., and parcels are being shipped regularly to Hamburg and Antwerp. The Continental trade is very valuable at this present juncture, and the expectations are that it will be at command for a few months longer. Residuals are a fair trade. The whole of the tar is going to the chemical works. Crude benzol is in steady demand, and the make of sulphate of ammonia is being absorbed. Road tar is quiet. East Coast coke supplies this week are 8,100 tons.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," August 11, 1888.)

A New Industry for Widnes.—Residents in Widnes will be pleased to hear that they are within measurable distance, not of the annihilation of waste heaps, but of their decrease, and at the same time the manufacturers are to be congratulated in the almost certain success which must necessarily follow, from their attempts to turn the alkali waste into gold. Some time ago we referred to Chance's process for extracting the sulphur from alkali waste, which left a residue of carbonate of lime still to be deposited somewhere. We pointed out at the time that this residuum was the safety-valve of the Leblanc process, whereby all impurities were let out, and it was folly to think of ever using it over and over again in the process of making black-ash balls. A new solution has been found for the problem, which is being energetically acted upon. It has been found that the residue from Chance's sulphur recovery process, and also the lime sludge from the manufacture of caustic soda, are most suitable materials for the manufacture of a high-class Portland cement, and a company with £150,000. capital is in course of formation to erect works with this object in view in the town of Widnes. It is projected to build the works on waste land adjoining the river and having easy access to the Ship Canal, in the construction of which enormous quantities of cement must necessarily be used. In all probability the new works will receive the caustic sludge and the Chance waste from those alkali works using a process, several works being now busy erecting the new plant, and, in addition, will be in a position to grant licences to use, to other manufacturers situated at a distance. After years of trade depression through which the town has passed, it is encouraging to see a prospect of satisfactorily turning waste to profitable account, and establishing an industry which will give employment to so many hands.

Index to Advertisers.

	PAGE
Allen, Marcus & Sons, Ltd.	18
Australian Alum Co., Ltd.	27
Bakers (Leeds) Ltd.	9
Baldwin, J., and Co.	5
Barter Trading Corporation, Ltd.	33
Bayley, F. S., Clanahan & Co.	27, 32
Benker & Millberg	5
Berk, F. W., and Co., Ltd.	11
Blackwell, G. G., Sons & Co., Ltd.	1
Blagden, V., and Co., Ltd.	2
Blair, Campbell & McLean, Ltd	1, 14
Blythe, Wm., and Co., Ltd.	24
Boake, A., Roberts & Co. Ltd.	1, i
Borax Consolidated, Ltd.	1, 31
Bottomley, J. C., and Emerson, Ltd.	32
Braby, F., and Co., Ltd.	6
British Hydrogen Co., Ltd.	1
British Oxygen Co., Ltd.	43
Brothers Chemical Co. (1922) Ltd.	32
Brotherton & Co., Ltd.	20, 34, 35
Brown, H, G., and Co.	9
Brown, J. M.	34, 35
Bruce, W. T., and Co.	34
Brunner, Mond & Co., Ltd.	42
Buckley Brick and Tile Co., Ltd.	31
Burton, Baker & Co.	29
Burton, Wm., and Sons. Ltd.	43
Bush, Beach & Gent, Ltd	17
Buyer's Guide	36, 37, 38, 39
Cannington, Shaw & Co., Ltd.	5
Capper, Pass & Son, Ltd.	1, 35
Castner, Kellner Alkali Co., Ltd.	41
Centrifugal Separators, Ltd.	9
Chance & Hunt, Ltd.	13
Christie & Co.	33
Christopherson, C., & Co.	4
Collett, J. M., and Co., Ltd.	35
Compagnie Commerciale du Nord	33
Cortin, J., Ltd.	2
Crone & Taylor, Ltd.	23
Crook, W. J.	39
Cruickshank, R., Ltd.	30
Daglish, R., and Co., Ltd	1
Dekker, Jan.	34
Douglas, W., and Sons, Ltd.	8
Electro Bleach and By-Products, Ltd	8
Elektrokemiska Akt.	22
Everitt & Co., Ltd.	32
Fletcher, Geo., and Co. Ltd.	3
Follows & Bate, Ltd.	43
Frickers Metal Co., Ltd.	24, 34
Fuller, W M., junr.	5
Gardner, H., and Co., Ltd.	17
Gardner, William and Sons, Ltd.	40
Garroway, R. & J.	6
Gibbons, Robert	34
Grey & Martin, Ltd.	31
Griffiths Bros. & Co. (London) Ltd.	1
Guthrie & Co.	8
Hadfield, J., & Co.	1
Hallams Ltd.	34
Harrison Blair & Co., Ltd.	39
Harrison, W., and Co , Ltd.	35
Hathern Station Brick and Terra Cotta Co., Ltd.	7
Haughton's Patent Metallic Packing Co., Ltd.	25
Heymann, Harry	iv
Hind & Lund, Ltd.	9
Holman, Michell & Co., Ltd.	33
Honeywill Bros. Ltd.	22
Houlder, W., Son & Co.	32
Huncoat Plastic Brick Works	7
Hunt, J. T., and Son, Ltd.	34
Huntington, Heberlein & Co., Ltd.	22
Igranic Electric Co., Ltd.	24
International Electrolytic Plant Co., Ltd.	7
Jenkyns, Claudius,P.	iii
Johnson & Sons Manufacturing Chemists, Ltd.	12
Johnson, S. H., and Co., Ltd.	40
Keeling's Oxides (1921), Ltd.	22
Keeling and Walker Ltd.	35
Kenyon, Wm., & Sons, Ltd.	11
Kestner Evap. and Eng. Co., Ltd.	v
Lankshear Wickstead & Co., Ltd.	34
Le Bas, Ed., and Co., Ltd.	8
Leigh, R. & H., and Sons, Ltd.	2, 44
Leitch, J. W., and Co., Ltd.	14
Lennox Foundry Co., Ltd.	30
Locke, Blackett & Co., Ltd.	43
Lowe, Chas, and Co.	27
Major & Co., Ltd.	3
Manchester Oxide Co., Ltd.	29
Manlove, Alliott & Co., Ltd.	28
Mann, Egerton & Co., Ltd.	4
Mason, A., and Sons, Ltd.	5
May & Baker, Ltd.	1, 26
McCarthy, H. J., Ltd.	21
McKechnie Bros., Ltd.	34
Meldrums Ltd.	41
Merchant Trading Co. Ltd.	15
Metal & General Agency	iv
Metcalfe, Wm., Ltd.	35
Neill, W., and Son, Ltd.	1
Newcastle Alloy Co., Ltd.	32
Oxley's Dyes and Chemicals, Ltd	11
Page, C., and Co., Ltd.	6, 26
Patent Hygienic Strainer Co,	7
Paus & Paus	30
Perry and Hope, Ltd.	32, 35
Petri Bros.	21
Porritt Bro. & Austin, Ltd.	33
Potter, E. P., & Co., Ltd.	32
Ransome, A,, and Co,	26
Rare Metals Ltd.	35
Reeve Angel, H., and Co. Ltd.	3
Riley, W.	35
Riley, J., and Sons, Ltd.	41
Ritchie-Atlas Eng. Co.	11
Rose, J. L.	34
Royal Worcester Porcelain Co.	4
Sachs Charles	i
Salamon & Co., Ltd.	29
Scales, W. T., and Co., Ltd.	43
Sheffield Chemical Co., Ltd.	32
Sherman, J., & Co., Ltd.	11
Shields & Ramsay, Ltd.	19
Simon, R., and Sons, Ltd.	5
Sofnol Ltd.	vi
South Metropolitan Gas Co.	10
Spencer, Chapman and Messel, Ltd.	21
Spence, P., and Sons, Ltd.	8
S.S. Mond Gas Co., Ltd.	30
Staniar, J. & Co.	34
Statham, J., and Sons	10
Staveley Coal and Iron Co., Ltd.	25
Steel Barrel Co., Ltd.	vi
Stora Kopparbergs Agency Ltd.	4
Sturge, J. & E., Ltd.	35
Sturtevant Engineering Co., Ltd.	27
Taylor, J., and Co.	43
Todd Bros.	30
Townsend, J., Ltd.	6
Varley, J., and Co., Ltd.	16
Vickers, Ltd.	23
Waller, G., and Son	33
Warrington Chemical & Drug Co., Ltd.	35
Ward, Thos., W., Ltd.	15
Washington Chemical Co., Ltd.	37
Watson, H. T.	iii
Waugh, W., and Co.	40
Western Chemical Co. (Paisley) Ltd.	6
White, J. & J., Ltd.	4
White, R., and Sons	32
Widnes Foundry Co., Ltd.	18
Wilkinson, Jas., and Son	40
Willcocks, H. S., and Co., Ltd.	26
Winser & Co.	iv
Womersley, A., and Son	32

REPORTS OF COMPANIES.

J. and J. Cunningham, Ltd.

The profits for the year to June 30 last were well maintained, the net surplus at £21,700, comparing with £21,400, for the previous year, while, including the sum brought in, the disposable balance is £1,700, higher at £42,900. As for each of the two preceding years the dividend on the ordinary shares is 5 per cent., free of tax, and the balance of £22,900, is carried forward, as compared with £21,200, brought in. In addition to a reserve fund of £35,000., there is a works reserve of £40,000, and a special reserve fund for preference dividend of £18,000., making total reserves £93,000.

Diamond Match Company.

Statement for six months to June 30 shows gross profit $2,251,427. Deducting State and city taxes, $170,478., depreciation and amortisation, etc., $584,570., insurance reserve, $100,000., interest on deferred timber payment, $29,343., and bond interest, discount, and premium, $289,701., leaves net profits $1,077,334. Reserve for Federal taxes absorbs $173,602., leaving $903,732, plus balance brought in, making $4,616,082. Deducting dividends, $678,604., leaves balance at June 30 $3,937,478.

DIVIDENDS.

Broken Hill Proprietary Co., Ltd.—Net loss for the year ending May 31, 1923, £106,086. 0s. 11d., after allowing for depreciation £155,304., and £131,277. debenture interest.

W. T. Henley's Telegraph Works Co., Ltd.—Dividend on preference shares at rate of 4½ per cent. per annum, less tax, for half-year to June 30 last; also interim dividend on ordinary of 1s. per share, less tax.

Dublin and Wicklow Manure Co., Ltd.—Preference dividend and dividend of 2½ per cent. on ordinary for year ended June 30, 1923.

United Turkey Red Co., Ltd.—It is proposed to pay the arrears of preference dividend up to date.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Australia.

A manufacturers' agent in Sydney desires to be placed in communication with British manufacturers of drugs and chemists' sundries. He wishes appointment, on a commission basis, for Australia, and is said to have a good connection among wholesale chemists throughout the Commonwealth. (Ref. No. 126.)

Barbados.

A commission agent in Barbados, who already represents some British manufacturers of fertilisers, etc., desires to secure the representation for Barbados of British exporters of lard-compound, matches, etc. (Ref. No. 134.)

Argentina.

A firm in Buenos Aires, with headquarters in Asuncion (Paraguay), wish to obtain connections with British importers of essence of petit grain, etc. (Ref. No. 158.)

NEW COMPANIES.

Lintox, Ltd.—Capital £100. Manufacturers of and dealers in chemicals and chemical preparations, etc. Office: 36, King Street, Cheapside, E.C.

Pattison's Combustion Product Plant, Ltd.—Capital £15,000., in 12,000 6 per cent. cum. part pref. shares of £1., and 30,000 ordinary shares of 2s. Director: C. M. Pattison, Cefn-Coed, Merthyr Tydfil.

Coxeter and Son, Ltd.—Private company. Capital £8,000., in 7,000 preference shares of £1. and 20,000 deferred shares of 1s. Manufacturers of and dealers in scientific instruments and apparatus, etc. Office: 171-175, Pancras Road, N.W. 1.

Ellis and Sons (1923), Ltd.—Private company. Capital £20,100. To acquire any secret or other information, process, or formula in respect of or in connection with the utilisation of waste materials, etc. H. A. King (managing director), 7, Cyprus Avenue, Finchley, N. 3.

Kirkland Iron Ore Co., Ltd.—Private company. Capital £5,000. Office: Bank Chambers, Lowther Street, Whitehaven.

Waipuna Kauri Gum Co., Ltd.—Private company. Capital £90,000., £1. shares (60,000 10 per cent. non-cum. preferred ordinary and 30,000 ordinary). Office: Winchester House, Old Broad Street, E.C.

Houston and Wallace, Ltd.—Private company. Capital £4,000. Oil and fat refiners. Office: 183, West George Street, Glasgow.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Cambrian Electrolytic Zinc Company, Ltd., London, E.C.—Registered July 19, £10,000. debs. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £3,000.

Cellulose Holdings and Investment Company, Ltd., London, E.C.—Registered July 16, Trust Deed dated June 28, 1923 (supplemental to Trust Deed dated October 18, 1922), securing £750,000. deb. stock (including £500,000. secured by original deed), and premium of 20 per cent. on redemption.

Central Cornwall China Clay Company, Ltd., St. Blazey.—Registered July 20, £3,200. debs., part of £25,000.

Chemical Engineering and Wilton's Patent Furnace Company, Ltd., London, S.W.—Registered July 12, £3,000. debs. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £2,000.; also registered July 20, £500. debs. part of £3,000.

Hydrogen, Oxygen and Plant Company, Ltd., London, E.C.—Registered July 13, £35,000. 2nd debs. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £14,800.

Manufacturing Concrete Works, Ltd., London, S.W.—Registered July 16, £5,000. debs.

Sydbie, Ltd., London, E.C., glass manufacturers.—Registered July 18, £5,300. deb., to Baron Somers, Eastnor Castle, near Ledbury.

Tidy Betty, Ltd., Leeds, stove polish manufacturers.—Registered July 17, £1,250 deb., to J. H. Broughton, Ferrybridge.

Western Laboratories, Ltd., London, W., celluloid manufacturers.—Registered July 14, £350. mort., to Cheltenham and Gloucester Building Society.

SATISFACTIONS.

Marley Hill Chemical Company, Ltd.—Satisfaction registered July 24, £2,500., part of amount registered January 4, 1921.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Degreasing Company, Ltd., Dewsbury.—Resolved June 28, confirmed July 20, that the company be voluntarily wound up. W. H. Shaw, Market Place, Dewsbury, liquidator.

North of Ireland Chemical Company, Ltd.—Meeting of creditors held at R. Bell's, 2, Wellington Place, Belfast, on August 1. N.B.—This meeting was called to comply with the provisions of the Companies (Consolidation) Act, 1908, and was a formal meeting, as all creditors have been or will be paid in full, consequent on the acquisition of the company's business by the Belfast Corporation.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Grice, H., Westlyn, Quarry Bank; analyst; £51. 18s. June 11.

Hutchinson, J. A., Holton Chemical Works, Bolton; chemical manufacturer; £11. 3s. June 20.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

July 23 to 28 (inclusive).

Film Mills for Emulsification of Liquids, etc., and for Grinding Coal, Pitch, etc. Barradell, L.; Carter, Ltd., J. H.; and May, C. 19,142.
Vulcanisation of Caoutchouc. British Dyestuffs Corporation, Ltd.; Hailwood, A. J.; and Lefebure, V. 19,197.
Soaking Liquors for Dried Hides. British Leather Manufacturers' Research Association; Lloyd, D. J.; and Pickard, R. H. 19,312.
Acid-resisting Cements. Calder, W. A. S.; Chance and Hunt, Ltd.; Gidden, W .T.; and Maudsley, R. T. 19,223.
Vulcanisation of Caoutchouc. Chatelan, J. 19,311.
Centrifugal Separators for Dehydrating Oil. De Laval Chadburn Co., Ltd.; and Johnstone, H. 19,091.
Treatment of Ammonium Chloride Lyes in Iron Vessels. Henkel et Cie.; and Weber, W. 19,218.
Desulphurising Shale Distillates. Hocking, C. M. 18,988.
Production of Argon. Jackson, W. J. Mellersh-. (*Soc. l'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude*). 18,911.
Distillation of Coal. Jones, F. W. Salisbury-. 18,899.
Dyeing Cellulose Acetate. Kilby, W.; and Morton Sundour Fabrics, Ltd. 19,261.
Extracting Tars and Gases from Bitumen-containing Materials. Klötzer, M. 18,947.
Apparatus for Elevating Liquids. Knight, H. M. 19,190.
Viscose. Lilienfeld, L. 19,027.
Nitrate of Potassium. Michael and Co., J. 19,229.
Tanning Extract. Moeller, W. 19,294.
Non-peroxidising Ether. Naamlooze Vennootschap Nederlandsche Gisten Spiritus Fabriek. 19,012.
Chemically Pure, Toxic Free, Narcotising Ether. Naamlooze Vennootschap Nederlandsche Gisten Spiritus Fabriek. 19,026.
Acid-proof Articles from Diatomic Earth. Ohlsen, J. U. A. 19,071.
Bauxite Cements. Patrouilleau, L. G. 18,940.
Separation of Solids from Liquids. Peet, R. F. O'D. 19,256.
Vulcanisation of Rubber. Pirelli and Co. 19,225.
Dyeing. Plauson's (Parent Co.), Ltd. (*Plauson*). 19,067.
Condensation Products. Pollak, F. 18,929.
Phosphorescence in Luminous Paints. Risler, J. 19,333.
Separating Particles of Metal from a Mixture. Schmidt, K. 19,208.
Cooling Gases During Condensation. Schmied, W. 19,170.
Cooling Incandescent Coke. Sulzer Brothers, Ltd. 18,896.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1922.

Titanium Compounds. Llewellyn, W. B.; Spence, H.; and Spence and Sons, Ltd., P. 1,413. **200,848**
Anthraquinone Sulphonic Acids. Thomas J.; and Scottish Dyes, Ltd. 1,575. **200,851**
Treating Ores and Concentrates to Convert them into Sulphates. Read, J. B.; and Coolbaugh, M. F. 1,577. **200,852**
Vulcanisation of Rubber. Naugatuck Chemical Co. 1,594. **180,978**
Prevention of Evaporation of Stored Liquids. Wade, H. (*Standard Oil Co.*). 2,436. **200,855**
Dyeing and Printing Acetyl-silk. Green, A. G.; Saunders, K. H.; and British Dyestuffs Corporation, Ltd. 7,980. **200,873**
Treating Cellulose Acetate before Dyeing. Soc. Chimique des Usines Du Rhone. 10,991. **192,994**
Cyanides. Marks, E. C. R. (*Du Pont de Nemours and Co., E. I.*) 11,022. **200,902**
Abrasive and Fire-resting Material. Bourdeau, L. E. 11,039. **200,903**
Bringing Liquids and Gases into Contact. Soc. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. 11,169. **178,852**
Plastic Materials. British Cellulose and Chemical Manufacturing Co., Ltd.; Small, F. T.; and Dickie, W. A. 11,257. **200,922**
Continuous Dehydration and Distillation of Tar or Oils. Wilton, T. O. 11,486. **200,933**
Removal of Chlorides from Milk. Puglia, Dr. J. and Meunier, C. 11,489. **179,919**
Drying Coal. Steen, T. 11,718. **200,937**
Dyes and Stains from Xanthorrhœa Gums. Moulder, C. H.; and Gulley, F. P. 11,990. **200,942**
Protection of Copper and Its Alloys from Oxidation or Corrosion. Muntz, Sir G. A. 12,040. **200,944**
Packing or Filling Material for Reaction Chambers, Towers, Absorption Chambers, and the Like. Schaefer, C. 12,516. **200,956**
Extraction of Oils or Fats from Oleaginous Vegetable Matter. Cellulose et Papiers, Soc. de Recherches et d'Applications. 12,952. **179,931**
Formic Aldehyde. Heinemann, A. 13,340. **179,951**
Tanning Process. Lauro, A. G. 15,575. **200,979**
Treating Substances Liable to Oxidation by the Action of Air. Moureu, C.; and Dufraisse, C. 15,482. **181,365**
Priming Compositions. Rathsburg, Dr. H. 18,060. **201,009**
Aromatic Aldehydes. Barrett Co. 28,836. **189,107**
Calcium Salt of Acetyl Salicylic Acid. Soc. Chimique des Usines du Rhône. 31,384. **190,123**

1923.

Washing Sand. Peebles, J. 1,392. **201,108**
Artificial Resins. Holzverkohlungs-Industrie Akt.-Ges. 8,750. **196,265**
Automatically Emptying Mixing-machines Having Pans with Rotating Bottoms. Baker, Sons, and Perkins, Ltd., J.; and Soc. Anon. des Anciens Etablissements A. Savy Jeanjean et Cie. 5,865. **195,601**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1922.

Separating the Vapours of Volatile Liquids from Gases. Bregeat, J. H. 25,711. **201,119**
Evaporating, Concentrating, Distilling, or Like Apparatus. Soc. des Condenseurs Delas. 28,971. **201,123**

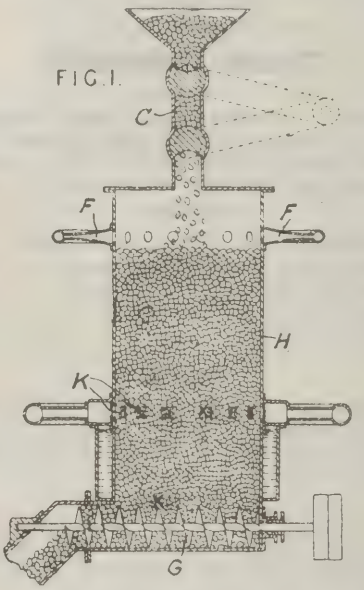
1923.

Calcium Oxalate from Trees. Bhopal Produce Trust, Ltd. 1,774. **201,131**
Evaporating-apparatus. Lillie, S. M. 4,239. **201,134**
New Azo-dyes. Farbenfabriken vorm. F. Bayer and Co. 15,548. **201,150**
Highly Active Charcoal. Farbwerke vorm. Meister, Lucius, and Brüning. 18,092. **201,163**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Distillation Plant. Plauson's (Parent Co.), Ltd., London. (H. Plauson, Hamburg, Germany.) British Patent, **198,705**, of 1921.

Oils, bitumens and resins are obtained from shale, oil-bearing sands, bleaching earths, peat, lignite, coal or wood, by effecting distillation of the materials in a current of steam or inert gas such as carbon dioxide moving at a high velocity of the order of 100 metres per second and upwards. The temperature is below the ordinary temperature of decomposition of the materials. A small quantity of solvent such as benzine, benzol, etc., may be added to the steam or inert gas. The material, for example, oil shale, may be passed down a vertical cylinder H, Fig. 1, from a feed device C to a discharge-worm G. Steam which may be superheated to



about 350° C. and under a pressure of 3.5 atmospheres is fed through a ring-shaped device having nozzles F such as are used in steam turbines, and expands to form a stream moving at about 500 metres per sec. Steam and entrained matters pass away through slits K, protected by wire netting. The lower part of the cylinder H is surrounded by a cooling-jacket in which water is preheated for use as boiler feed. A horizontal cylinder through which the material is fed by a worm, may be used. Steam is supplied through a single nozzle near the outlet, and passes with the material from the outlet. Bituminous coal yields a product containing Montan wax and a petroleum jelly. In treating peat at 375-400° C., tar oils, wax, methyl alcohol, acetic acid and acetone are obtained. In treating roots and resinous woods under vacuum at about 220° C., turpentine, resin and a small amount of resin oil are obtained. The wood may be afterwards treated with steam at about 300-380° C. to yield methyl alcohol, acetic acid, acetone and tar oils.

Preserving Wood. W. Carpmael, London. (Chemische Fabriken vorm. Weiler-ter Meer, Uerdingen, Germany.) British Patent, **198,825,** of 1922.

Wood is impregnated with a composition comprising an inorganic salt, an organic nitro-compound, and a basic or other compound of a bivalent metal of the ammonium sulphide group—namely, zinc, manganese, nickel and cobalt. In examples, sodium fluoride, sodium sulphate, and magnesium chloride; dinitrophenol, sodium dinitrophenate, dinitro-o-cresol, and basilite (a mixture of anilinedinitrophenate and sodium fluoride); zinc oxide, zinc carbonate, zinc sulphate, and nickel carbonate, are specified.

Electrolytic Production of Glyoxylic Acid. E. C. R. Marks. London. (Royal Baking Powder Co., New York, U.S.A.) British Patent, **198,855,** of 1922.

In apparatus of the type in which the cathode is constituted by a film of mercury supported by diaphragms 35, Fig. 3, the electrolyte is introduced through a series of openings 58 in conduits 56, 57 so as to impinge against the outer edges of the diaphragms, and flows to a central space between the diaphragms whence it is led away by a pipe 59. Each diaphragm is provided with a central depression 41, Fig. 4, housing a spider 42 at the end of an electric connection 43 enclosed in a glass or porcelain tube 44. A number of diaphragms are arranged the length of the cell and are supported by shoulders on insertions 38 in the walls 15 and at their contiguous rims by transverse members.

FIG.3.

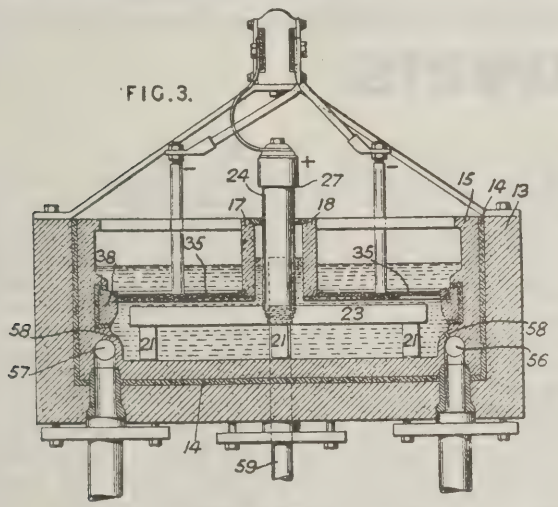
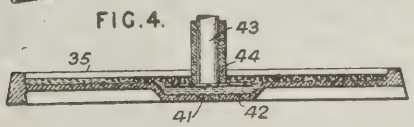


FIG.4.



Slabs 17, 18 of slate or other insulating material running the length of the cell and forming the central chamber, are supported at the ends by standards. Graphite or other anodes 23 are supported by blocks 21 and are provided with connecting members 24 passing through a cover 27. The spent electrolyte is led to a regenerating vat from which it is pumped back to the conduits 56, 57; the vat is provided with a gas discharge pipe. Chambers in communication with the space above the cathodes are provided at opposite ends of the cell, one of which is provided with porcelain or stoneware paddle to circulate the liquid and the other with a discharge pipe. The discharge pipe is connected to a vat where the substance to be acted upon by the amalgam is added. The regenerated liquid is pumped to a cooling tank whence it passes to the paddle chamber. The vessel 15 is of stoneware and is separated by a layer 14 of cement from an outer vessel 13 of reinforced concrete. The apparatus is suitable for the conversion of oxalic acid into glyoxylic acid. An electrolyte of sodium chloride solution is used, and a little hydrochloric acid is added to the oxalic acid.

Tanned Rubber. C. Marter, London. British Patent, **198,914,** of 1922.

India-rubber in a plastic state is heated with tanning agents such as extract of hemlock, oak, chestnut, etc., and is rolled into sheets or otherwise shaped to produce a material having the appearance, and most of the properties of leather. The tanned rubber is slightly plastic and is soluble in most of the usual solvents for rubber. Colouring, filling, etc., materials, fats, oils, etc., may be added before, during or after treatment with the tanning agent. The material may be rendered fireproof by soaking it in a solution of protochloride of tin, and may be made tougher, and more porous by treatment with alum solution.

Azo Dyestuffs. W. Carpmael, London. (Farbenfabriken vorm. F. Bayer and Co., Leverkusen, Germany.) British Patent, **198,634,** of 1922.

Disazo dyes are prepared by coupling the tetrazo compound from 4:4¹-diamino diphenyl-3:3¹-dicarboxylic acid on the one hand with an aryl-2-naphthylamine, and on the other with an azo dye component which contains a sulphonic or carboxylic group, or two hydroxy or two amino groups, or one hydroxy and one amino group or a hydroxy group in conjunction with the $CH_2.CO$ group of the acetoacetic-anilide or of the pyrazolones. The products dye cotton in red to blue shades which by after-treatment with metallic salts, for example copper or vanadium salts, become deeper and fast to light and washing. In an example the tetrazo compound is coupled with phenyl-2-naphthylamine and 1-amino-8-naphthol-4-sulphonic acid.

Asbestos in Pottery Manufacture. J. E. Tams, Stoke-on-Trent. British Patent, **198,607,** of 1922.

A transparent body similar to china, felspar, or parian consists of powdered asbestos and powdered frit produced from powdered asbestos and soda fretted in the usual way and ground. China clay, felspar, or stone may be added.

Removing Ink from Printed Papers. P. Bourcet, and H. Regnault, Paris. British Patent, **198,854,** of 1922.

In removing ink from printed paper, in the recovery of pulp for paper making, the paper is pulped, and the oily constituent of the ink is removed by treating the pulped paper at 50° to 100° C., for about 1 hour, with an emulsion of oleic or other liquid fatty acid in an aqueous solution of sodium sulpho-ricinate or other alkaline salt of a sulphated oil such as sulpho-oleic, sulpho-ricinic or sulpho-resinic acid. An emulsion of oleic acid and alkaline oleate may be used. Toluene, xylene, or other volatile hydrocarbons or other liquids of lower density than, and not miscible with, water are added together with tepid water, and the mass agitated, when the carbon and pigments are separated from the pulp and absorbed. For separating the liquids, high speed centrifugal filters are used, the pulp being retained and the water and hydrocarbon driven out. The hydrocarbon is recovered by distillation.

Purifying Fats. F. Bedford, York. British Patent, **198,706,** of 1921.

Fats and fatty oils are purified by treatment with an alkaline solution of a neutralising agent capable of giving off oxygen or of a neutralising agent and an oxygen carrier, manganese compounds excepted. Aqueous solutions specified are those of (1) sodium peroxide or percarbonate to which sodium hydrate, hydrogen peroxide, or both may be added; (2) hydrogen peroxide and caustic soda. Examples are given of the treatment of cottonseed oil at 16° C. with a 10 per cent. solution of sodium peroxide, and of hot-pressed sesame oil at 22° C. with a solution of caustic soda of 20° Bé. mixed with a solution of sodium peroxide.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Chromium Sulphate. O. Nydegger, Mornimont, Belgium. British Patent, **198,645.** Convention date, May 31, 1922.

Iron is separated from the solutions of chromium and ferric sulphates obtained by treating chromite with chromic and sulphuric acids, by adding an alkali sulphate, such as ammonium sulphate, and concentrating the solution until the boiling-point reaches 150° C. A double salt such as ammonium ferric sulphate separates out and is removed. The excess of acid remaining is neutralised with lime, leaving a solution of normal or basic chromium sulphate. The double salt may be treated with lime or soda to recover the alkali sulphate.

Soaps. Hohenloher Seifenfabriken Akt.-Ges., Augsburg, Germany. British Patent, **198,681.** Convention date, June 1, 1922.

Soaps for use with hard water are provided with a proportion of insoluble metal combinations of a feebly basic character, such as oxides or hydroxides of magnesium, calcium, barium, aluminium or zinc, which precipitate the hardness-causing salts as a loose powder. Conveniently a water-soluble salt such as magnesium sulphate is added to the soap ingredients before or during saponification, alkali in sufficient excess to decompose the salt being used. The proportion per 100 parts fatty acid may be one part of magnesium sulphate for each degree of hardness of the water; 40 parts is specified.

Control of Sulphuric-acid Manufacture. Aktieselskab Dansk Svovlsyre- and Super Phosphat-Fabrik, and Dansk Aktieselskab Siemens Schuckert, both in Copenhagen. British Patent **199,004.** Convention date, June 9, 1922.

The rate at which the oxidising agent is fed to the reaction in the production of sulphuric acid in chamber, tower, or like apparatus is controlled by the difference of temperature between the gases when leaving and when entering the plant, or the difference between the temperatures of the first and last chambers or towers. These temperatures are measured by electrical thermometers which are connected through suitable resistances with a galvanometer and battery in the manner of a Wheatstone bridge arrangement so that the difference of temperature is measured by the galvanometer deflection. The zero of the galvanometer scale is arranged to indicate the desired difference of temperature, and two adjustable contacts are arranged on the scale on either side of the zero so that the pointer of the galvanometer on reaching these contacts will make or break a circuit controlling the cock which admits the oxidising agent, the distance of the contacts from the zero corresponding with the permissible fluctuation of the temperature difference. It is stated that this controlling apparatus may be connected with more than one apparatus for admitting the oxidising agents, for instance, in such a way that these are controlled simultaneously or one after the other; or it may be arranged to control two or more admission apparatus for two or more first chambers; or it may control only a part of the total supply of oxidising agent, the rest being admitted by an apparatus not automatically controlled.

Ceramic Material. W. Green, Northallerton, Yorkshire. British Patent, **198,817,** of 1922.

A ceramic material is made by incorporating hard porcelain ingredients containing potash, etc., with a sintered irreducible oxide such as pure alumina or zirconia of a high melting point. The composition is fired at a high temperature to produce a hard tough product having a low electric conductivity and a low porosity. The composition may consist of alumina, potash felspar, china clay, and ground flint. Cores which resist the action of liquid or gaseous mercury may be made from the composition.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Over the holidays business has been more or less at a standstill. The little passing has been confined to purchases of smallish spot lots. The European political situation is naturally having a bad effect on trade generally. **Acetic Acid,** 80% technical, £47. to £48.; 80% pure, £50.; 98% glacial, £60. in casks and £75. in glass demi-johns, ex wharf, London; this market remains firm with business dull. **Acetone,** British Government specification, about £125. to £130. per ton; owing to acute scarcity of spot supplies and at the same time an active demand, this product is very firm; the prices quoted are nominal; further advances are expected. **Arsenic,** Cornish, white powdered, about £72. to £73. per ton, for spot parcels; there has been little demand for the material on offer. **Alum,** lump, £10 to £10. 10s. per ton, in casks; last week's cheaper prices from dealers have not brought any improvement in demand. **Anhydrous Ammonia,** 99.95%, 1s. 5d. per lb.; at this quoted rate the market is easy and remains dull. **Barium Chloride,** 98/100%, £15. to £15. 5s. per ton, on spot; business is very limited indeed; dealers quoting at these rates. **Bleaching Powder,** 35/37%, £10. to £10. 10s. per ton; continental material offered by dealers at these figures is very slow in being taken up. **Borax,** commercial, granulated, £26. 10s.; crystals, £27.; powdered, £28.; extra fine, £29.; B.P., crystals, £31.; powdered, £32.; extra fine, £33. per ton, for home trade only, in 2cwt. free bags, carriage paid to destination; British makers offering at these unchanged rates; prices for export vary as to destination; importers are offering for home consumption under similar conditions at—granulated £25. 10s., and powdered £27. per ton. **Borax Glass,** lump, £74.; powdered, £75. per ton, in tin-lined cases; British makers selling for home trade only at these rates, packages free, carriage paid to destination. **Boric Acid,** commercial, crystals, £50; powdered, £52.; B.P., crystals, £56.; powdered, £60.; extra fine, £62. per ton, in free bags, carriage paid to destination; British makers selling at these rates for home trade only; dealers are offering some grades at competitive prices. **Cream of Tartar,** 99/100%, 90/- to 92/- per cwt., in ton lots; at these somewhat easier rates the market is very steady, and some limited business is being done. **Citric Acid,** B.P., crystals, about 1s. 6¼d. to 1s. 7d. per lb., less 5 %; the tone here remains weak and the demand for supplies offering is still poor. **Epsom Salts,** commercial quality, about £5. per ton, in bags; business remains very flat, with prices unchanged. **Formaldehyde,** 40% volume, about £96. per ton; with no business being done the price quoted is nominal. **Glauber's Salt,** commercial quality, £3. 15s. to £4. per ton, in bags; there is seldom any inquiry for this article, and dealers' prices steady. **Lead Acetate,** brown, about £41. to £41. 10s.; white, about £42. per ton; dealers prices are steady at last week's cheaper rates; demand remains slow. **Litharge,** pure flake, British, about £37. per ton; dealers offering imported material at about £36. per ton on a quiet market. **Lithopone,** 30% Continental red seal, £22. to £22. 10s. per ton; at these unchanged rates the market is steady, although business has been slower. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; dealers holding imported stocks are asking these unchanged rates, with little doing. **Nickel Sulphate,** home trade, single and double salts, £38. per ton., f.o.b.; British makers quoting at about these figures. **Oxalic Acid,** about 6d. per lb.; the market remains flat, with prices unaltered. **Carbonate of Potash,** 90/92%, about £27. 10s.; 96/98%, about £31. per ton; dealers are asking slightly cheaper rates this week, but business remains poor. **Chlorate of Potash,** crystals and granulated, about 3d. per lb.; there is practically nothing doing in this product. **Caustic Potash, 88/92%,** £32. to £33. per ton, in drums; spot material is available but little is being taken up. **Permanganate of Potash,** commercial quality, about 9¼d. to 9½d. per lb.; at about these prices the market seems fairly steady, but business has been slower of late. **Prussiate of Potash,** yellow, about 1s. 2d. per lb.; stocks on spot are being offered at these prices; some small business is being done. **Sulphate of Potash,** 96%, £11. 10s. per ton, ex ship; the market shows no change on the week. **Mercury,** about £10 5s. to £10 10s. per bottle of 75/76lbs.; a further slight fall in spot values is recorded, with the market dull. **Red Lead,** imported, about £36. per ton.; dealers are finding business quiet, but their prices are unchanged. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49.; medium, £43. to £43. 10s.; fine white

crystals, £26. to £27. per ton; spot material is available, but the demand is still small. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; export, about £5 5s. per ton, f.o.b.; inquiry has fallen off lately. **Acetate of Soda,** about £25. per ton; dealers offering for forward delivery at about this price. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid to destination; British makers selling at about this rate for home trade only; prices for export vary as to destination. **Soda Crystals,** £5. 5s. per ton, in bags, carriage paid in the U.K.; British makers' prices for home trade only remain at this level; dealers are offering at competitive rates. **Caustic Soda,** 70/72%, £18. 10s.; 76/77%, £20. 10s. per ton, in drums, ex wharf, shipping port; dealers continue to quote at these prices, with business small; British makers' prices for home trade only are unaltered, from £19. to £21. 10s. per ton, in drums; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers selling at this price for home trade only; dealers offering at competitive rates. **Bichromate of Soda,** home trade, 4½d. per lb.; export, about 5d. per lb.; British makers' prices are given. **Chlorate of Soda,** crystals and granulated, about 2⅞d. per lb.; dealers are doing next to nothing in this product. **Cyanide of Soda,** 98/100%; export, about 8¾d. to 9d. per lb.; home trade, about 10½d. per lb.; British makers' prices are unchanged. **Nitrate of Soda,** 96%, £13. 7s. 6d. per ton, f.o.r., Liverpool; at this unchanged price the market keeps steady. **Nitrite of Soda,** 100%, £26. 10s. per ton; there is no change on the week. **Prussiate of Soda,** about 6½d. per lb.; there is no further fall in the price of this article to record; market now steady. **Hyposulphite of Soda,** pea crystals, about £14. 10s. per ton, for pea crystals on the spot, in 1cwt. kegs; commercial quality, £10. per ton, in casks; dealers are offering at about these rates. **Sodium Sulphide,** 60/62%, solid, £14.; ditto, broken, about £15. per ton; importers are offering here at these prices, but business remains very poor; 60/65%, concentrated, £15. per ton; this market is dull and prices are varying; Continental offers are cheap. **Tin Crystals,** 1s. 4d. per lb.; no change to record. **White Lead,** imported, about £43. per ton; dealers are selling small lots at about this rate. **Zinc Oxide,** B.P., about £51.; white seal, about £43.; 99.5%, about £37. 10s. per ton, f.o.r., makers' works; British makers' prices are a shade firmer this week.

Pharmaceutical Chemicals.—After the continued, but slight reductions recorded in this market during the past few weeks, there is very little change to comment upon. Business, if possible, has been even quieter this week, but the holidays probably account for this. **Acetanilid,** crystals and powder, about 1s. 5d. per lb.; this product has been slow in demand, and prices are rather unsteady. **Acetyl-Salicylic Acid,** B.P., 3s. to 3s. 1d. per lb.; spot parcels are steady at these prices, with business quiet. **Benzoic Acid,** B.P., about 2s. 3d. per lb.; there is no change here; no business about. **Diethylbarbituric Acid,** B.P. (barbitone), about 20s. to 21s. per lb.; slightly easier rates are being quoted, with little business about. **Salicylic Acid,** B.P., about 2s. 2d. to 2s. 3d. per lb.; at these rates the spot position is unchanged and keeps steady. **Tannic Acid,** leviss, about 3s. 3d. per lb.; business is on the smallest scale; quoted prices unchanged. **Amidopyrin,** about 14s. to 14s. 6d. per lb.; although the demand is very small, prices are fully maintained. **Ammonium Bromide,** 7d. to 7½d. per lb.; the weak state of the market commented upon during the last few weeks is as marked as ever. **Benzonaphthol,** about 5s. per lb.; nominal; no business on the market. **Benzaldehyde 03,** about 3s. per lb.; this is a steady but quiet market. **Betanaphthol,** resublimed, about 1s. 10d. per lb.; a few inquiries have been dealt with, but not much actual business done. **Calcium Lactate,** about 1s. 9d. per lb.; this product seems steadier after last week's big drop in price. **Chloral Hydrate,** duty paid, about 4s. per lb.; the market keeps steadily up to this figure, and some little business has been done. **Creosote Carbonate,** about 8s. 6d. per lb.; the quoted rate stands as this old figure, with little doing. **Guaiacol Carbonate,** about 8s. 3d. per lb.; nominal, no life in the market. **Hexamine,** about 3s. 10d. per lb.; the spot position seems fairly firm at this recently lowered price, but business has been slow. **Hydroquinone,** about 3s. 6d. per lb.; business continues fairly satisfactory, and prices are maintained. **Methyl Salicylate,** 2s. 5d. to 2s. 6d. per lb.; this market has a steady tone, and some little business has been done. **Methyl Sulphonal,** about 15s. per lb.; hardly any inquiry being received, and quoted rates are unaltered. **Paraformaldehyde,** 3s. 9d. to 4s. per lb.; after the weakening reported last week matters are steadier here. **Paraldehyde,** about 1s. 5d. per lb.; although this price is still quoted, business would generally be at slightly easier rates. **Phenacetin,** about 6s. per lb.; some big lots are offering at slightly under this figure, on spot, with demand quiet. **Phenazone,** about 7s. 6d. per lb.; the spot position is firmer here in most quarters. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; these high prices continue to be quoted, and the market seems steady. **Piperazine,** about 4s. 6d. per oz., in kilog. lots; no inquiry on the market. **Potassium Bromide,** crystals and granular, 6½d. to 7d. per lb.; the market shows little life, stocks offering freely, and prices are being cut to secure business. **Potassium Permanganate,** B.P., 10d. to 10¼d. per lb.; a steady tone governs the market, which has seen some limited business. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; dealers continue to quote at this level, with no interest shown. **Salol,** 2s. 8d. to 2s. 9d. per lb.; holders of spot stocks continue to quote at these prices, with little doing. **Sodium Benzoate,** about 2s. 6d. per lb.; nominal; the market remains idle. **Sodium Bromide,** crystals and granular, 7d. to 7½d. per lb.; the position on spot is still weak, with business slow. **Sodium Diethylbarbiturate,** about 19s. per lb.; this is about the best price quoted for spot material. **Sodium Salicylate,** powder, about 2s. 5d. per lb.; crystals, about 2s. 9d. per lb.; the spot rates quoted are firmer this week; importations would be much dearer. **Sulphonal,** about 14s. 6d. per lb.; nominal; the market remains idle. **Terpin Hydrate,** about 1s. 9d. per lb.; business is quiet, but prices are steady. **Thymol,** about 15s. per lb.; quoted unchanged on spot.

Coal-tar Products, Intermediates, etc.—Over the holidays things in this market have been very flat indeed; owing to the lack of inquiry quotations have been maintained at about level rates on the week. **Aniline Oil,** about 9d. to 9¼d. per lb., drums free; a steady tone is maintained, with the market quiet. **Aniline Salt,** 9½d. to 10d. per lb., casks free; business remains quiet, with prices quoted unchanged. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; this market has been practically inactive of late. **Benzol,** 1s. 4d. per gallon, f.o.r., makers' works, in buyers' packages; no further decline in quoted rates is likely in this product for some time. **Xylol,** pure, about 2s. 3d.; commercial, about 1s. 6d. per gallon, drums extra; this market is dull and as quoted rather weak. **Naphtha,** about 1s. 5d. per gallon; the demand remains poor, and prices as quoted do not seem firm. **Solvent Naphtha,** 90/160, about 1s. 5d. per gallon, drums extra; dealers' prices show no change; business flat. **Heavy Solvent Naphtha,** 90/190, 1s. 4d. per gallon, drums extra; the market is unaltered on the week, with very little doing. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; the market quotation is unchanged, with business small. **Burning Oil,** crude, No. 3 8½d., No. 2 8d. per gallon, barrels free; prices quoted are at these unchanged levels, with the demand poor. **Creosote Oil,** 10d. per gallon, naked, f.o.b.; inquiry for export remains small, but prices are very steady. **Carbolic Acid,** crystals, about 1s. 2d. per lb., f.o.b.; the better tone reported last week continues in this market. **Naphthalene,** £20 per ton; although business is so poor prices appear fairly steady; crude, £7. to £13.; crystals, £21.; powder, about £17.; balls, £28.; candles, £34.; tablets, £34. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; the market is steady but quiet. **Pyridine,** 19s. to 20s. per gallon; nominal; inquiry is good, but there appears to be no stocks to offer on spot, and future imports can only be made at high rates. **Hexamethylene,** 4s. to 4s. 3d. per gallon; these prices are fully maintained. **Pure Methyl Alcohol,** £100. per ton, ex wharf, London; some business continues at about this level. **Pitch,** about 135s. per ton, in London, spot; the tone of the market is now very steady. **Sulphate of Ammonia,** 25¾% neutral, £14. 5s. per ton, delivery over August; September delivery, £14. 10s. per ton.

ITALIAN CHEMICAL MARKET.

Genoa, July 31.

July was an unfavourable month for the Italian chemical market. The continued instability and the violent fluctuations of the foreign exchange rendered importation very difficult. The demand for sulphate of copper was very slight, in spite of the prevalence of disease among the vines, due to the heavy rains. Sulphate of ammonia experi-

enced a considerable reduction in price as a consequence of offers of the German war-reparation product, assisted by a weak demand. Quotations during the month were as follows, prices being per 100kilogs. at Milan, unless otherwise stated: **Caustic Soda,** 70—72%, Italian 185 lire, American 76—78% 210 lire, English 190 lire, French 190 lire. **Carbonate of Soda,** 98—100%, Italian 80 lire, English 85 lire (Genoa), American 85 lire (Genoa); demand stronger than supply. **Soda Crystals,** 50 lire; demand was very good. **Alum,** crystals, 85 lire; in good demand. **Bicarbonate of Soda,** powder, kegs, rose from 159 to 162 lire (Genoa). **Bichromate of Soda,** 445 lire (Genoa). **Potash,** crystals, 590 lire. **Borax Crystals,** 99%, in kegs, 425 lire; in fair call. **Carbonate of Ammonia,** lump 430 lire, powder 370 lire; still in good demand. **Carbonate of Magnesia,** pure, 430 lire; demand fair. **Chlorate of Potash,** crystals in strong request at 310 lire, powder 310 lire (Genoa). **Acetone,** pure, 98—99%, 1,250 lire. **Glacial Acetic Acid,** 99%, lower at 1,200 lire. **Boric Acid,** crystals, 800 lire. **Lactic Acid,** 80%, in fair demand at 600 lire. **Bisulphite of Soda,** crystals, 350 lire. **Formaldehyde,** 40%, in better call at 880 lire. **Phosphate of Soda,** 160 lire. **Hyposulphite of Soda,** crystals 120 lire. **Metabisulphite of Potash,** 400 lire. **Nitrite of Soda,** 96—98%, quiet, and lower at 290 lire. **Permanganate of Potash,** crystals, in better request, at 800 lire. **Sulphate of Alumina,** crystals, 18%, 100 lire. **Sulphate of Zinc,** quiet at 180 lire. **Citric Acid,** crystals, in fair request at 1,900 lire. **Sulphate of Iron,** slow, at 50 lire. **Hydrofluoric Acid,** 50%, in little call at 600 lire. **Oxalic Acid,** crystals, moderate trade, at 660 lire. **Tartaric Acid,** crystals, steady at 1,350 lire. **Chloride of Ammonia,** lump, 98—100%, lower at 600 lire (Milan); powder, 95—96%, in good demand at 325 lire (Genoa). **Chloride of Calcium,** 75—80%, stronger, at 70 lire. **Bleaching Powder** in fair request; French, 110—115%, 90 lire; electrolytic, 100 lire. **Cream of Tartar,** 98—99%, powder, steady at 930 lire. **Yellow Prussiate of Potash,** crystals, dull at 2,000 lire; **Soda,** crystals, 1,400 lire. **Silicate of Soda,** Italian, 38—45%, 65 lire, crystals 85 lire; English, 140° Tw., 100 lire. **Sulphate of Soda,** crystals 43 lire, powder, better at 70 lire. **Sulphate of Magnesia,** crystals, 50 lire. **Chloride of Magnesia,** solid, lower at 75 lire, with little business. **Hydrochloric Acid,** 20—21° Bé., 25 lire. **Sulphuric Acid,** 50° Bé. 20 lire, 66° Bé. 45 lire. **Nitric Acid,** 36° Bé. 150 lire, 42° Bé. 185 lire. **Benzaldehyde,** 3,500 lire. **Tannic Acid,** 80%, 2,000 lire. **Aluminium Acetate,** quiet at 160 lire. **Lead Acetate,** yellow 560 lire, white 570 lire. **Beta Naphthol,** 2,800 lire; in fair demand. **Barium Peroxide,** 1,000 lire. **Sodium Peroxide** in brisker demand, at 1,800 lire. **Red Prussiate of Potash,** not much doing, at 3,150 lire. **Caustic Potash,** 88-92%, 380 lire. **Tartar Emetic,** powder, 1,200 lire. **Mineral Superphosphate,** 28 lire. **Bone Superphosphate,** in strong demand, at 53 lire. **Basic Slag,** 16—18%, little business at 37 lire. **Nitrate of Soda,** 15—16%, 142 lire. **Nitrate of Ammonia,** 15—16%, lower at 120 lire. **Nitrate of Lime,** 12—13%, dull at 110 lire. **Sulphate of Ammonia,** 20—21%, quotations reduced to 163 lire, with small demand. **Sulphate of Copper,** 98—99%, Italian 225 lire, foreign 226 lire. **Chloride of Potash** rose from 72 to 78 lire. **Sulphate of Potash** in good call at 100 lire. **Calcium Cyanamide,** 15—16%, quieter at 105 lire. **Sulphur,** refined, in blocks, 53 lire (Catania, Sicily), 70 lire (Milan). **Sulphur,** sublimed, 70 lire (Catania, Sicily), 77 lire (Genoa). **Green Olive Oil,** 360 lire. **Pure Olive Oil,** Riviera 825 lire, Pari 650 lire, Molfetta 625 lire, Bitonto 650 lire, Calabria 625 lire, refined 750 lire. **Raw Tartar,** quotation reduced to 310 lire.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £64. 12s. 6d. to £64. 15s., cash; £65. 7s. 6d. to £65. 10s., three months; electrolytic, £71. to £71. 10s. **Tin**: Standard, £184. 10s. to £184. 12s. 6d. cash; £185. to £185. 5s., three months; Straits, £188.; English, £185. **Lead,** soft foreign, £24. 2s. 6d., prompt; English, £25. 5s.; chemical sheet, 33s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £31. 12s. 6d.; hard £25. 5s. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110, c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £10. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. 6d. to 12s. 9d. per unit, c.i.f., United Kingdom or Continent. **Zinc Dust,** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET Wednesday.

There are no signs of improvement in the demand for heavy chemicals, and prices generally have still a downward tendency, with buyers only covering for spot or near requirements. For **Alkali** products the current quotations are unchanged. **Chlorates** and **Bichromates** are easy at recent rates, with only a small inquiry. **Bleaching Powder,** softwoods, dull, at £11. 5s. on rails. **Roasted Saltcake,** firm, at £4. 10s. per ton, carriage paid. For **Sulphate of Copper** the demand is quiet, and price remains nominal, at £26., f.o.b. American **Sulphur,** steady, at £5. 5s., on rails. There is little or no business doing in **Phosphate** and **Hyposulphite of Soda,** and prices are easy; **Nitrite,** 96%, well maintained at £26. 10s., ex store. Concentrated **Sodium Sulphide,** weak, at £15. White powdered **Arsenic** is fairly steady at £70. on rails, Cornish works. **Yellow Prussiates** have again declined in value; **Potash** to 1s. 2d. and **Soda** 6¼d. per lb. **Carbonate** and **Caustic Potash** are short on the spot and quotations firm. Grey and brown **Acetate of Lime** continue scarce and the high prices are well maintained. **Acetic Acid** unchanged. **Acetate of Soda** is again easier, at £23. 10s., c.i.f. **Lead Salts** are dull; white **Acetate** at £41., brown £43.; and **Nitrate,** £42., delivered. **Acetone,** higher, at £125. per ton. **Green Copperas** is in fairly steady demand. **Barium Chloride,** unaltered, at £15. per ton. **Oxalic Acid,** difficult to move, at 6d. per lb. **Permanganate of Potash,** firm, at 9¾d. to 10d. per lb.

SWANSEA MARKET REPORT Wednesday.

Tinplate prices unchanged on basis of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets,** in better demand, at £17. 15s. per ton. **Copper,** easier, at £64. 17s. 6d., prompt, and £65. 12s. 6d. per ton, three months. **Tin,** irregular, at £181. 17s. 6d., prompt, and £182. 17s. 6d., three months. **Lead,** steady, at £24. 2s. 6d. per ton, prompt, and £23. 17s. 6d., forward. **Spelter,** firm, at £30. 17s. 6d. per ton, prompt, and £30. 12s. 6d., three months. **Zinc Sheets,** in fair demand, at £38. 17s. 6d. per ton. **Linseed Oil,** quiet, at £2. 3s. 3d. per cwt., in barrels. **Cottonseed Oil,** in good demand; common edible, £2. 4s. 6d., and deodorised, £2. 7s. 6d. per cwt. **Rape Oil,** slow; refined, prompt, £2. 5s. 3d., net, in barrels. **Cod Oil,** scarce and nominal. **Palm Oil,** quietly steady; Lagos, prompt, £32. 2s. 6d.; softs, £31. 10s. 6d.; mediums, £32. 2s. 6d.; and hards, £32. 7s. 6d. per ton. **Turpentine,** quiet, at £3. 14s. 6d. per cwt. **Oxalic Acid,** dull, at 6¼d. per lb. **Sulphate of Copper,** quiet, at £26. 12s. 6d. per ton, less 5%, in casks, f.o.b. **Arsenic,** in poor demand, at £72. 2s. 6d. per ton for white powdered. **Nitrate of Soda,** in moderate demand, at £13. 12s. 6d. per ton, f.o.r. **Pitch,** dull, at £6. 12s. 6d. per ton, at docks. **Copperas,** slow, at £2. 2s. 6d. per ton. **Sulphate of Ammonia,** in better inquiry. **Sulphuric Acid, in steady call, at** £3. 12s. 6d. up to £6. 12s. 6d. per ton. **Coals,** owing to the holiday season, were rather dull market; best Admiralty smokeless, £1. 10s. 9d. to £1. 12s.; Monmouthshire black vein, £1. 8s. 10d. to £1. 9s.; small, £1. 2s. 6d. per ton. **Anthracite** in better demand, best large £2. 11s. 3d. to £2. 12s., best nuts £3. 1s. 3d. per ton f.o.b. **Cokes** continue in strong demand, with best qualities, for export, up to £3. 2s. 6d. per ton, f.o.b.; foundry £2., and furnace £1. 10s. per ton on rails at ovens. **Patent Fuel,** £1. 13s. 9d. to £1 10s. per ton.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Business in the heavier chemicals has been quiet, the August holiday period having tended for the time to restrict the moderate inquiry for such chemicals that existed through the previous two weeks. The continued labour strain in some industries, and the uncertainties as to production arising therefrom, have also had a restricting influence, and have tended to lengthen the August holiday period. Shipments on foreign account have gone on steadily and have been on a fair scale. **Bleaching Powder** has been quieter, and is £10. to £11. per ton for use in the United Kingdom,

and £11. per ton for export. **Calcium Chloride** has been in fair request, and is £5. 17s. 6d. per ton. **Caustic Soda** has been in moderate demand for use in the U.K., and has had a very fair shipment for foreign ports; the price is £20. 7s. 6d. to £21. 7s. 6d. per ton for 76%, carriage paid, for home-trade use; and £20. 10s. per ton for export. **Bicarbonate of Soda** has been steadily called for on home-trade account, and has had a moderately active shipment for export; the price is £10. 10s. per ton, carriage paid, for use in the U.K. **Soda Crystals** have been in fair demand, and are £5. 5s. per ton for home-trade uses. **Nitrate of Soda** has been quiet, and is £13. 5s. to £13. 10s. per ton. **Borax** has been inactive; commercial crystals are £27. per ton, and powdered £28.; higher grades are, crystals £31. per ton, and powdered £32. per ton, carriage paid in the U.K. **Saltcake** has been in moderate demand, and is £4. 10s. to £5. per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has moved but slowly, and is 4½d. per lb., c.i.f. to usual ports. **Ammonia Alkali** has been in fair request for use in the U.K., and has been shipped rather freely for export. **Hyposulphite of Soda** has been rather more in demand; it is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £16. per ton, in 1cwt. kegs, for photographic. **Sulphide of Soda** has been but little called for; solid is £16. per ton, and crystals £10. 10s. to £11. per ton. **Chlorate of Soda** has had a slow sale, and is 3d. to 3½d. per lb. **Phosphate of Soda** has been very quiet, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been but little in demand and the price has eased; it may be given as 7d. per lb. **Yellow Prussiate of Potash** has been in quietly steady request, and is somewhat cheaper; the price is 1s. 2½d. to 1s. 3d. per lb. **Red Prussiate** has been quiet, and is 3s. 6d. to 3s. 9d. per lb. **Carbonate of Potash** has been but little in demand, and is £25. to £32. per ton, according to quality. **Nitrate of Potash** has had a moderate sale, and is £33. to £35. per ton. for refined. **Chlorate of Potash** continues very quiet, and is 4d. per lb. **Caustic Potash** has had a limited inquiry, and is £32. to £33. per ton. **Permanganate of Potash** has been quieter, and is 9¾d. to 10d. per lb. **Bichromate of Potash** has moved slowly, and is 5¾d. per lb. c.i.f. to usual ports. **Salammoniac** has been but little demand; first quality is £63. per ton, second £60., and third £57. **Sulphate of Ammonia** has been reduced; neutral is £14. 5s. per ton, and ordinary £13. 2s. per ton, for August. **Carbonate of Ammonia** has had a moderate sale, and is 4d. per lb. **Muriate of Ammonia** has been but little called for, and is £32. to £33. per ton. **Magnesia** has been in fair demand; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. per ton. **Alum** has been quieter, and is £12. per ton for export. **Sulphate of Alumina** has had a very limited inquiry, and is £8. to £11. per ton, according to quality. **Sulphur** has been quiet; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8 to £8. 10s. per ton, and American £5. to £5. 10s. per ton. **Tartaric Acid** has had a steady sale, and is 1s. 2½d. to 1s. 3d. per lb. **Cream of Tartar** has been in very fair demand, and is £4. 12s. to £4. 15s. per cwt. **Boric Acid** has been in quietly steady demand; commercial crystals are £52. per ton, and powdered is £58., £2 per ton more being charged if in casks. **Citric Acid** has been quieter, and is cheaper; the price may be given as 1s. 7d. to 1s. 9d. per lb. **Oxalic Acid** has had a slow sale, and is 6d. to 6¼d. per lb. **White Acetate of Lead** has been but little called for, and is £42. to £43. per ton. **Sulphate of Copper** has again been quiet in the export branch, and in the home branch of the trade; the price is £26. to £26. 5s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been very quiet; white powdered is £72. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

A little more activity has been noticeable in the Glasgow market during the week, and business, though still of small dimensions, is considered as having a more hopeful tone. The usual day-to-day demand for chemicals on home account is maintained, but inquiries for export are still of a limited character. Prices generally are steady, with some improvement to be noted in lead acetates. Quotations, at Glasgow, are as follows:—**Alum,** quiet, and in small demand; prices steady, at £12. 5s. for lump, and ground £12 per ton. **Arsenic** continues in short request, and supplies are still very scarce; it is quoted on spot at £77. net. **Barium Chloride** remains very quiet, despite the recent reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation still stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax,** granulated, is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride,** 70—75%, solid, £5. 12s. 6d. per ton. **Citric Acid** is a declining market, with the price reduced to 1s. 7¼d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure of £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar,** easier, with better inquiry, at £4. 8s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in fair request; brown steady at £41. per ton, net, and white better at £41. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid** at 6¼d. per lb. **Paraffin Wax** experiences a fair export trade at 2¾d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the rather easier figure at 1s. 3¼d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 11s. per cwt., but business is nominal. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic,** 43—44%, in fair request at 1s. 1½d. **Tartaric Acid** still shows a quieter tendency at 1s. 2¾d. per lb., less 5%, Glasgow.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

						Qnty.	Quantity (otherwise undeclared).		qr.	Quarters.
Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.				lb.	Pounds.
Bls.	Bales.	Css. or Cs.	Cases.	Hf. pps.	Half pipes.					
Brls.	Barrels.	Cks.	Casks.	Hhds.	Hogsheads.	Rnlts.	Runlets.			
Bgs.	Bags.	Chts.	Chests.	Kgs.	Kegs.	Sks.	Sacks.			
Btls.	Bottles.	Cylds.	Cylinders.	Oz.	Ounces.	Slbs.	Slabs.			
Bdls.	Bundles.	Drms.	Drums.	Pkgs.	Packages.	Tcs.	Tierces.			
Bskts.	Baskets.	Djns.	Demijohns.	Pns. Puns.	Puncheons.	t. c.	Tons.	Cwts.		
Bxs.	Boxes.	Frkns.	Firkins.							

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending August 4.

ACETIC ACID—
Hamburg, 17 crbys.

AMMONIA—
Philadelphia, 120 cylds.

ANTIMONY SALTS (*otherwise undes.*)
Bremen, 1 ck.

BARIUM SULPHATE—
Tarragona, 20 brls.

BARYTES—
Antwerp, 250 bgs.
Bremen, 350 pkgs.

BARYTES—
Hamburg, 150 bgs.

CALCIUM CHLORIDE—
Hamburg, 9 cks.

CHEMICALS (*otherwise undescribed*)
Bremen, 2 pkgs.

CREAM OF TARTAR—
Bordeaux, 50 brls., 12 cks.
Tarragona, 12 brls.

DISINFECTANTS (*otherwise undes.*)
Montreal, 91 pkgs.

GELATINE—
Hamburg, 5 cs.

GLUCOSE—
Hamburg, 200 brls.

MAGNESIUM CHLORIDE—
Hamburg, 82 drms.

OCHRE—
Norfolk, 252 brls.

PHOSPHATE—
Hamburg, 1,000 bgs.

ROSIN—
Hamburg, 10 brls.

SALT—
Bremen, 600 bgs.
Hamburg, 740 bgs.

SOAP—
Genoa, 300 pkgs.; Montreal, 4 bxs.; Norfolk, 100 brls.

SODIUM ACETATE—
Antwerp, 42 cks.

SODIUM PHOSPHATE—
Bremen, 7 cks.

SODIUM SULPHATE—
Hamburg, 250 bgs.

SODIUM SULPHIDE—
Hamburg, 20 drms.

WHITE LEAD—
Bremen, 38 cks.
Hamburg, 19 brls., 37 cs.

GOOLE.

Week ending August 4.

BARYTES—
Antwerp, 100 bgs.

COAL TAR PRODUCTS—
Naphthalene
Antwerp, 26 cs.

COPPER SULPHATE—
Hamburg, 8 brls.

LITHOPONE—
Rotterdam, 20 cks.

MAGNESITE—
Amsterdam, 50 bgs.

SALT—
Hamburg, 850 t.

TARTARIC ACID—
Hamburg, 14 brls.

GRANGEMOUTH.

Week ending August 4.

LITHOPONE—
Rotterdam, 80 cks.

PHOSPHATE (*otherwise undes.*)—
Rotterdam, 650 bgs.

ZINC OXIDE—
Rotterdam, 50 cks.

GRIMSBY.

Week ending August 4.

ACETIC ACID—
Rotterdam, 10 cks.

CHEMICALS (*otherwise undescribed*)
Dieppe, 8 cs.

IRON OXIDE—
Antwerp, 100 sks., 37 brls.

LEAD ACETATE—
Rotterdam, 7 cks.

MAGNESITE—
Hamburg, 176 bgs.

POTASSIUM NITRATE—
Hamburg, 50 t.

SOAP—
Antwerp, 41 cs.

STEARINE—
Antwerp, 26 bgs.

TANNING MATERIALS—
Sumac
Antwerp, 6 cks.

HULL.

Week ending August 4.

ACETIC ACID—
Hamburg, 5 cks.
Rotterdam, 51 cks.

AMMONIUM CHLORIDE—
Hamburg, 68 cks.

BARYTES—
Antwerp, 460 bgs., 196 pkgs.
Bremen, 88 cks.

CALCIUM CARBIDE—
Antwerp, 700 drms.

CARBON BLACK—
New York, 600 cs.

CREAM OF TARTAR—
Amsterdam, 20 kgs.

DEXTRINE—
Amsterdam, 20 bls.
Rotterdam, 11 bls.

ESSENTIAL OILS (SYNTHETIC)—
Citronella
New York, 6 drms.

FERRO CHROME—
Bremen, 20 cs.
Gothenburg, 123 cks.

FORMIC ACID—
Rotterdam, 259 blns.

GELATINE—
Bremen, 13 cs.

GLUCOSE—
Hamburg, 20 brls.
New York, 398 brls.

GLUE—
Antwerp, 10 brls.

LEAD ACETATE—
Bremen, 15 cks.
Rotterdam, 2 cks.

LITHOPONE—
Rotterdan, 60 cs.

MAGNESIUM SULPHATE—
Rotterdam, 100 bgs.

MINERAL COLOURS (*otherwise undes.*)—
Rotterdam, 5 cks.

MOLYBDENUM CONCENTRATE—
Hamburg, 24 kgs.

RED LEAD—
Rotterdam, 17 cks.

SALAMMONIAC—
Hamburg, 21 brls., 16 cks.

SALT—
Hamburg, 100 t.

STEARINE—
Rotterdam, 51 bgs.

TARTARIC ACID—
Amsterdam, 111 cks.

WHITE LEAD—
New York, 23 cks.
Rotterdam, 96 cks.

ZINC OXIDE—
Antwerp, 20 brls.
New York, 250 brls.
Rotterdam, 25 cs.

LEITH.

Week ending August 4.

BONE PHOSPHATE—
Rotterdam, 680 bgs.

CREAM OF TARTAR—
Amsterdam, 50 kgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 4 cks.

FERRO CHROME—
Gothenburg, 12 cs.

GELATINE—
Antwerp, 6 cs.

LEAD ACETATE—
Rotterdam, 5 cks.

LITHOPONE—
Amsterdam, 160 cks.
Rotterdam, 80 cks.

SALT—
Hamburg, 100 bgs.

SOAP—
Odense, 20 cks.

SODIUM CHLORATE—
Hamburg, 32 cs.

ZINC OXIDE—
Rotterdam, 50 cks.

LIVERPOOL.

Week ending August 4.

ACETIC ACID—
Hamburg, 86 crbys.

ALBUMEN—
Antwerp, 20 cs.

AMMONIA—
Hamburg, 34 cks.

AMMONIUM BROMIDE—
Hamburg, 3 cs.

ARGOLS—
Oporto, 30 cks.

ARSENIC—
Bordeaux, 14 cks.

BARYTES—
Bremen, 50 bgs.
Hamburg, 30 cks., 22 brls.

BEESWAX—
Conakry, 27 pkgs., 192 blks.
Iddo, 7 bgs.

BISMUTH ORE—
Hong Kong, 69 bgs.

BLEACHING POWDER—
Montreal, 69 cs.

BONE FERTILISER—
Nanking, 9 bgs.

BORAX—
Nanking, 121 brls.

CARNAUBA WAX—
Ceara, 143 bgs.
Parnahyba, 1,434 bgs.

CASEIN—
Bordeaux, 1 bg.
Melbourne, 400 bgs.

CAUSTIC POTASH—
Hamburg, 20 drms.

CAUSTIC SODA—
Melbourne, 1 drm.

CHEMICALS (*otherwise undescribed*)
Hamburg, 2 cs.

COAL TAR PRODUCTS—
Naphthalene
Antwerp, 40 cs.
Tar
Amsterdam, 20 cks.
Hamburg, 250 brls.

COPPER PYRITES—
Huelva, 453 t.

CREAM OF TARTAR—
Bordeaux, 20 cks.

CRYOLITE—
Copenhagen, 300 bgs.

DEXTRINE—
New York, 32 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
New York, 1 brl.
Rio de Janeiro, 19 pkgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 47 bls., 96 cks.
Unspecified
New York, 40 brls.

FERTILISER (DRIED BLOOD)—
Alexandria, 75 bgs.
Nanking, 48 bgs.

FORMIC ACID—
Hamburg, 219 crbys.

GLUE—
Antwerp, 20 bdls.
Copenhagen, 20 bgs.
Hamburg, 10 bgs.

IRON OXIDE—
Antwerp, 7 kgs.

IRON PYRITES—
Huelva, 555 t.

KAINIT—
Rotterdam, 5 bgs.

KIESELGUHR—
Oran, 3,500 bgs.

LITHOPONE—
Rotterdam, 148 cks.

MAGNESITE—
Amsterdam, 50 bgs.
Rotterdam, 63 bgs.

MAGNESIUM SULPHATE—
Rotterdam, 100 bgs.

MANGANESE ORE—
Marmagoa, 5,600 t.
Shanghai, 340 bgs.

MINERAL COLOURS (*otherwise undescribed*)—
Hamburg, 15 cks.

NAPHTHA (WOOD)—
Hamburg, 69 cs.

PARAFFIN WAX—
New York, 309 bgs.

POTASSIUM BROMIDE—
Hamburg, 10 cs.

POTASSIUM CARBONATE—
Hamburg, 10 cks.

ROSIN—
Lisbon, 33 brls.

SALAMMONIAC—
Hamburg, 14 cks.

SALT—
Hamburg, 350 bgs.

SALTPETRE—
Antwerp, 20 bgs.
Nanking, 249 bls.

SOAP—
Amsterdam, 100 cs.; Hamburg, 26 cs.; New York, 2 cs.

SODIUM BROMIDE—
Hamburg, 3 cs.

SODIUM NITRATE—
Shanghai, 100 brls.

STEARINE—
Antwerp, 38 bgs.; Buenos Aires, 100 trcs.; La Plata, 74 pkgs., 100 trcs.; Monte Video, 46 cks., 31 trcs., 142 pkgs.

SULPHUR—
Catania, 1,100 bgs.
Huelva, 2,767 t.

TALLOW—
Boston, 1,192 brls.; Buenos Aires, 892 cks.; Monte Video, 498 cks.; New York, 2 trcs.; Rio Grande do Sul, 3,708 pkgs.

TANNING MATERIALS—
Gambier.
Singapore, 1,431 cs.
Quebracho
Rosario, 4,090 bgs.
Unspecified
Bordeaux, 1,677 cks.

TARTARIC ACID—
Bari, 20 brls.
Hamburg, 94 kgs.

TIN ORE—
Lisbon, 250 bgs.

TIN OXIDE—
Rotterdam, 75 cks.

TUNGSTEN ORE—
Hong Kong, 560 bgs.
Shanghai, 2,800 bgs.

ULTRAMARINE BLUE—
Antwerp, 10 brls.

WAX (*otherwise undescribed*)—
Alexandria, 7 bgs.; New Orleans, 196 brls.; New York, 970 brls.

WHITE LEAD—
Rotterdam, 35 cks.

ZINC ASHES—
Barcelona, 108 pkgs.; Boston, 53 brls.; Hamburg, 112 cs.

ZINC OXIDE—
New York, 250 brls.

ZINC WHITE—
Amsterdam, 100 drms.

LONDON.

Week ending August 4.

ACETIC ACID—
Belgium, 15 pkgs. Reitmayer, Calburn and Kindersley

ALUMINIUM SULPHATE—
Spain, 1,000 pkgs.
France, 1,600 J. Bailey
,, 100 Kingston and Stewart

AMMONIA—
Irish F. State, 2 c.

AMYL ACETATE—*
——— £322.

ARGOLS—
Spain, 897 pkgs.

ARSENIOUS ACID—
Portugal, 20 t.

BARYTES—
Germany, 32 cks. G. Elliott
,, 150 bgs. ,,
,, 20 cks. W. Harrison
,, 100 bgs. W. Harrison
,, 30 cks. W. Hamsher
Spain, 584 brls. Greeff
,, 10
,, 100 bgs.

BEESWAX—
Anglo Egypt
Sudan, 20 bgs.
Brit. India, 16 pkgs. J. W. Cook

BORIC ACID—
China, 100 pkgs. J. Batt

CALCIUM CARBIDE—
Sweden, 10 t. C. J. Quirk

CAMPHOR—
Japan, 75 cs. Weber, Smith & Hoare

CARBON BISULPHIDE—
Germany, £62. Ronsheim & Moore
Sweden, £335. W. W. Jones & Dooly

CASEIN—
Brit. India, £160.
N.Z., £3,645.

CAUSTIC POTASH—
Germany, 165 pkgs. J. M. Steel

CHEMICALS (*otherwise undescribed*)
France, £25. L. Vannier
,, £13.
Germany, £62. Ronsheim & Moore

CHEMICALS (*otherwise undes.*)—*
——— £729.

COAL TAR PRODUCTS—
Tar Oil
Finland, 15 cks. Major

COUMARINE—*
——— £403.

* Entered under the Safeguarding of Industries Act.

CREAM OF TARTAR—
Holland, 120 pkgs. J. Knill
,, 20
Italy, 100 Leach

DEXTRINE—
Germany, 19 t. 14 c. K. J. Mulder
Holland, 21 5 ,,
,, 1 19 R. Windmuller
,, 2 Pronk, Davis & Rushby

DYESTUFFS (ARTIFICIAL)—
Unspecified
Germany, 20 pkgs. Greeff
Switzerland, £120.

DYESTUFFS (NATURAL)—
Logwood
B.W.I. 529 pkgs. Perkins & Homer
Turmeric
Brit. India, 98 pkgs.

FERTILISERS (*otherwise undes.*)—
France, 2 t. P. Le Brun

GELATINE—
France, £36. Soc. des Prod. Chimiq.
Germany, £66.
,, £17. C. W. Hartrodt

GLUE—
Belgium, £15.
Holland, £151.
Straits Setts. £15.
France, £154.
,, £91. P. Le Brun
,, £250. Van Oppen
,, £70. Greathed & Humbert
,, £209. Soc. des Prod. Chimiq.

GLYCERINE—
Belgium, £160. T. Potter Priestley
Holland, £255.
Russia, £1,515. Thornett & Fehr

HYDROGEN PEROXIDE—
Germany, 1 c.
,, 1 t. 4 Brit. Drug Stores

ISINGLASS—
Brit. India, 3 cs.

KIESELGUHR—
Spain, 10 t. Clyde

LITHOPONE—
Holland, 283 cks. F. T. H. Nye

MAGNESITE—
Holland, £48. Ray
,, £165. Cazaly, Mills

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slovakia, 15 cks., 22 bgs.
Spain, 38 brls. Burrell

MONTAN WAX—
Germany, 100 bgs. Holroyds Oil & Cer.
Holland, 20 Wilkins, Campbell

OCHRE—
France, 36 cks. F. T. H. Nye
,, 133 W. Harrison

OZOKERITE—
Germany, 200 bgs. Holroyds Oil & Cer.

PARAFFIN WAX—
Mexico, 14 t. 14 c.
U.S.A., 88 1 Price Pat Candle
,, 100 Anglo-American Oil
Poland, 3 13 c.

PLUMBAGO—
Ceylon, 286 cks. A. Branwell

POTASSIUM CARBONATE—
Germany, 38 pkgs. Petri

POTASSIUM CHLORATE—
Germany, 200 pkgs. Reitmayer, Calburn & Kindersley

PRUSSIAN BLUE—
Holland, 13 cks. H. Smart

QUININE ETHYL CARBONATE—*
——— £476.

RED LEAD—
Italy, 30 cks. Russell & Baker
,, 17 brls. A. W. Page

ROSIN—
France, 50 cks. Rosin & Turp. Imp
Portugal, 44 W. R. Green
U.S.A., 2,500
,, 600 H. Hill
,, 500 Fox, Stockell
,, 350 Bigland & Jeffries
,, 200 Fairclough, Dodd & Jones
,, 300 brls. M. H. Winkley
,, 300 W. Rogers
,, 600 Co-op. W'sale

SHELLAC—
Brit. India, 56 t. 5 c. J. W. Cook
,, 22 1 Litchfield & Saundy
,, 14 5

SIZE—
U.S.A., £1,283. H. D. Pochin

SOAP—
Austria, £8.
Belgium, £90. S. Kalisky
France, £107.
Germany, £120. S. Kalisky
Italy, £117. Calmans
Holland, £598. Litchfield & Saundy
Switzerland, £5.
U.S.A., £365.
,, £20. F. Newbery.
,, £185. L. F. Smith
Victoria, 1,800. ,,

SODA ASH—
Kenya, 125 t. J. W. Cook

SODIUM HYPOPHOSPHITE—*
——— £372.

SODIUM HYPOSULPHITE—
Germany, 9 t. W. J. Cook

TALLOW—
N.S.W., 8 c.
,, 61 brls. H. Hill
N.Z., 288 t. 1 c.
,, 40 3 Weber, Smith & Hoare
,, 1 16 Anning & Cobb
,, 31 10 Thornett & Fehr
,, 25 Co-op. W'sale
Queensland, 10 17
S. Australia, 2 16 Goad, Rigg
U.S.A., 16 pkgs.

TANNING MATERIALS—
Divi-Divi
B.W.I., 135 pkgs. Culverwell & Brookes
Myrabolans
Brit. India, 1,000 pkgs. Dixon & Taylor

TANNING MATERIALS
Unspecified
B.W.I., £100. Weber, Smith & Hoare
Switzerland, 53 pkgs.

TURPENTINE—
U.S.A., 4,367 brls.
,, 695 Rosin & Turps. Imp.
,, 1,650 Fairclough, Dodd & Jones
,, 350 W. W. Jones & Dooly
,, 100 Phillip & Watts
,, 450 Langley-Smith
,, 250 Bigland & Jeffreys

ULTRAMARINE —
Germany, 5 cks. W. Harrison

WAX (*otherwise undescribed*)—
Germany, 141 cks. C. S. Gobey
Japan, 50 pkgs. Gerhard & Hey

WHITE LEAD—
U.S.A., 77 cks. Greeff

ZINC OXIDE—
Germany, 2 cks. Stephens
Holland, 25 F. T. H. Nye

MANCHESTER.

OFFICIAL AMENDMENTS.

To return for week ending January 13, 1923, *Add*—

PARAFFIN SCALE—
Philadelphia, 1 brl.

LITHARGE—
Philadelphia, 1 drm.

Week ending August 4.

ACETIC ACID—
Hamburg, 50 crbys.
Montreal, 467 brls.
Rouen, 50 cks.

ACIDS (*otherwise undescribed*)—
Antwerp, 51 cks.

CALCIUM CARBIDE—
Amsterdam, 250 drms.

CARBON BLACK—
New York, 225 cs.

CASEIN—
Rouen, 67 bgs.

CHEMICALS (*otherwise undescribed*)
Antwerp, 56 drms., 4 cs.
Hamburg, 20 bgs.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 100 cs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 6 cs.
Dunkirk, 2 cks.

FERRO SILICON—
Gruz, 178 brls.
Larvik, 188 cs.

GLUCOSE—
Hamburg, 13 brls.

GLUE—
Antwerp, 67 bls.
Rotterdam, 9 cks.

LEAD ACETATE—
Bremen, 15 cks.

LITHARGE—
Bremen, 10 cks.

LITHOPONE—
Antwerp, 34 bgs.
Rotterdam, 300 cks.

MAGNESITE (CALCINED)—
Amsterdam, 100 bgs.

MAGNESIUM SULPHATE—
Antwerp, 80 bgs.
Rotterdam, 200 bgs.

OCHRE—
Dunkirk, 41 cks.

PARAFFIN WAX—
New York, 255 cs., 600 brls.

PLUMBAGO—
Hamburg, 26 brls.

POTASSIUM BROMATE—
Bremen, 6 cs.

POTASSIUM CARBONATE—
Hamburg, 21 cks.

POTASSIUM PRUSSIATE—
Rouen, 7 cks.

RED LEAD—
Venice, 16 brls.

SALTPETRE—
Antwerp, 35 bgs.
Rotterdam, 20 bgs.

SOAP—
Catania, 200 cs.
Rotterdam, 5 cks.

SODA—
Antwerp, 20 cks.

SODIUM SULPHITE—
Hamburg, 350 bgs.

SULPHUR—
Catania, 1,233 bgs., 68 brls.
Galveston, 2,000 t.

TALLOW—
Freariksstad, 870 brls.

TANNING MATERIALS—
Sumac
Palermo, 38 bls., 300 bgs.

TARTARIC ACID—
Amsterdam, 15 kgs.

THIOCARBANILID—
New York, 7 brls.

TIN OXIDE—
Hamburg, 10 brls.

TRICHLORETHYLENE—
Hamburg, 18 cks.

ULTRAMARINE BLUE—
Antwerp, 12 cs.

WAX (*otherwise undescribed*)—
New York, 204 bgs., 65 brls.

ZINC DUST—
Antwerp, 57 cks.

NEWCASTLE-ON-TYNE

Week ending August 4.

ACETIC ACID—
Ghent, 26 brls.

CALCIUM CARBIDE—
Christiania, 190 drms.

GLUE—
Rotterdam, 231 pkgs.

SALT—
Hamburg, 500 bgs.

SOAP—
Copenhagen, 10 cs.

SODIUM NITRATE—
Christiania, 51 bgs.

N. & S. SHIELDS.

Week ending August 4.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 4.

AMMONIUM CARBONATE—
Calcutta, 10 c.

AMMONIUM CHLORIDE—
Genoa, 4 t. 17 c.

AMMONIUM SULPHATE—
Hong Kong, 160 t.; Kobe, 770 t. Malaga, 149 t.; Yokohama, 140t.

CHEMICALS (*otherwise undescribed*)
Alexandria, 101 pkgs.; Boston, 40 pkgs.; Buenos Aires, 1,080 pkgs.; Bordeaux, 60 pkgs.; Calcutta, 25 pkgs.; Callao, 200 pkgs.; Catania, 6 pkgs.; Coquimbo, 60 pkgs.; Deseado, 1,015 pkgs.; Gallegos, 500 pkgs. Kingston, 42 pkgs.; Kobe, 422 pkgs.; Leghorn, 2 pkgs.; Marseilles, 84 pkgs.; Melbourne, 106 pkgs.; Montreal, 8 pkgs.

CHEMICALS (*otherwise undescribed*)
New York, 2,969 pkgs.; Penang, 40 pkgs.; San Julian, 350 pkgs.; San Cruz, 250 pkgs.; Singapore, 480 pkgs.; Sydney, 178 pkgs.; Valparaiso, 4 pkgs.; Vera Cruz, 500 pkgs.; Yokohama, 50 pkgs.

COAL TAR PRODUCTS—
Unspecified
Alexandria, 20 t.; Antofagasta, 107 t.; Bombay, 40 t. 7 c.

COAL TAR PRODUCTS—
Unspecified
Boston, 32 t.; Calcutta, 4 c.; Hamburg, 4 c.; Chittagong, 1 t. 7 c.; Kingston, 10 c.; Cyprus 1 t. 16 c.; Colombo, 2 t. 9 c.; Madras, 5 t. 10 c.; Penang, 1 t. 4 c.; Pt. Swettenham, 1 t. 1 c.; Rouen, 3 t. 17 c.
Pitch
Algiers, 302 t. 10 c.
Alexandria, 43 t.

* Entered under the Safeguarding of Industries Act.

COAL TAR PRODUCTS—
Tar
Durban, 31 t.; Kingston, 6 t. 16 c.; Penang, 127 t. 17 c.; Taltal, 9 c.

GELATINE—
New York, 4 t.

GLUE—
Montreal, 7 c.; Sydney, 2 t.

MAGNESIUM CARBONATE—
New York, 6 t.

MAGNESIUM CHLORIDE—
Manilla, 1 t. 8 c.

MAGNESIUM OXIDE—
Yokohama, 5 t.

PARAFFIN WAX—
Arica, 50 t.; Barcelona, 1 t.; Genoa, 52 t. 10 c.; Guayaquil, 2 t.; Leghorn, 41 t.; Melbourne, 50 t.; Pasages, 5 t. 10 c.; Talcahuano, 40 t.; Valparaiso, 60 t.

POTASSIUM BICHROMATE—
Alexandria, 3 t. 18 c.; Calcutta, 1 t. 10 c.; Hamburg, 15 c.; Melbourne, 16 t. 6 c.; Sydney, 2 t. 2 c.; Valparaiso, 5 t. 2 c.; Yokohama, 10 t.

SOAP—
Alexandria, 2 t. 14 c.
Barcelona, 3 t. 5 c.

SODA ASH—
Huelva, 10 c.

SODIUM BICHROMATE—
Alexandria, 6 c.; Melbourne, 5 t. 1 c.; Rouen, 15 t. 5 c.; Valparaiso, 1 t. 18 c.; Sydney, 1 t.

SPERMACETTI WAX—
Hamburg, 2 t. 4 c.

TALLOW—
Colombo, 1 t. 5 c.

TANNING MATERIALS—
Unspecified
Adelaide, 6 t. 18 c.; Melbourne, 11 t. 8 c.; Sydney, 33 t. 10 c.

TAR (WOOD)—
Alexandria, 12 c.

WAX (*otherwise undescribed*)—
Colombo, 2 t.; Durban, 1 t. 1 c.; Sydney, 60 t.; Yokohama, £98.

ZINC OXIDE—
Cyprus, 2 c.

GRANGEMOUTH.

Week ending August 4.

COAL TAR PRODUCTS—
Pitch
Riga, 10 t. 9 c.

PARAFFIN WAX—
Antwerp, 1 t. 10 c.

HULL.

Week ending July 31.

NIL.

LEITH.

Week ending August 4.

ETHYL ALCOHOL—
Rotterdam, 30 drms.

GLUE—
Hamburg, qty.

METHYL ALCOHOL—
Rotterdam, 30 drms.

MINERAL COLOURS (*otherwise undescribed*)—
Copenhagen, 2 cks.

PARAFFIN WAX—
Amsterdam, 5 t.
Hamburg, 16 bgs.

POTASSIUM BICHROMATE—
Ghent, 2 cks.

SALT—
Borgarnes, 3 brls.

SHEEP DIP—
Laudarkrok, 3 cs.

SOAP—
Reykjavik, 11 cs.

SODIUM BICARBONATE—
Copenhagen, 3 cks.

SODIUM BICHROMATE—
Ghent, 5 cks.

TALLOW—
Copenhagen, 40 trcs.
Rotterdam, 50 cks.

WAX (*otherwise undescribed*)—
Iceland, 1 cs.

LIVERPOOL.

Week ending August 1.

ACETIC ACID—
Durban, 10 c., £40.

ALUM—
Adelaide, 1 t., £11.; Havana 4 t. 13 c., £47.; Lagos, 1 t. 5 c., £14.; Padang, 1 t. 10 c., £18.

ALUMINIUM SULPHATE—
Antwerp, 10 t., £88.; Calcutta, 35 t., £1,350.; Rotterdam, 5 t., £51.; Sydney, 2 t. 4 c., £18.

ALUMINOFERRIC—
Monte Video, 50 t., £357.

AMMONIUM CARBONATE—
Adelaide, 1 t., £41.; Alexandria, 4 t. 3 c., £128.; Bombay, 1 t., £44.; Copenhagen, 2 t. 9 c., £81.; Hamburg, 4 t. 18 c., £151.; Lyttleton, 1 t., £41.; Marseilles, 1 t., £35.; Madras, 1 t., £44.; Montreal, 1 t. 5 c., £44.; New York, 8 t. 5 c., £278.; Pernambuco, 18 c., £42.; Rotterdam 10 c., £17.; Singapore, 1 t. 10 c., £66.; Sydney, 1 t. 5 c., £51.

AMMONIUM CHLORIDE—
Adelaide, 10 c., £18.; Brisbane, 1 t. 17 c., £60.; Constantinople, 2 t. 19 c., £123.; Melbourne, 10 c., £19.; Philadelphia, 15 t. 2 c., £485.; Wellington, 3 c., £9.

AMMONIUM SALTS (*otherwise undescribed*)—
Christiania, 2 t. 15 c., £94.; Marseilles, 8 c., £11.; Pernambuco, 9 c., £20.

AMMONIUM SULPHATE—
Cheribon, 149 t. 18 c., £2,174.; Hong Kong, 50 t., £913.; Las Palmas, 110 t., £1,648.; Mauritius, 550 t. 8 c., £8,978.; Oporto, 9 t. 17 c., £147.; Palermo, 4 t. 19 c., £80.; Samarang, 55 t., £775.; Tarragona, 89 t. 6 c., £1,250.; Teneriffe, 65 t., £960.; Yokohama, 403 t. 16 c., £6,662.

ANTIFOULING PAINT—
Auckland, 8 c., £52.; Barbados, 13 c., £60.; Bilbao, 5 t. 12 c., £585.; Halifax, 2 t., £207.; Manaos, 1 c., £10.; Talcahuano, 19 t. 14 c., £1,525.; Trinidad, 1 t., £104.; Valencia, 11 c., £50.; Wellington, 10 c., £50.

BARIUM CHLORIDE—
Rouen, 10 t., £155.

BITUMEN—
Sydney, 1 c., £10.

BLEACHING POWDER—
Alexandria, 1 t., £12.; Alexandretta, 19 c., £12.; Auckland 2 t., £24.; Colon, 8 c., £13.; Calcutta, 20 t. 4 c., £244.; Cape Town, 1 t., £15.; Christiania, 30 t. 6 c., £268.; Delagoa Bay, 1 t., £18.; Drammen, 50 t. 2 c., £443.; Durban, 6 t., £74.; Monte Video, 59 t., £589.; Maceio, 3 t., £30.; Melbourne, 5 t., £56.; Piracus, 1 t. 10 c., £15.; Philadelphia, 3 t. 3 c., £86.; Pernambuco, 3 t., £35.; Rio de Janeiro, 15 t., £170.; Santos, 5 t. 2 c., £60.; Sydney, 1 t. 1 c., £12.

BOILER COMPOSITION—
Corinto, W.I., 2 c., £16.
La Guaira, 4 c., £10.

BORAX—
Brisbane, 10 c., £15.; Calcutta, 5 t., £142.; Mollendo, 1 t., £35.; Pasages, 1 t., £25.; St. John's, N.F., 2 c., £3.; Sydney, 3 t. 10 c., £102.

BORIC ACID—
Constantinople, 10 c., £29.
Sydney, 10 c., £27.

CALCIUM CARBIDE—
Lagos, 9 c., £14.

CALCIUM CHLORATE—
Brisbane, 5 t. 3 c., £31.

CALCIUM CHLORIDE—
Rangoon, 15 t. 3 c., £86.
Sydney, 25 t. 5 c., £154.

CARBONATE OF LIME—
Genoa, 10 t. 1 c., £98.

CHEMICALS (*otherwise undescribed*)
Adelaide, 1 t., £12.; Amsterdam, 10 t. 4 c., £200.; Barcelona, 15 t., £403.; Bilbao, 2 t. 6 c., £63.; Bombay, 10 t., £119.; Lisbon, 1 t., £28.; Melbourne, 5 t. 17 c., £1,609.; Montreal, 5 c., £56.; New York, 14 c., £52.; Oporto, 1 t. 10 c., £42.; Sydney, 1 t., £11.; Santander, 4 t., £112.; Teneriffe, 10 t. 5 c., £25.

CHLORINE—
Durban, 6 c., £10.

CITRIC ACID—
Sydney, 3 t. 15 c., £663.
Wellington, 5 c., £47.

COAL TAR PRODUCTS—
Benzol
Duala, 7 c., £20.
Carbolic Acid
Genoa, 10 c., £73.; Hamburg, 90 t. 7 c., £11,900.; Kobe, 9 t. 18 c., £1,755.; Mauritius, 11 c., £22.; Melbourne, 1 c., £12.; Sydney, 6 t. 15 c., £213.; Yokohama, 10 t., £1,400.
Creosote
Gefle, 18 c., £24.
Sydney, 1 t. 4 c., £30.
Mirbane Oil
Havana, 1 t. 7 c., £81.
Pitch
Lagos, 2 t. 6 c., £27.
Pyridine
New York, 2 t. 3 c., £335.
Tar
Accra, 1 t. 1 c., £13.; Calabar, 1 t., £10.; Coromel, 1 t. 7 c., £20.; Duala, 1 t., £10.; Talcahuano, 1 t. 6 c., £19.
Unspecified
Melbourne, 7 c., £54.; Rotterdam, 11 t. 13 c., £1,139.; Wellington, 10 c., £93.

COPPER OXIDE—
Buenos Aires, 1 t. 9 c., £103.

COPPER SULPHATE—
Brisbane, 6 t., £157.; Calcutta, 5 t., £129.; Melbourne, 3 t., £79.; Nyasaland, 5 c., £15.; Napier, 5 c., £6.; Sourabaya, 20 t., £495.; Santos, 1 t., £25.

CREAM OF TARTAR—
Auckland, 10 c., £50.; Brisbane, 4 t., £360.; Cape Town, 10 c., £46.; Sydney, 10 t., £900.

DISINFECTANTS (*otherwise undes.*)
Amsterdam, 1 t. 4 c., £159.; Baltimore, 1 t., £37.; Batavia, 2 t. 6 c., £112.; Buenos Aires, 8 c., £65.; Callao, 2 t. 9 c., £69.; Calcutta, 2 t. 16 c., £105.; Durban, 4 t. 6 c., £151.; Calabar, 4 c., £14.; East London, 2 t. 13 c., £112.; Havre, 9 c., £103.; Mollendo, 7 c., £19.; Montreal, 1 t. 18 c., £69.; New York, 24 t. 8 c., £964.; Rangoon, 11 c., £20.; Sierra Leone, 18 c., £37.; Switzerland, 5 t., £1,166.; Sekondi, 9 c., £15.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 28 t. 7 c., £3,066.
Unspecified
Calcutta, 2 c., £28.; Dunedin, 1 t., £308.; Famagusta, 2 qrs., £34.; Genoa, 3 c., £75.; Lyttleton, 8 c., £56.; Madra, 1 c., £22.; Melbourne, 1 c., £57.; Montreal, 4 t. 6 c., £681.; Penang, 1 c., £32.; Shanghai, 2 t. 19 c., £513.; Singapore, 40 lb., £13.; Sydney, 2 t. 2 c., £656.

DYESTUFFS (NATURAL)—
Cutch
Amsterdam, 2 t., £78.

ESSENTIAL OILS (SYNTHETIC)—
Citronella
Durban, 1 t. 1 c., £409.

ESSENTIAL OILS (SYNTHETIC)—
Iddo, 3 c., £58.
Switzerland, 19 c., £335.

GLYCERINE—
Antwerp, 10 t. 16 c., £1,199.; Colombo, 6 c., £28.; Durban, 3 c., £16.; East London, 5 c., £25.; Kobe, 9 t. 4 c., £711.; Malta, 9 c., £50.; Pt. Said, 2 t. 4 c., £80.; Yokohama, 29 t. 13 c., £2,216.

HYDROCHLORIC ACID—
Calcutta, 15 c., £21.

LEAD ACETATE—
Auckland, 5 t. 2 c., £220.
Rouen, 2 t., £82.

MAGNESIA (CALCINED)—
Buenos Aires, 5 c., £39.
Pto. Barrios, 2 c., £24.

MAGNESIUM SULPHATE—
Accra, 1 c., £2.; Black River, 3 c., £3.; Burutu, 1 c., £2., Iddo, 1 c., £1.; Lagos, 3 c., £4.; San Fernando, Trinidad, 10 c.; £4.; Sekondi, 1 c., £1.

MANGANESE SULPHATE—
New York, 5 t. 3 c., £150.

PITCH (*otherwise undescribed*)—
Genoa, 18 t. 2 c., £330.

PITCH (VEGETABLE)—
Arica, 12 c., £7.
Valparaiso, 19 c., £11.

PLATING SALTS (*otherwise undes.*)
Calcutta, 1 c., £10.

POTASSIUM BICHROMATE—
Alexandria, 7 t. 4 c., £343.
Melbourne, 1 t. 1 c., £54.

POTASSIUM CHLORATE—
Melbourne, 10 t., £397.

POTASSIUM IODIDE—
Forcados, 15 lb., £14.; Opobo, 56 lb., £59.; Warri, 18 lb., £17.

POTASSIUM PRUSSIATE—
Melbourne, 5 c., £86.

POTASSIUM SILICATE—
Amsterdam, 2 c. 3 c., £38.

QUININE BISULPHATE—
Huelva, 1 c., £21.

SALAMMONIAC—
Famagusta, 10 c., £27.; La Corunna, 4 c., £11.; Wellington, 4 c., £11.

SALICYLIC ACID—
Brisbane, 5 c., £64.
Switzerland, 10 t. 5 c., £1,719.

SALTPETRE—
Durban, 5 c., £11.

SHEEP DIP—
Adelaide, 1 t. 6 c., £48.; Albany, 1 t. 17 c., £70.; Beira, 1 t. 14 c., £124.; Buenos Aires, 17 t. 18 c., £955.; Constantinople, 5 c., £17.; Hobart, 2 t. 2 c., £78.; Launceston, 5 t. 7 c., £201.; Melbourne, 27 t. 10 c., £1,050.; Pt. Stanley, 5 t. 1 c., £200.; Punta Arenas, 2 t. 4 c., £144.; Pto. Descado, 3 t. 9 c., £263.; Sydney, 10 t. 4 c. £394.; Wellington, 22 t. £794.

SULPHUR—
Punta Areans, 15 t., £148.

SULPHURIC ACID—
Bahia, £14.

TANNIC ACID—
Amsterdam, 4 c., £29.

TANNING MATERIALS—
Unspecified
Antwerp, 13 t. 13 c., £190.; Cape Town, 2 t. 6 c., £40.; Christiania, 13 t. 4 c., £192.; Dunedin, 2 t. 4 c., £36.; East London, 2 t. 2 c., £48.; Genoa, 24 t. 11 c., £323.; Mossel Bay, 16 t. 13 c., £348.; Pt. Elizabeth, 9 t. 1 c., £165.; Rotterdam, 4 t. 10 c., £57.; Venice, 1 t. 11 c., £39.

TARTARIC ACID—
Montreal, 1 t., £55.

WOOD PRESERVATIVE—
Adelaide, 8 t. 19 c., £297.; Barranquilla, 10 c., £24.; Christiania, 3 t. 5 c., £104.; Durban, 11 c., £20.; Lyttleton, 6 t. 6 c., £144.; St. John's, N.F., 1 t. 7 c., £36.

ZINC CHLORIDE—
Bombay, 1 t., £37.
Calcutta, 2 t. 6 c., £59.
Colombo, 10 c., £14.
Rouen, 2 t., £52.

ZINC OXIDE –
Cape Town, 1 t., £50.

ZINC SULPHATE—
Melbourne, 1 t., £13.
New York, 2 c., £23.

Week ending August 3.

BONE FERTILISER—
Antwerp, 25 t.

CAUSTIC SODA—
Alexandria, 137 drms.; Antwerp, 6 drms.; Auckland, 71 drms.; Beyrout, 3 drms.; Buenos Aires, 10 drms.; Calcutta, 40 drms.; Copenhagen, 30 drms.; Corfu, 11 drms.; Gefle, 25 drms.; Durban, 98 drms.; Dunedin, 55 drms.; Hong Kong, 44 drms.; Lyttleton, 137 drms.; Manaos, 25 drms.; Melbourne, 20 drms.; Mollendo, 9 drms.; Monte Video, 50 drms.; Montreal, 50 drms.; Oporto, 21 drms.; Padang, 141 pkgs.; Pernambuco, 200 cs., 269 drms.; Pto. Mexico, 168 drms.; Pt. Alegre, 5 drms.; Pt. Swettenham, 40 drms.; Punta Arenas, 2 drms.; Rangoon 20 drms.; Rio de Janeiro, 332 drms.; Rotterdam, 704 drms.; San Francisco, 10 cs.; Santos, 500 cs.; Sydney, 161 drms., 130 cs.; Tampico, 985 drms.; Vera Cruz, 537 drms.; Wellington, 34 drms.

CHINA CLAY—
Vigo, 10 t.

FERRO MANGANESE—
Antwerp, 125 t.; Los Angeles, 30 t.; Montreal, 30 t.; New Orleans, 60 t.; San Francisco, 255 t.; Sydney, 10 t.

GLUE, SIZE, AND GELATINE—
Amsterdam, 2 pkgs.; Calcutta, 30 bgs.; Jaffa, 10 bgs.; Manaos, 7 pkgs.; Matanzas, 12 bgs.; Montreal, 17 cks., 8 cs., 70 pkgs.; Pt. Elizabeth, 10 cks.

LEAD ASHES—
Antwerp, 17 t.

SALT—
Antwerp, 150 t.; Auckland, 350 t.; Barbados, 4 t. 10 c.; Beira, 2 t. 10 c.; Buenos Aires, 100 t.; Calabar, 150 t.; Cape Town, 5 t.; Cape Coast, 5 t.; Christiania, 100 t.; Copenhagen, 37 t. Duala, 86 t.; Durban, 45 t.; Gefle, 50 t.; Grand Lahou, 4 t.; Iddo, 225 t.; Kingston, Ja., 62 t.; Lyttleton, 515 t.; Lucea, 4 t.; Matadi, 2 t.; Montreal, 589 t.; Onitsha, 50 t.; Pt. Harcourt, 200 t.; Sierra Leone, 210 t.; St. John's, 10 t.; Victoria, W.C.A., 7 t.

SOAP—
Accra, 675 bxs.; Addah, 352 pkgs.; Alexandria, 136 cs.; Amsterdam, 250 bxs.; Antofagasta, 25 bxs.; Annotto Bay, 45 pkgs.; Antigua, 150 pkgs.; Axim, 90 pkgs.; Auckland, 10 bxs.; Barcelona, 1 ck.; Bolivia, 102 cs.; Buenos Aires, 3 pkgs.; Calabar, 608 bxs.; Callao, 420 pkgs.; Cameroons, 110 pkgs.; Cape Coast, 50 pkgs.; Cartagena (Col.), 50 bxs.; Cayenne 1,024 pkgs.; Ceuta, 175 pkgs.; Colombo, 50 pkgs.; Duala, 894 pkgs.; Eten, 100 pkgs.; Famagusta, 6 pkgs.; Grand Bassam, 57 pkgs.; Grenada, 150 pkgs.; Guayaquil, 227 pkgs.; Havre, 25 pkgs.; Helsingfors, 60 bxs.; Iquique, 25 pkgs.; Iquitos, 844 pkgs.; Jaffa, 18 cs.; Kingston, Ja., 1,338 pkgs.; Lagos, 197 bxs.; Larache, 125 pkgs.; Las Palmas, 500 pkgs.; La Libertad, 100 pkgs.; Leghorn, 350 pkgs.; Libreville, 15 pkgs.; Malta, 19 pkgs.; Maracaibo, 1 cs.; Melilla, 28 drms.; Mollendo 10 cs.; Montego Bay, 99 bxs.; Monte Video, 40 cs.; Montserrat, 60 cs.; Okopedi, 250 bxs.

SOAP—
Opobo, 1,000 pkgs.; Oporto, 4 pkgs.; Paita, 50 bxs.; Panama, 111 bxs.; Paramaribo, 50 pkgs.; Pimentel, 150 bxs.; Pto. Colombia, 1 bx.; Pt. Gentil, 9 pkgs.; Pt. Harcourt, 3 bxs.; Punta Arenas, 85 bxs.; Quittah, 100 pkgs.; Rangoon, 2,219 bxs., 26 cs.; Rio de Janeiro, 33 bxs.; Rosario, 124 bxs.; Salaverry, 50 cs.; Saltpond, 250 pkgs.; San Fernando, 1 cs.; Santiago de Cuba, 1 cs.; Sekondi, 337 pkgs.; Serb Croat Slovene, 50 cs.; Sierra Leone, 3 pkgs.; St. John's, 2 cs.; Stockholm, 4 bxs.; Surinam, 2 cs.; Switzerland, 111 pkgs.; Tangiers, 14 bxs.; Teneriffe, 194 pkgs.; Ternate, 245 bxs.; Tetuan, 125 bxs.; Trinidad, 369 cs.; Victoria, W.C.A., 100 bxs.; Winnebah, 200 cs.

SODA CRYSTALS—
Antofagasta, 100 pkgs.; Barbados, 55 pkgs.; Gibraltar, 20 brls.; Piraeus, 7 pkgs.; Punta Arenas, 32 pkgs.; Rangoon, 123 pkgs.

SODA ASH—
Auckland, 41 pkgs.; Bahia, 43 cks.; Bahia Blanca, 82 cks.; Buenos Aires, 287 cks.; Brisbane, 295 bgs.; Calcutta, 6,580 bgs.; Callao, 12 pkgs.; Christiania, 150 bgs.; Copenhagen, 156 pkgs.; Corral, 50 bgs.; Curacao, 150 bgs.; Dalny, 616 bgs.; Dunedin, 135 bgs.; Durban, 100 bgs.; Fremartle, 160 pkgs.; Kalmar, 300 bgs.; Lyttleton, 50 bgs.; Melbourne, 655 pkgs.; Moji, 5,193 pkgs.; Oporto, 100 bgs.; Pt. Alegre, 77 cks.; Rio de Janeiro, 80 bgs.; Rotterdam, 1,000 bgs., 300 pkgs.; San Antonio, 220 cks.; Santos, 428 cks.; Stockholm, 600 bgs.; Singapore, 60 cks.; Sydney, 582 pkgs.; Tientsin, 2,184 bgs.; Wellington, 100 bgs.; Yookohama, 3,138 pkgs.

SODIUM SULPHIDE—
Callao, 10 pkgs.
Corral, 30 drms.
Santos, 20 drms.

SODIUM BICARBONATE—
Adelaide, 178 pkgs.; Alexandria, 210 kgs.; Antwerp, 813 pkgs.; Ancona, 130 pkgs.; Auckland, 174 pkgs.; Bahia Blanca, 10 kgs.; Barbados, 75 pkgs.; Beira, 2 cs.; Brisbane, 30 pkgs.; Calcutta, 200 pkgs.; Copenhagen, 80 pkgs.; Fremantle, 135 pkgs.; Genoa, 250 pkgs.; Leghorn, 271 pkgs.; Melbourne, 170 kgs.; Naples, 80 kgs.; Penang, 30 pkgs.; Pernambuco, 100 kgs.; Rio de Janeiro, 200 pkgs.; Singapore, 260 kgs.; Sydney, 118 bgs., 48 kgs.; Varna, 40 kgs.; Wanganui, 20 kgs.; Wellington, 290 pkgs.

SODIUM BICHROMATE—
Hamburg, 16 pkgs.
Sydney, 32 cks.

SODIUM CYANIDE—
Puerto Bolivar, 483 cs.

SODIUM HYDROSULPHITE—
Amsterdam, 108 pkgs.
Sydney, 40 kgs.

SODIUM PRUSSIATE—
Genoa, 4 drms.

SODIUM SILICATE—
Adelaide, 66 pkgs.; Bari, 10 pkgs.; Buenos Aires, 211 pkgs.; Durban, 10 pkgs.; Hong Kong, 250 pkgs.; Lyttleton, 10 pkgs.; Melbourne, 571 bgs.; Messina, 50 bgs.; Montreal, 31 pkgs.; Para, 24 pkgs.; Pernambuco, 1 pkg.; Pt. Said, 124 pkgs.; Rio de Janeiro, 26 pkgs.; Sinapore, 3 pkgs.; Sydney, 57 bgs.

STEARINE—
Delagoa Bay, 365 pkgs.

TALLOW—
Danzig, 60 brls.; Hamburg, 6 cks.; Lisbon, 40 t.

WAX (VEGETABLE)—
Genoa, 61 bgs.

LONDON.

Week ending August 1.

ACETIC ACID—
Irish Free State (F.), 1 cs., £14.

AMMONIUM NITRATE—
Teneriffe, 9 t., £243.

BONE FERTILISER—
Channel Islands, 1 t. 10 c., £26.
Hamburg, 10 t., £40.

BORAX—
Durban, 4 c., £9.
Rotterdam, 1 t., £78.

CALCIUM CARBIDE—
Mauritius, 2 c., £5.

CARBON (RETORT)—
Boulogne, — £297.
Hamburg, 300 t., £721.

CAUSTIC SODA—
Bombay, 2 cs. (pt.), £13.
Dunedin, 12 c., £17.

CHEMICALS (*otherwise undescribed*)
Adelaide, 1 cs., £15.; Batoum (F.), 1 ck., £6.; Bombay, 1 cs., £16.; Danzig, 150 pkgs., £405.; Delagoa B., 11 cs. £8.; Demerara, 2 pkgs. (pt.), £6.; East London, 2 cs., £5.; Irish Free State, 52 pkgs., £180.; Melbourne, 13 cs., £215.; Pt. Elizabeth (F.), 2 pkgs., £6.; Rangoon, 2 cs. (pt.), £7.; Romney, 300 bgs., £810.; Sydney, 3 cs., £65.; Valparaiso, 50 cs., £133.

CITRIC ACID—
Lyttleton, 2 c., £18.
Singapore, 1 c., £10.

COAL TAR PRODUCTS—
Creosote Oil
Channel Islands, 3 cks., £12.
Phthalic Anhydride
Rouen, 1 ck., £18.
Pitch
Rouen, 168 pkgs., £490.

COBALT OXIDE—
Amsterdam, 3 cs., £220.

COBALT SULPHATE—
Gothenburg, 1 ck., £33.

CREAM OF TARTAR—
Albany, 10 c., £46.
Singapore, 2 c., £11.

DISINFECTANTS (*otherwise undes.*)
Auckland, 10 c., £51.; Bombay, 1 c., £8.; Christchurch, 3 t. 2 c., £616.; Constantinople, 2 c., £20.; Malta, 1 c., £5.; Wellington, 14 c., £77.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bagdad, 3 cs., £15.
Calcutta, 1 kg., 1 cs. (pt.), £26.
Fremantle, 1 cs., £8.
Melbourne, 14 pkgs., £271.
Sydney, 2 cs., £61.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 6 t. 18 c., £64.

GLYCERINE—
Hamburg (F.), 15 t. 4 c., £750.
Madras, 15 c., £78.

HYDROGEN PEROXIDE—
Alexandria, 2 cs., £18.

IODINE (RESUBLIMED)—
Bremen, 1 cs., £90.
Sydney, 1 cs. (pt.), £91.

MAGNESIUM CITRATE—
Havana, 1 cs., £8.
Singapore, 2 cs., £22.

MAGNESIUM SULPHATE—
Belize, 8 c., £16.

POTASSIUM BROMIDE—
Perth, 5 cs., £19.

POTASSIUM CITRATE—
Melbourne, 2 cs., £23.

SODIUM BISULPHITE—
Oporto, 10 c., £9.
Singapore, 50 drms., £50.

SODIUM TARTRATE—
Perth, 10 c., £40.

SPENT OXIDE—
Amsterdam, 187 t. 2 c., £530.

SULPHUR (FLOWERS)—
Rangoon (F.), 10 c., £7.

SULPHURIC ACID—
Channel Islands, 1 t. 11 c., £41.; Durban, 8 c., £13.; Pt. Elizabeth, 8 c., £13.

SUPERPHOSPHATE—
Durban, 43 t. 12 c., £400.

TARTARIC ACID—
Greymouth, 3 c., £22.

Week ending August 4.

BEESWAX—
Buenos Aires, 1 c.

FERRO MANGANESE—
Libau, £210.

GLUE, SIZE, AND GELATINE—
Bombay, 14 c.; Gibraltar, 1 c.; Toronto, 1 t.

ISINGLASS—
Bombay, 1 c.

PLUMBAGO—
Boulogne, 4 c.

QUININE—
Bombay, 5,760 oz.

SALT—
Gibraltar, 6 c.; Inbrambanc, 1 c.; Malta, 10 c.

SOAP—
Adelaide, 3 c.; Ahwaz, 3 c.; Alexandria, 3 c.; Amsterdam, 3 c.; Bangkok, 10 c.; Basra, 5 c.; Bombay, 13 c.; Brussels, 1 t. 12 c.; Cologne, 3 c.; Durban, 2 c.; Gibraltar, 3 c.; Italy, 3 c.; Melbourne, 8 c.; Sekondi, 8 c.; Sydney, 4 c.; Timaru, 6 c.

TALLOW—
Duisburg, 11 t. 15 c.
Riga, 76 t.

WHITE LEAD—
Auckland, £1,305.

MANCHESTER.

Week ending August 4.

NIL.

NEWCASTLE-ON-TYNE

Week ending August 4.

AMMONIA—
Bergen, 10 cks.

ANTIMONY—
Antwerp, 23 cks.

BLEACHING POWDER—
Gothenburg, 60 cks.
Rotterdam, 24 cks.

CAUSTIC SODA—
Copenhagen, 40 drms.
Gothenburg, 49 drms.
Hamburg, 931 drms.
Rotterdam, 35 drms.

CHEMICALS (*otherwise undescribed*)
Bergen, 2 demijhns.

COAL TAR PRODUCTS—
Benzol
Hamburg, 1,000 drms.
Tar
Bergen, 1 kg.

GLUE—
Christiania, 40 pkgs.

LITHARGE—
Antwerp, 13 cks.
Rotterdam, 12 cks.
Valparaiso, 10 kgs.

RED LEAD—
Antwerp, 40 drms.
Bergen, 30 cks.
Copenhagen, 29 cks.
Rotterdam, 200 t., 116 cks.

SALT—
Christiania, 261 cs.

SOAP—
Gothenburg, 550 cs.

WHITE LEAD—
Copenhagen, 6 cks.
Valparaiso, 40 cks.

N. & S. SHIELDS.

Week ending August 4.

NIL.

PRICES CURRENT.

WEDNESDAY, AUG. 8, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	..*cwt.	23/6 & 47/-		
Acetic, (Glacial, B.P.) in carboys	..*ton	66	0	0
Arsenic, S.G. 2.000	.. ton	85	0	0
Boric (crystals)	..†ton	50	0	0
Citric	.. lb.	0	1	8¼
Formic, 80/85%	..*ton	52	0	0
Hydrofluoric, 59/60%	..*lb.	0	0	7½
Lactic, 80%	.. ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	..*carboy	0	4	0
Nitric, 80° Tw.	..*ton	21	10	0
Oxalic	.. lb.	0	0	6
Phosphoric, 1,500° tech.	..*ton	33	0	0
Sulphuric (168°)	..*ton	7	10	0
Sulphuric (140°)	..*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	..*ton	4	10	0
Tannic (commercial)	.. lb.	0	1	9
Tartaric (crystals)	.. lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	..*lb.	0	0	9
Aniline Salt	..*lb.	0	0	9½
Anthracene, 40/45%, "A"	.. unit	0	0	4
Benzol, 90%	..*gallon	0	1	4
Carbolic Acid (crude 60%)	.. gallon	0	3	4
Carbolic Acid (crystals 40°)	.. lb.	0	1	3
Creosote	..*gallon	0	0	9
Cresylic Acid, 95%	..*gallon	0	2	6
Naphtha, crude, 30%	..*gallon	0	0	9
Naphtha, solvent (90/160)	..*gallon	0	1	4
Naphthalene, refined	.. ton	18	10	0
Pitch (f.a.s. Liverpool)	.. ton	7	2	6
Pyridin	.. gallon	9	19	0
Tar, crude	.. ton	4	5	0
Tar, refined	.. barrel	2	2	6
Toluol	..*gallon	0	1	9
Xylol, (pure)	..*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	..*ton	125	0	0
Alum, loose lump (delivered)	..*ton	12	0	0
Aluminium Sulphate, 17/18%	.. ton	10	10	0
Aluminium Sulphocyanide	.. lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	.. ton	7	0	0
Ammonia, anhydrous	..*lb.	0	1	4
Ammonia, .880	..*ton	22	10	0
Ammonia, .920	..*ton	14	10	0
Ammonium Carbonate (lump)	.. lb.	0	0	4
Ammonium Muriate (grey)	..†ton	30	0	0
Ammonium Nitrate	.. ton	35	0	0
Ammonium Phosphate	.. ton	60	0	0
Ammonium Sulphate, 25¾% delivered	..†ton	14	5	0
Ammonium Sulphocyanide, 95%	.. lb.	0	1	3
Antimony (Golden Sulphide)	.. lb.	0	0	9
Arsenic (Cornish White)	.. ton	71	0	0
Barium Carbonate (native), 92/94%	.. ton	5	15	0
Barium Chlorate	.. lb.	0	0	8
Barium Chloride (in casks)	.. ton	15	0	0
Barium Sulphate	.. ton	£5 to £7		
Barium Sulphocyanide, 95%	.. lb.	0	0	10½
Bleaching Powder, 35%	..*†ton	11	7	6
Bleaching Liquor, 7%	..*ton	4	5	0
Calcium Chloride	..†ton	5	7	6
Carbon Bisulphide	..*ton	28	0	0
Casein (commercial)	.. ton	80	0	0
China Clay (at Runcorn), in bulk	.. ton	50/- to 90/-		
Chromium Acetate (crystals)	.. lb.	0	0	8
Copper Sulphate	.. ton	26	0	0
Formaldehyde, 40%	.. ton	98	0	0
Glycerine (chemically pure, S.G. 1,260)	..*ton	85	0	0
Glycerine (crude), 80%	..*ton	60	0	0
Iodine	..*oz.	0	1	0
Iron Nitrate, 80° Tw.	..*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	.. ton	6	0	0
Lead Acetate (white)	.. ton	41	0	0
Lead Acetate (brown)	.. ton	43	0	0
Lead Carbonate (White Lead)	.. ton	44	0	0
Lead Nitrate	.. ton	42	0	0
Lime Acetate (brown)	..*ton	11	10	0
Lime Acetate (grey), 80%	..*ton	19	10	0
Lime Bisulphite (S.G. 1,070)	..*ton	8	0	0
Lime Superphosphate, 30%	.. ton	3	15	0
Litharge	.. ton	37	0	0
Magnesite, Calcined (delivered)	.. ton	11	0	0
Magnesite, Raw	.. ton	3	0	0
Magnesium Carbonate (light)	.. cwt.	2	0	0
Magnesium Chloride (solid)	.. ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	.. ton	6	0	0
Manganese Borate, 85%	.. ton	112	0	0
Manganese Sulphate, 90%	.. ton	46	0	0
Methylated Alcohol, 64° (industrial)	.. gallon	0	2	1
Naphtha (Wood), Solvent	..*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	.. gallon	0	6	6
Potassium Bichromate	.. lb.	0	0	5¾
Potassium Carbonate, 90%	.. ton	28	0	0
Potassium Chlorate	.. lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	.. ton	18	0	0
Potassium Chloride 80%	.. ton	8	10	0
Potassium Nitrate (refined)	.. ton	32	0	0
Potassium Permanganate (commercial)	.. lb.	0	0	9¾
Potassium Prussiate (yellow)	.. lb.	0	1	2¼
Potassium Prussiate (red)	.. lb.	0	3	9
Potassium Sulphate, 90% (ex ship)	.. ton	11	10	0
Potassium Sulphocyanide	.. lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	60/- & 57/-		
Sodium Acetate	.. ton	24	10	0
Sodium Arsenate, 45%	.. ton	50	0	0
Sodium Borate (Borax), Crystals	..*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	..†ton	10	10	0
Sodium Bichromate	.. lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	.. ton	15	0	0
Sodium Carb. (Alkali), 58% bags	..†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	.. lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d. to 9d		
Sodium Hydrate (76% C. Soda), f.o.r.	..†ton	21	10	0
Sodium Hydrate (70% C. Soda)	..†ton	20	0	0
Sodium Hydrate (60% C. Soda)	..†ton	19	0	0
Sodium Hydrate (Liquid, 90° Tw.)	..†ton	8	10	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	26	0	0
Sodium Hyposulphite (commercial)	..†ton	10	0	0
Sodium Hyposulphite (photographic)	.. ton	14	0	0
Sodium Manganate (basis 25%)	.. ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	.. ton	13	7	6
Sodium Nitrite, 100% basis	.. ton	26	10	0
Sodium Perborate	.. lb.	0	0	11¼
Sodium Phosphate	.. ton	15	0	0
Sodium Prussiate	.. lb.	0	0	6¼
Sodium Silicate (glass), Alkaline	..†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	..†ton	9	0	0
Sodium Sulphate (Saltcake)	..†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	.. ton	4	0	0
Sodium Sulphide (conc.), 60/65%	.. ton	15	0	0
Sodium Sulphide Crystals (casks)	..†ton	8	10	0
Sodium Sulphocyanide (liquid)	.. lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	.. ton	8	5	0
Sulphur (Roll Brimstone)	.. ton	8	5	0
Sulphur (Texas Gulf)	.. ton	5	5	0
Tartar Emetic, 43/44%	.. lb.	0	1	1
Tin Crystals	.. lb.	0	1	4
Tin Perchloride fused	.. lb.	0	1	10
Titanous Chloride	.. lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	..*ton	20	0	0
Zinc Sulphate, Crystals	.. ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	.. ton	115	0	0
Antimony	.. ton	30	0	0
Copper	.. ton	64	17	6
Lead (Chemical Sheet), delivered	.. cwt.	1	14	0
Lead (Foreign Pig)	.. ton	24	0	0
Nickel	.. ton	130	0	0
Silver	.. oz.	0	2	7
Tin, English Ingots	.. ton	181	10	0
Zinc (Spelter)	.. ton	31	5	0
Zinc Dust, 90/92%	.. ton	50	0	0
OILS.				
Cottonseed	..*ton	44	10	0
Linseed, Raw	..*ton	43	0	0
Stearine, 115-120° M.P.	.. ton	48	0	0
Tallow	.. ton	38	0	0
Turpentine	.. cwt	3	11	3

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only

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CONTENTS.

	PAGE
Current Topics:—	
A Novel Nitrogen-fixation Process	183
Our Japanese Alkali Market.	184
Trade Returns	184
National Certificates in Chemistry	184
The Formaldehyde Decision.	184
The Technology of Soldering Materials	185
Platinum in the United States	186
India's Heavy-chemical Industry	187
World's Trade in Artificial Silk	188
Arsenic Situation in America	189
The Development of the Fast Dye Industry	190
America and the German Patents.	191
Japanese Match Industry	191
The Oils and Fats Industry	192
Canadian Cobalt Production	193
Correspondence	193
Items of Interest	194
British Overseas Chemical Trade	195
Our Bookshelf	196
South Wales Notes	196
New Companies	196
Fertiliser News	197
Cumberland Coking and By-product Industries	197
Imports of Chemicals and Allied Products in July	198
Exports of Chemical and Allied Products in July	199
Reports of Companies	200
Thirty-five Years Ago	200
Gazette News	200
Trade Inquiries	200
The Patent List:—	
Applications for British Letters Patent	201
Complete Specifications Accepted	201
Complete Specifications Open to Public Inspection before Acceptance	201
Abstracts of Latest Complete Specifications	201
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	202
Market Reports:	
London "Open Market" Report	202
London Metal Market	204
Manchester Chemical Market	204
Swansea Market Report	204
Liverpool Chemical Market	204
West of Scotland Chemicals	205
Imports of Chemical Products	205
Exports of Chemical Products	207
Prices Current	210

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CURRENT TOPICS.

A NOVEL NITROGEN-FIXATION PROCESS.

IT is now more than eighty years ago since the suggestion was first made by T. Sterry Hunt that it might be possible to hydrolyse nitrogen gas with the direct formation of ammonium nitrite. The theory underlying this suggestion is that since the molecule of nitrogen consists of two atoms, and since the great stability of molecular nitrogen can only be explained satisfactorily by the hypothesis that the constituent atoms possess opposite electrical charges; hydrolytic decomposition of the nitrogen under suitable conditions should give rise to the formation of the electro-positive ammonium ion from one of the nitrogen atoms, and the electro-negative ion of nitrous acid from the other. Similar views have since been advanced from time to time, but the experimental difficulties in the way of proving the theory have been so great, and those results that have been obtained are so conflicting, that the reaction has become almost discredited. It would appear, however, from recent work carried out by H. George Falk, of New York, and Professor R. H. McKee, of Columbia University (*Chemical and Metallurgical Engineering*, August 6, 1923), that the reaction does take place, and to quite a definite extent; and that it may possibly form the basis of a new and simple method of nitrogen fixation. In the first experiments in which nitrogen at 300 pounds pressure was maintained in contact with water at the ordinary temperature, approximately six parts of nitrogen per million were found to have been hydrolysed, and the products formed were ammonium nitrite and ammonium nitrate, the latter compound possibly resultant upon the presence of accidental traces of oxygen. In glass or silica vessels the reaction did not take place until a clean piece of iron was present. Increasing the pressure of the nitrogen to 1,800 pounds per square inch gave an increased yield, which was still further augmented by employing an alcohol-acetone-water mixture instead of water alone. As the American chemists point out, it is very much easier to work at ordinary or low temperatures with water and nitrogen, than it is to work at red heat with gases such as the nitrogen-hydrogen mixture at present used; and, although the results so far obtained are negligible, from the economic standpoint, it is far from impossible that by the discovery of a suitable catalyst, and the use of the

very high pressures, the process might emerge into the realm of practical politics.

OUR JAPANESE ALKALI MARKET.

In these days, when the loss of several of our overseas markets for chemicals, and the serious shrinkage in the shipments to many others are so frequently lamented, it is a pleasant relief to be able to record a case in which the British manufacturer has regained completely his pre-war position. Such a case is the Japanese market for soda ash and for caustic soda. According to reports from our Japanese correspondent at Osaka, after a period of fierce competition and ruthless price-cutting, British alkali manufacturers have now recovered their dominant position. Of the three Japanese soda-ash producers, two ceased operations some time ago, and the third, the Asahi Glass Company, has just completed a contract for ten thousand tons of British soda ash, and has closed down its own alkali plant. It appears also that Magadi soda importers have found the competition of the British-produced ash too keen, and have ceased to import. With regard to caustic soda, the price drop of 25 sen per 100 pounds made by Brunner, Mond, and Company on the 11th of last month has already produced satisfactory results, American producers obviously finding it impracticable further to reduce quotations below their last figure of 9.50 yen per 100 pounds for spot delivery. The Japanese product itself has for some time been offered considerably below cost, and it is difficult to see how the present quotation can be maintained, let alone lowered much further.

TRADE RETURNS.

The Board of Trade returns for July show that the month's import figures are the lowest since February, 1922, while there is a decrease of £12½ million on the June total. Exports have declined by nearly £3½ million on the June figures, and by £12 million on those of May. It is impossible to say how far these movements may represent trade which has been totally lost as a result of the dockers' strike, and how far mere postponement has occurred. The stoppage at the Port of London continued throughout the month, while Hull, Manchester, Liverpool, and other ports had their business stopped in the first part of the period. The opening-up of these ports allowed a considerable transference of traffic to them from London, otherwise the trade figures must have been much worse. There is a limit, however, to this kind of diversion of trade, and it appears to be increasingly imperative that immediate action in connection with the strike should be taken. It will be realised, therefore, that the figures for July alone indicate quite a different position when compared with those for the seven months since the beginning of the year. Conclusions deduced from an examination of the larger figures are much more hopeful, the total imports at £616,000,000. exceeding the figure for the seven months in 1922 by £47,000,000., while British exports were £30,000,000. better at £442,000,000. Although these figures point to a better general trade position, it is a little disturbing to find that the main increase in our exports during the period is to be attributed to raw materials, chiefly coal, exports of manufactured articles being only just over one per cent. higher than last year. So far as the general direction of trade is concerned, it is interesting to note that in the period January to June, 1923, British exports to the United States have considerably increased, as compared with 1922, while the value of our imports from that country has fallen by a small percentage.

NATIONAL CERTIFICATES IN CHEMISTRY.

The arrangements and conditions for the award of national certificates in chemistry to students in technical schools and colleges in England and Wales, have just been issued as a white paper by the Board of Education (H.M. Stationery Office, 2d. net). It will be remembered that under this scheme the Institute of Chemistry was invited, and has undertaken to work in co-operation with the Board in approving submitted schemes of training, in conducting the final examinations, and in awarding the certificates to successful candidates. Four types of certificates are to be issued, senior and advanced part-time course certificates intended mainly for students at evening classes, and full-time course certificates in chemistry and in applied chemistry intended for students who have attended a secondary school up to the age of 16. Full-time course certificates in chemistry will necessitate attendance at a course extending over at least three years, and an additional minimum period of study of one year after this course must be spent by the candidate for the certificate in applied chemistry. The conditions of award of the certificates are not too onerous, and it should be easily within the capacity of the average student to qualify. What the ultimate value of these certificates will be, only experience can decide. As stepping stones to higher examinations they will undoubtedly be of advantage, but their economic value to those who do not intend to pursue further their studies of chemistry is, to say the least, problematical.

THE FORMALDEHYDE DECISION.

The referee, appointed under Part I. of the Safeguarding of Industries Act, has given his decision in the formaldehyde appeal case. The complaint of the Chemical Merchants' and Users' National Vigilance Committee, that formaldehyde has been improperly included in the list of articles prepared by the Board of Trade as dutiable under Part I of the Act, has been found to be valid, and as from Monday, the 20th inst., the substance will be withdrawn from the list. It is not known yet which of the points raised by the complainants carried most weight with the referee. It is true that their contentions, firstly that formaldehyde production from natural methyl alcohol is not a true synthesis, and secondly that the material is not a generally acknowledged analytical reagent, possess a certain amount of validity, but we cannot help thinking that the decision is somewhat against the spirit in which the Act was framed.

THE TECHNOLOGY OF SOLDERING MATERIALS.

A COMPREHENSIVE REVIEW OF MODERN PROGRESS.

By "Metallurgicus."

THE fusible alloys used for soldering purposes are usually classified as "hard" and "soft" solders, according to their melting point. Hard solders comprise the various brazing alloys, silver and gold solders, while the soft solders are predominantly lead-tin alloys, melting as a rule below 300° C. Fusibility, temperature range of solidification, hardness and chemical composition, are some of the factors which determine the utility of a solder, the constitution controlling the tendency to form solid solutions with the metals to be united. Thus microphotographic examination shows that brazing alloys actually diffuse into and alloy with the brass of the joint, a similar effect resulting when ordinary plumbers' solder is applied to brass (Sterner-Rainer, *Zeit für Metallkunde*, 1921). For ease of application, soldering alloys should be more fusible than the metals to be joined, and for a union of maximum strength, they should be of the same hardness and malleability as the metal. High fusibility is a factor of particular importance in aeroplane work, where the effect of heat on mechanical properties has to be considered.

The Manufacture of Soldering Alloys.

The preparation of the alloys under consideration is carried out so as to obtain uniformity of composition and to minimise losses by volatilisation and oxidation. For this purpose the least fusible constituent is completely melted first and the other metals then added, stirring being effected by means of a piece of greenwood, so as to reduce any oxide formed. Brazing alloys are fused under a layer of powdered borax or charcoal and then granulated or cast in ridged iron moulds, so that the resulting cake can easily be broken up. The pieces are then heated to a red heat, ground in a mortar and the powder sifted to size. Another method is to pour the melt in a thin stream through a broom of twigs into water, which is kept in motion; or, again, the metal is allowed to flow in a thin stream through a water-jet on to a rotating disc, from which the particles are flung into water. Granulation can also be effected by means of a high-pressure steam jet, after which the granules are dried by shaking with sawdust in a sieve. Soft solders are generally melted under tallow and then cast into sticks or run off into strips, or they can be granulated by shaking in a closed iron vessel lined with a thin layer of plaster. Gold and silver compositions are usually rolled into sheets and then cut into strips or drawn into wire.

The More-important Soft Solders.

As stated above, soft solders are usually lead-tin alloys, melting below 300° C., and should be free from zinc. Additions of bismuth and cadmium serve to lower the melting point without increasing the strength, while the alloys may be hardened by adding up to 10 per cent. of antimony. The ductility is very low, being still further reduced by antimony, which, together with zinc and aluminium, has a deleterious effect on the adhesive properties of the solder. For soldering zinc, copper may be incorporated with good results, while the addition of phosphor-tin (tin containing a small proportion of phosphorus) is also beneficial.

In the series of lead-tin alloys, the most fusible and most homogeneous solder consists of the eutectic mixture, which solidifies at about 170° C., and contains 37 per cent. of lead. Ordinary plumber's solder, composed of 2 parts of lead and 1 part of tin, with possibly 1 per cent of antimony, begins to solidify at about 60° C. above the eutectic freezing point. This extended range of solidification imparts a pasty consistency to the cooling solder, enabling the material to be shaped to the joint (the plumber's "wiped" joint). For soldering cans a long temperature range of solidification is not essential, ready fusibility and fluidity being the qualities desirable. For this purpose the eutectic alloy would be ideal, but would be too costly, alloys containing 60 per cent. of tin, and even less, sufficing. In soldering pewter ware, the proportion of lead must be cut down for reasons of safety. A tin copper alloy, melting point 257° C., has been patented as being suitable for cast iron, the composition being given as cobalt 2.2 per cent., copper 10 per cent., silver 0.6 per cent., antimony 0.6 per cent., and tin 88.6 per cent. (*Brit. Pat.* 159,797 of 1920). The composition and melting points of some widely used products are as follows:—

—	M. Pt. ° C.	Tin. Per cent.	Lead. Per cent.	Bismuth. Per cent.
Plumber's soft solder	188	50	50	—
Plumber's coarse solder	227	33·3	66·7	—
Tinsmith's fine solder	168	66·7	33·3	—
Tinsmith's ordinary	171	60	40	—
For cans	—	59	37	4
For tinned iron	275	12·5	87·5	—
For pewter	96	25	25	50

Effect of Cadmium in Soft Solders.

With a view to reducing the cost, attempts have been made to introduce cadmium into soft solders in place of tin. A study of lead-cadmium alloys showed that the one containing 8 to 9 per cent. of cadmium had good tensile strength and a solidification range extending from 275° to 248° C. When applied to copper, however, this alloy does not flow very evenly, the addition of a considerable percentage of tin being necessary to overcome this defect. A satisfactory solder results on adding 5 per cent. of zinc (*U.S. Pat.* 1,333,619 of 1920). A lead alloy consisting of 80 per cent. lead, 10 per cent. tin, and 10 per cent. cadmium is claimed to have about the same tensile strength but double the ductility of an ordinary 60 per cent. lead—40 per cent. tin solder. The temperature of complete liquidation is only slightly higher, but the freezing range is much more extensive. Owing to its relatively higher lead content such a solder would be low in price (*U.S. Pat.* 1,301,688 of 1919).

Brazing Alloys and Other Hard Solders.

Hard solders are generally used for very strong joints which are liable to be subjected to high temperatures. The brazing alloys melt at about 1,000° C., which temperature can be lowered by adding cadmium, the presence of tin being undesirable. For brass, copper, iron, and steel, spelter (equal parts of copper and zinc) may be used, the zinc content being increased for pale brasses, while for iron work the copper content is augmented. According to some recent comparative tests, the strongest joint is given by an alloy consisting of 83 per cent. of copper and 17 per cent. zinc (*Tech. Review*, 1921). Recent metallographic study shows that with steel, a constituent intermediate in composition between the alloy and the steel is formed, producing a zone of great strength.

For soldering silver ware, "silver" solders with high silver content are used, and these can also serve as hard solders for brass, copper, iron, and steel. Thus ordinary coil silver is useful for iron, copper, and high-melting-point brass. Arsenic figures as a constituent of some silver solders—*e.g.*, one contains equal parts of silver, arsenic, and brass,—while a soldering composition consisting of silver 55-65 per cent., copper 20-30 per cent., zinc 10-20 per cent., together with arsenic trioxide, is the subject of a recent specification (*U.S. Pat.* 1,375,552 of 1921).

For jewellery, solders consisting largely of gold, together with silver and copper, are used—gold of the same fineness as the article itself being preferably used. Cheaper ornaments are soldered with a composition consisting of brass and gold, but antimony, arsenic, tin, and lead should be absent. Nickel silver (copper-nickel-zinc alloy) can be brazed with an alloy of similar composition in which some of the zinc has been replaced by manganese. The latter is added as cupro-manganese. Nickel silver itself and copper-zinc-manganese alloys find application for iron and steel brazing. In the following table are given some data in connection with some hard solders:—

	Silver. Per cent.	Copper. Per cent.	Zinc. Per cent.	Gold. Per cent.	Other Metals. Per cent.
Silver solder	78	17	5	—	—
" "	75	20	5	—	—
" " for steel	80	15	5	—	—
For bronze, gunmetal, brass	50	33	17	—	—
" " " "	6	47	47	—	—
Brazing alloy for steel	40	29	4·5	—	Cd. 20·5 & Mn 6·0
Gold solder	7	3	—	90	—
" "	—	7	3	90	—

Fluxes for Soldering.

For an efficient union with any solder the metal surfaces much be mechanically and chemically clean. The film of oxide usually present prevents the solder from properly

wetting the metal, and so impairs the adhesion. It has been proposed to operate in an atmosphere of reducing gas in brazing, but for practical purposes fluxes are generally employed. The latter are threefold in function: they decrease the surface tension of the molten solder and so improve its wetting power; they dissolve away any oxide film; and, lastly, they protect the heated metals from further oxidation. Borax and boric acid are the usual brazing fluxes, organic compositions being precluded owing to the high operating temperatures. To obtain a "cooler" medium—that is, to lower the melting point—a mixture is often used, one consisting of five parts of boric acid with two parts of borax being very efficacious. Metal borates are formed, which dissolve in the excess of the flux.

For soft soldering a variety of materials are available, both inorganic and organic. The inorganic fluxes are "killed spirits"—that is, zinc chloride, both fused and in solution, for brass, copper, gunmetal, and tinplate; salammoniac for copper and iron, and hydrochloric acid for zinc and galvanised products. Among organic fluxes are resin for soft alloys, turpentine for pewter and Britannia metal, and palm oil and tallow for light and heavy lead work respectively. The action of the resin is to dissolve the oxides with the formation of resino-resinates, and, unlike zinc chloride and hydrochloric acid, there is no tendency towards subsequent corrosion. Fused zinc chloride ground with salammoniac, and zinc chloride compounded with petroleum jelly, are the chief constituents of some well-known soldering fluxes. Two useful fluxes consist of phosphoric acid dissolved in alcohol and aqueous lactic acid dissolved in glycerol. For lead-cadmium solders a flux of the following composition is recommended: NaCl 11 per cent, KCl 14 per cent, salammoniac 10 per cent, and fused zinc chloride 65 per cent. (*Chem. and Met. Eng.* 1918).

Frequently the solder is ready mixed with the flux in the form of pastes. For instance, granulated soft solder and zinc chloride are made into a paste with beeswax or with celluloid. Such compositions can be applied with a brush, and are especially useful on vertical surfaces. Tubes of soft solder filled with resin can be obtained, while such compositions as $ZnCl_2$ 40 per cent., NH_4Cl 45 per cent., Zn 15 per cent.; and NH_4Cl 1, borax 2, mercury 5, tin 20, and lead 26 parts, are the subjects of recent specifications (*Brit. Pat.* 170,221 of 1920, and *U.S. Pat.* 1,357,297 of 1920).

The Problem of Soldering Aluminium.

The vexed question of a satisfactory solder for aluminium still awaits solution. The metal is electro-positive to all the soldering alloys, so that electrolytic action sets in at the joint, leading to rapid corrosion. Joints exposed to moisture should therefore be protected by painting or varnishing. Another difficulty is the ease with which an oxide film, very difficult to remove completely, forms. Further, aluminium only alloys at a high temperature. Ordinary lead solders cannot be used, as they alloy only with great difficulty. According to a recent investigation of the United States Bureau of Standards (*Circ.* 78, 1919), the most satisfactory solders are zinc-tin alloys with or without aluminium—*e.g.*, zinc 15-50 per cent., tin 85-50 per cent., zinc 8-15 per cent., and aluminium 15-50 per cent., the remainder being tin. There are applied without a flux after tinning the aluminium, the higher the temperature of the latter operation, the better the adhesion. Brittleness results with a too high aluminium content, or when copper or antimony are present. A soldering alloy which is stated not to crack away when an aluminium casting cools down has the following complex percentage composition: Al 85, Cu 6.5, Zn 4.5, Fe 2.0, Si 1.5, and Pb 0.5 (*German Pat.* 340,294, of 1919).

Another method proposed for soldering aluminium is to electroplate the metal with a film of iron, which is then tinned, so that it can be soldered in the usual way. The plating bath consists of equal parts of 4 per cent. ammonium oxalate and 2 per cent. ferric-sulphate solutions, a current density of 0.15 amp. per sq. dm. of cathode being used (*Brit. Pat.* 134,315, of 1918). The table at the head of the next column gives some of the host of compositions recently patented.

Many soldering fluxes for aluminium have also been proposed, the chief being phosphor-tin, cryolite Na_3AlF_6, stearic acid, and various alkali chlorides and fluorides. Thus one composition consists of equal proportions of tin, zinc, lead, and stearic acid, together with a little skunk oil (*U.S. Pat.* 1,321,529, of 1919). Another contains cryolite, and the chlorides of ammonium, lithium, and manganese (*Brit. Pat.* 152,486, of 1919).

—	Tin. Per cent.	Zinc. Per cent.	Aluminium, Per cent.	Lead. Per cent.	Copper, Per cent.	Other Metals.
U.S. Pat. 1333237/'20	37—43	37—43	—	14—26	—	—
Brit. Pat. 124715/'19	33	37	28	—	2	—
U.S. Pat. 1323520/'19	66	25	4·5	—	—	Phosphor tin, 4·5; Bi, trace.
U.S. Pat. 1341508/'20	67·6	16·9	1·41	—	—	Phosph-tin, 11·3; Bi, 2·8.
U.S. Pat. 1336081/'20	34	30	2	34	—	—
Brit. Pat. 139402/'19	69	26·2	2·4	—	—	Phosphorus 2·4
Brit. Pat. 132724/'19	60	30	10	—	—	—
Brit. Pat. 164655/'20	49	49	—	—	2	—
Brit. Pat. 156665/'21	30—35	50—53	12—15	—	1—2	—
	—	75—84	5—20	—	7—12	—
	—	85·7	—	—	—	Cd, 14·3 Fe, trace.

In order to overcome the soldering difficulty, autogeneous welding of aluminium has been introduced. Here the molten aluminium itself acts as the solder, but the presence of the almost infusible Al_2O_3 is a difficulty. Various welding fluxes are used, many being sold under such trade names as "autogal" and "zasa." These either protect the metal from oxidation (alkali chlorides) or act as solvents for the oxide (cryolite, sodium, potassium, lithium and aluminium fluorides, alkali bisulphates and pyrophosphates). One such medium consists of KCl 45 per cent., NaCl 30 per cent., KF 7 per cent., LiCl 15 per cent., and 1 to 10 per cent. of alkali pyrosalts (*Brit. Pat.* 170,343, of 1920).

PLATINUM IN THE UNITED STATES.

RESOURCES PROVED TO BE NEGLIGIBLE.

THE main source of the world's supplies of platinum is normally Russia, which once had an output of 300,000oz. per annum, derived from gravel beds. As a result of the war the price of platinum is about three times what it was formerly, and the temptation has apparently been considerable in the United States to boom platinum mining in that country. To this end, all sorts of properties have been pronounced to be capable of producing platinum from ores of various kinds and even shales and sands. As a matter of fact the country, save in very small quantities, is practically as destitute of platinum, as it is of nickel and tin, and the cases in which the United States Bureau of Mines has been able to check claims advanced, have revealed at the most practically unworkable traces of the metal. Platinum was the subject of a good deal of prospecting and assaying on the part of the Bureau during the war, when it was thought that such work might reveal sources of supply which would then have been very valuable. The work, then and since carried out, served for the most part to convince the officials that the platinum resources were, however, very small. At its best the United States have produced less than 1,000oz. a year, and that as ancillary to the working of gold, silver and copper, without which the platinum recovery would have been uneconomical

The Bureau's investigations have led to the examination of a large number of samples, in most of which no platinum whatever was discovered though rich claims had been made and certified. In one case platinum was found in the form of soluble platinum salts and sponge, "neither of which exists in nature," to quote the damaging judgment of the Bureau; another "sample revealed wire and foil therein." As it had been claimed that many of the samples did not lend themselves to ordinary assay methods, and most of the promising claims were made in connection with special methods of analysis or assaying, the Bureau instituted a number of tests of a similar character, but with negative results. The fire assay method is held in all cases by the Bureau to be the most effective and reliable. The relatively small quantities which have been recovered in conjunction with work on other metals have mainly been from well-known lode deposits in Wyoming, Nevada, Colorado and Alaska. In all these cases the platinum is present in very small quantities and is only recovered as a by-product, usually in working copper ore. Black sand deposits have been tested but found to contain nothing workable, but the black sand concentrate from dredges and hydraulising plants has been found to yield recoverable quantities. As the dredges alone handle over 50,000,000 cub. yards of gravel per annum the actual platinum content is infinitesimal and would not be workable alone.—*Engineering.*

INDIA'S HEAVY-CHEMICAL INDUSTRY.

A BRIEF SURVEY OF THE ACTUAL POSITION.

By F. R. Lowe.

THE heavy-chemical industry in India has since the war been a very attractive field for chemists and chemical engineers. During the boom period of 1919 to 1920, many schemes were discussed and more or less attempted, but the rapid decline of the rupee to its pre-war value proved the death-blow to the great majority of these schemes. The directorates of industry in the various presidencies have gathered together staffs and statistics showing the demands and resources of the country, but the net result cannot be said to be very encouraging. This is not the place, however, to go into the whys and wherefores of the relative failure of these directorates.

Sulphuric-acid Manufacture.

The heavy-chemical industry of India may be said to comprise sulphuric acid, aluminium sulphates, sodium sulphide, nitric acid, hydrochloric acid, magnesium sulphate, sodium sulphate, and zinc chloride. Sulphuric acid has been manufactured in India for many years, one of the first large factories being that at Cossipore, near Calcutta, which was later removed to the right bank of the River Hooghly, about fourteen miles from Calcutta, and is still in existence. Other factories are situated at Bombay (2), Ranejunge, Lodna, Loyalad, Bowrah, Bararree, Tatanajar (2), Cawnpore, Calcutta, and Madras. The factories at Ranejunge, Lodna, Loyalad, Bowrah, Banaree, and one at Tatanajar produce solely for sulphate-of-ammonia manufacturing purposes, with small quantities of concentrated acid for benzol refining at the coke-ovens. One at Jamshedpur is manufacturing the acid for galvanising purposes only.

The output of the various plants given above is notoriously higher than the requirements for ammonia absorption necessitate. Two at least of the factories are reputed to be capable of producing 10,000 tons of chamber acid per annum, and the remainder down to 1,200 tons per annum. As there are no large deposits of pyrites or sulphur available in India, sulphur is in all cases burnt, mostly imported from America, No practical difficulty exists in working the chambers with or without Glover and Gay-Lussac towers, five plants at least not having these adjuncts.

The plants at the coke-ovens do not yet cater for buyers of strong acid, but there is no doubt that in the near future they will do so. They have the initial advantage in that fuel, coal or coke, has not to pay the heavy freight which is such a burden on plants further from the coalfields. The demand for acid of 1.84 gravity probably reaches 700 tons per annum, and, generally speaking, the quality required is much higher than that in England. This appears to have arisen from the fact that in the early days acid was made from the best sulphur in small chambers without towers, and thus no exterior impurities were in the acid, which is often water-white.

There are optimists who think that in the next few years the demand for superphosphates will influence the output of sulphuric acid. Whether this is or is not the case, there is undoubtedly an increasing demand due to the manufacture of soda and other aerated waters.

Transportation of the commercial acid is generally effected by means of 2½gal. jars and 5gal. carboys, although in one case a small tank is occasionally used, and in another steel drums of 40gals. capacity. With regard to these steel drums, they are used to transport 1.84 acid, and owing to the heat, action on the steel and cast-iron bungs and seatings takes place. The greatest corrosion was on the bungs, but this source of trouble has been eliminated by coating the bungs and seatings with paraffin wax. Painting the drums white has also helped to keep down the internal temperature.

Some plants use sodium nitrate and some potassium nitrate as the source of nitric acid for the chambers. The sodium sulphate formed in the first case is difficult to get rid of, whilst the potassium bisulphate can easily be converted to the neutral sulphate and sold at a price which materially helps to reduce the cost of production of the sulphuric acid.

The Hydrochloric-acid Industry.

The demand for hydrochloric acid appears to be greatest in the Bombay and Ahmedabad district, and a total for all India of about 900 tons per annum appears to be the maximum demand. The type of plant used varies from the old-fashioned horizontal cylindrical retort, with Woulffe bottles as absorption elements, to the latest pot and muffle furnace type with cisterns and towers. The former turns out the best class of acid, but the latter, with certain modifications, should produce equally good acid. The manufacture of hydrochloric acid is bound up with the demand for Glauber salts and sodium sulphide, and it requires the greatest skill and knowledge of the market requirements to so produce that the loss on one part of the manufacture does not absorb the profit on the others.

Sulphates and Nitric Acid.

Glauber's salt, Epsom salts, and copperas are made in five factories, four of which we in England would term only manufacture on the experimental scale. All these chemicals are subject to keen competition from the German imports, and it is very doubtful if any profit is made on these products in any one of the above factories.

Nitric acid is made in four factories, and is about to be produced in one other. The retorts are cylindrical, horizontal, and of the modern three-piece vertical type. Decolourising in one factory is done by steaming the acid in jars. Earthenware and silica condensers are usual. The demand is greatest in the Madras district, the bazaars of Calcutta and Bombay coming next. A pure acid is not demanded, and the total quantity consumed does not appear to be more than one hundred tons per annum.

The manufacture of T.N.T. has been mooted, but the scheme seems to have been abandoned, as has also the contemplated production of diazo compounds for the dyeing establishments. In addition to shortage of the necessary raw materials, the activities of the German colour companies have no doubt had a lot to do with the decision that the game was not worth the candle.

Zinc chloride is most in demand on the Bombay side of India, due to the numerous cotton mills established in this presidency. A production of two hundred tons per year of concentrated chloride meets the present total consumption. A small quantity is used as a timber preservative, as a protection against the ravages of the white ant

Aluminous Compounds and Sodium Sulphide.

There is a large consumption of aluminium compounds in India, waterworks and paper mills being the chief purchasers, with textile mills coming next. Alum is made by two factories, their output being about 100 tons per annum, whilst a third is about to commence operations. The process used is complicated and costly, and needs improvement. Sulphate of alumina is made in two forms—crude cake, from Indian bauxite, and a purer form, 14/15 per cent. Al_2O_3, by redissolving the crude cake, settling and concentrating. No iron-free or neutral material is made, although the demand is of the order of 6/8,000 tons per year, and likely to increase.

Sodium sulphide is in good demand, and is certain to increase as dyehouses and tanneries increase in number. None is made in India, but one factory is about to make the attempt so far as concentrated liquor is concerned. Obviously this is bound up with the supply of sodium sulphate, of which there are two sources of supply—viz., hydrochloric acid plants, and direct from sulphuric acid. It is true that in the alkaline earth of Bihar, sodium sulphate is found, but the cost of extracting and concentrating is prohibitive.

Caustic soda and sodium carbonate are in great demand, but unless an enormous protective duty is placed on these products it is not in the least likely that their manufacture in India will be attempted for many years to come.

Aniline in Fuel Oil Analysis.—Gravimetric and volumetric experiments on synthetic mixtures have shown, state D. Holde and S. Weill (*Brennstoff-Chem.*, 1923, 4, 177–179), that wet aniline dissolves coal-tar oils completely from mixtures of these oils with mineral oils, leaving the latter unaffected, so that it can be used to determine the percentages of tar oils present in mixtures. According to an abstract of their paper in the *Journal of the Society of Chemical Industry*, a little aniline is dissolved by the mineral oil, but it can be removed thence and from the solution of the coal-tar oils by treatment with hydrochloric acid. Rosin oils are somewhat soluble in wet aniline, and if an excess of the latter be employed, they can be dissolved from mineral oils quantitatively. Further, fatty oils can be separated from mineral oils by treatment with an excess of dry aniline. Aniline has the advantage of being much less poisonous than dimethyl sulphate, which up to the present has been used to separate various classes of oils.

THE WORLD'S TRADE IN ARTIFICIAL SILK.*

RAPID EXPANSION BOTH IN EUROPE AND AMERICA.

THE use of artificial silk has expanded with such rapidity as already to have a direct bearing on the situation in real silk and a potential influence on both the cotton and wool markets. As early as the eighteenth century attempts were made to discover a substitute for raw silk, but it was only with the perfection of the nitro-cellulose process in the eighteen eighties by Count Hilaire de Chardonnet that a commercially successful fibre was produced. Upon the Frenchman's experiments as a foundation the artificial silk industry has been expanded until to-day the world produces over 70,000,000 pounds of artificial silk, an amount considerably in excess of the commercial crop of real silk.

General Survey of World Production.

Estimates of pre-war world production of artificial silk vary considerably, a Belgian authority quoting 26,000,000 pounds as the probable 1914 figure, an increase of 21,600,000 pounds from the 1902 estimate or approximately 500 per cent. Considered in the light of an average real silk output of only 64,000,000 pounds for the years 1910 to 1914 the significance of artificial silk in the textile field is manifest. Less striking but very significant is the increase which the last eight years have brought. While accurate information on production in most countries is unavailable, estimates secured by the United States Department of Commerce indicate a world production for 1922 in excess of 70,000,000 pounds. This figure may be compared with a world real silk production of only about 63,000,000 pounds in 1922. Belgium, whose 1921 artificial silk production was over 4,000,000 pounds, largely expanded its output in 1922, and France, which was credited with a daily production of 9,000 pounds in 1920, more than tripled its output last year. Germany, too, enjoyed a remarkable revival, its 1922 production being about 200 per cent. larger than that of the previous year. Other important producers were Switzerland and Italy, each contributing last year about 6,000,000 pounds to the world's supply. Both Japan and Poland furnished over a half million pounds, the Netherlands double that amount and the production of the United States expanded over 60 per cent. in the year.

Growth in the British Trade.

British trade in artificial silk, though of considerable importance before the war, is not recorded separately in official statistics. However, in 1914 Great Britain sent 1,300,000 pounds of artificial silk yarns to the United States alone, according to American statistics of imports. In 1919 American imports of British yarns had dropped to 196,900 pounds or only 15 per cent. of 1914 imports, but by 1921 they had risen to 56 per cent. of pre-war figures. Last year's imports showed a considerable advance over 1919 quantities, but amounted to only 37 per cent. of 1914 imports. The marked decline in American imports from Great Britain as compared with 1921 takings was only part of a general decrease of 43 per cent. in U.S. imports from all countries.

Although most of the British yarns are made by the viscose process, since the war the cellulose acetate process has been developed under Government subsidy. The product has a high lustre and elasticity, is apparently waterproof and sun fast, and is marked by its similarity in appearance to natural silk. This type of silk is spun largely in the fine counts, the average running around 40-50 deniers. However, acetate silk is so costly as yarn and so expensive to convert into the finished product that it holds a field rather separate from that of other artificial silks and is more nearly a competitor of raw silk.

The Belgian and French Positions.

Belgium, which before the war furnished about one-fourth of the world's supply of yarns, had dropped to a position of practical insignificance by 1919 due to the fact that the industry was largely destroyed by wartime confiscation of machinery. It has since recovered volume remarkably, net exports amounting to 543,600 pounds in 1922.

The trade of France in artificial silk yarns was less important quantitatively before the war than it is to-day. However, its position has changed considerably since the war, French imports now exceeding exports. From net exports of 190,000 pounds in 1909 (France imported no yarns at that time) its trade rose rapidly till 1913 when it sold 1,400,000 pounds abroad. 1919 found France importing considerable quantities from both Switzerland and Belgium, its own industry being apparently unable to supply all the demands of the domestic market. In 1921 it resumed its old status as a net exporter, but in 1922 imports exceeded exports by 315,000 pounds. However, the volume of 1922 trade showed a considerable increase over the preceding year, especially in imports, which totalled 3,700,000 pounds against 1,900,000 during the year 1921. Most of the French yarn is spun by the viscose process. An interesting development has taken place in the establishment at Lyons of an artificial silk mill capitalised at 15,000,000 francs to produce viscose silk, the promoters including many well-known textile manufacturers.

The German Output and Trade.

In 1913 production of artificial silk in Germany was equal in value to 28 per cent. of total European production, according to the estimate of the Berlin National Office of Artificial Silk. Although we have no standard by which to measure comparatively the importance of its output, it is manifest, taking value as the basis, that the product of the German mills was very appreciable even before the war. Production in 1919 amounted to 3,500,000 pounds. By 1921 it had more than doubled, and the 1922 output is expected to show an increase over 1921. Germany has always been a net importer of artificial silk yarns, although exports before the war were considerable and are to-day. Present imports are well under the pre-war average, Belgium supplying most of the imports during 1922 as it did before the war. Second and third places are now occupied by Switzerland and Italy, supplanting Austria-Hungary and France which prior to 1914 supplied substantial quantities. However, Switzerland is now the chief customer for German artificial silk yarn exports, the United States and Czecho-Slovakia assuming important places. At present, a number of firms formerly producing military explosives are making artificial silk, and German inventive ingenuity is being turned to perfection of the processes. Among other inventions, a vegetable substitute for spun silk or schappe is said to have been discovered.

From a minor position before the war, Italy has now taken a place of importance, net exports for 1922 aggregating over two million and gross exports over three million pounds of artificial silk yarns. As a net exporter, Italy holds a position of pre-eminence on the Continent and as a gross exporter is surpassed only by France. Switzerland is the leading customer, the United States ranking second, while Belgium is now the principal source for Italian imports.

The Rapid Rise of Switzerland and Holland.

The rise of Switzerland in the artificial silk field was accelerated by the war. Before 1913 an exporter of considerable quantities of yarn, it had made substantial progress, until in the year 1922 it exported 1,900,000 pounds, principally to Great Britain, the United States and Spain. Its advance during the war was due in no small measure to its favourable position in relation to the Central Powers and its status as a neutral. Great Britain is at present the best customer. Though it exports large quantities of yarn, most of its output is consumed by the domestic industry which produces a variety of goods. With the exception of the years 1920 and 1922, Switzerland has been a consistent net exporter not only in the years just prior to 1913, but since the end of the war. Last year saw a change from 1921 net shipments of over 1,000,000 pounds to net imports of 70,500 pounds in 1922, the reversal being due in part at least to a quickened home demand.

The rise of the Netherlands to importance in the European trade has been very rapid since 1919. In that year 70,000 pounds of yarns were imported chiefly from Switzerland, but in 1922 imports had reached 291,000 pounds, an increase of 316 per cent. The principal source of supply was Germany. Exports in 1922 likewise showed a remarkable increase amounting to 284 per cent. over 1919 figures which stood at 456,000 pounds and net exports for the same period made a 278 per cent. advance. It is reasonable to suppose that the Netherlands, like Switzerland, benefited by its status during the war, but quantitative comparisons are impossible since pre-war statistics do not report artificial silks separately.

Even Japan, which supplies over half of the world's real silk, has been invaded by the artificial silk product. Prior to 1912 Japan carried on no trade in artificial silk, but in that year it imported 162,000 pounds, the countries of

* Statistical data from *Commerce Monthly*, the official publication of the National Bank of Commerce in New York.

origin not reported. By 1916 its imports had dropped to 42,000 pounds, but rose again and stood at 75,900 pounds in 1919, derived principally from Switzerland and Great Britain. They have continued to rise steadily and in 1922 totalled 224,600 pounds.

While the artificial silk yarn trade of the principal European countries and of Japan bulks large, both quantitatively and in value, of greater importance are their operations in manufactured products containing artificial silk, either alone or in combination with other textiles. These invisible imports and exports may be regarded as of very substantial bulk and value. Especially is the trade of France and Switzerland distorted unless exports of manufactures of artificial silk are associated in mind with the trade in yarns.

Growth of the Artificial Silk Industry in America.

The year 1911 witnessed the beginning of the artificial silk industry in the United States, the establishment of an organisation operating under the viscose process marking the launching of a new fibre in the American textile trade. From a modest output of 320,000 pounds in 1911 this factor alone has increased its production to a total estimated for 1922 at 19,900,000 pounds. Other producers have entered the field, operating under the Chardonnet, acetate and cuprammonium processes, and production of yarns in 1922 totalled 24,406,000 pounds. Unsettled transit conditions and Europe's war demand for its domestic output caused a reduction in U.S. artificial silk imports from 2,700,000 pounds in 1915 to 93,000 pounds in 1918. After the war they reacted sharply, reaching a peak in 1921 when the United States took 3,700,000 pounds. Of this Italy supplied 771,000, Switzerland 720,000, Great Britain 714,000, and Belgium 637,000 pounds. U.S. imports reflect very accurately the ascendancy which Italy and Switzerland gained as a result of the war, imports by the United States for the fiscal year 1914 standing at 60,000 pounds from Italy and 158,000 pounds from Switzerland. The Netherlands sent 218,000 pounds in 1921 against 5,000 pounds in 1914, figures which bear eloquent witness to its progress as an exporter.

Due in part to strong competition from the domestic product in 1922, U.S. imports of yarns decreased over 40 per cent., imports from several important sources showing material declines. Belgium supplied only a little over one-third of its 1921 quantity and the Netherlands but one-half, while France sent last year only 15 per cent. of the total exported to U.S. in 1921. From Germany and Austria, on the other hand, decided advances in importations were made. American receipts from Austria rose from nothing in the period 1919-21 to 29,600 pounds in 1922, approximating 1914 exports to the United States. Imports from Germany were 63 per cent. greater than in 1921, that country being the only large producer to increase its supplies to America last year.

The following table shows the trade of the United States in artificial silk yarns, accurate figures for manufactures not being available. Trade in finished goods, pure and mixed, is known to be very large, but the artificial silk content cannot be dissected out.

Trade of the United States in Artificial Silk Yarns, Threads, and Filaments, in Pounds.

—	Production.	Imports.	Exports.	Re-exports.	Net Imports.	Available for Consumption.
1913.....	1,566,000	2,304,795	—	6,354	2,298,441	3,864,441
1919.....	8,000,000	1,148,513	*	1,138	1,147,375	9,147,375
1920.....	8,000,000	1,846,875	*	48,337	1,798,538	9,798,538
1921.....	15,000,000	3,667,180	*	247,716	3,419,464	18,419,464
1922.....	24,406,000	2,087,772	*	69,833	2,017,939	26,423,939

* Not reported separately.

Price Stability an Aid to the Industry.

Perhaps the most conspicuous fact in the artificial silk situation in America is the price of the material, which is now less than one-third of the price of raw silk. However, even more important than the position of the price to-day in relation to real silk is the stability of the quotations for artificial silk. While during the last three years raw silk has pursued an erratic course between a maximum of 16.85 dollars and a minimum of 5.00 dollars, artificial prices have fluctuated little and have held firm for many months at low figures. With real silk to-day at nearly 9.00 dollars and replacement prices a matter of speculation, the appeal which artificial silk is making to the American manufacturer is apparent, and the far-sighted action of the producers in keeping artificial silk prices steady in what has long been practically a "seller's market" has further advantaged the manufacturer of silks by supplying an alternative material for the virtually monopolised real silk. How valuable this alternative has been is illustrated by the fact that domestic production of artificial silk in 1922 was equal to 55 per cent. of American imports of raw silk, with artificial stocks negligible.

Even with the amazing increases in production of artificial silk the supply has not kept pace with the demand which has steadily increased and broadened. While the production of real silk responds only tardily to demand, the circumstances of artificial silk production allow for elastic regulation of supply to demand. However, the large initial capital costs, the necessity for quantity output to make production profitable, the relatively low profits per pound and the great mechanical and technical difficulties inherent in the industry have kept the units relatively large. In America and elsewhere the textile men have fostered the industry, realising its potentialities in protecting them from centralised control of raw silk.

ARSENIC SITUATION IN AMERICA.

STATISTICS FOR FIRST HALF OF 1923.

FIGURES are now available of the U.S. output and sales of arsenic products during the first half of 1923. An increase of 25 per cent. over the 1922 output is shown, but the estimate made by the Geological Survey last Spring of 22,000 tons of white arsenic has been proved to be too high. According to the *Oil, Paint and Drug Reporter*, the actual figures show that white arsenic was produced at nine plants operated by six companies in the United States during the first six months of 1923. The sales during the first five months of the year and the estimated sales in June amounted to 6,035 short tons of refined arsenic, valued at 8.36 cents to 15 cents a pound, and 1,183 tons of crude arsenic, valued at 7.43 cents to 10 cents a pound. No large stocks of arsenic remained at the works, and the prospect is good that production during the last half of the year will equal or exceed that during the first half.

Imports of White Arsenic.

The imports of white arsenic during the first three months of 1923 amounted to 2,694 short tons, valued at 447,645 dollars. During this period Germany shipped the largest quantity of white arsenic—588 short tons, valued at 117,549 dollars—and was followed by Japan, with 513 tons, valued at 78,869 dollars. Other countries, named in order of size of shipments of white arsenic to the United States, were France, Belgium, Mexico, England, Canada, Dominican Republic, Brazil and Australia. If the imports of white arsenic continue during 1923 at the rate of 800 tons a month the total available supply in the United States for the year will be about 21,000 tons.

No red or yellow arsenic sulphide was reported to have been produced in the United States during the period considered, but imports of these products amounting to 452 tons were received from China in January, 1923, having shipped through a port of British India. Smaller quantities were shipped from France, Germany, England, Belgium, Canada and Japan. Some metallic arsenic was received from Germany in February.

Supplies in the United States.

The Western States have the largest undeveloped deposits of arsenic, and these are now receiving attention. Several new plants for the direct treatment of arsenic ores are contemplated. The deposits of Montana at present furnish the largest supply of arsenic, producing more than 4,500 tons of white arsenic annually.

Nevada has the largest available supply of arsenic above ground in the United States. At Eureka there is a great accumulation of speiss from smelting operations that were carried on in the seventies. During the first six months of 1923 this speiss dump was drawn on by the smelters in Utah and Washington at the rate of 2,000 tons a month. The speiss carries an average of 30 per cent. of arsenic, and when all metallurgical losses are deducted it probably provides 3,500 tons of white arsenic annually. At Toulon, near Lovelock, Nev., the Toulon Arsenic Co. operates the only arsenic plant in Nevada.

THE DEVELOPMENT OF THE FAST DYE INDUSTRY.*

THE GROWING IMPORTANCE OF THE VAT COLOURS.

THE production of fast dyestuffs has developed along a few well-defined lines. Among wool colours there are the acid alizarine dyestuffs and the after-chrome dyestuffs; among cotton colours, the vat dyestuffs, sub-divided into anthraquinone and indigoid dyestuffs, and it is a point of some significance that the more important fast colours for both wool and cotton are derived from anthraquinone.

The oldest vat dyestuff, indigo, was long considered the last word in fastness, but is now considered only of medium fastness. Soon after the commercial synthesis of indigo came the discovery of indanthrene and flavanthrene by Bohn in 1901. The discovery of the property of the anthraquinone molecule of yielding readily oxidised leuco compounds led to the preparation of a whole new series of dyestuffs, and development for the last twenty-five years has proceeded along two lines, that of dyestuffs constitutionally similar to indigo—the indigoid dyes—and that of dyes containing the anthraquinone molecule. A third and growing series is that of the carbazole colours, represented by the hydron colours of Cassella, though these are sometimes classed as sulphur colours.

Some idea of the progress made with vat dyestuffs may be gathered from the following figures, from which synthetic indigo is excluded, though its substituted derivatives are included. In 1901 there was one firm producing one dye (indanthrene); in 1906 there were three firms producing 20 dyes; in 1910 there were six firms producing 80 dyes; in 1914 there were six firms producing 206 dyes; and in 1922 there were ten firms producing 250 dyes (excluding U.S.A.). The total consumption of German imported vat dyes, excluding indigo, in Great Britain in 1913 was 294 metric tons, comprising one-sixtieth of the total imports. The imports in 1922 amount to 126 tons, comprising one-eighteenth of the total imports. To this we may add 100 tons as representing British production, so that the total consumption in 1922 is almost equal to that of 1913 in vat dyes, and that in a year of very bad trade conditions. The proportion of vat dyes consumed shows an enormous increase.

Principal Classes of Vat Colours.

The anthraquinone series include the Indanthrene, Algol, Cibanone, and some of the Helindone colours. Among the indigoid class are the Ciba, Thioindigo and Thioindone, Alizarine Indigo colours, and the various bromindigos, brilliant indigos and methyl indigos. These are substitution products of synthetic indigo. The indanthrenes are the most popular on account of their excellent fastness, in which, generally speaking, they surpass all the other groups, and also by reason of the comparative simplicity of their application. Simplicity of process is an important factor in regard to demand, and the adoption of two standard processes—one for hot dyeing colours and another for cold dyeing colours—has probably operated in favour of the indanthrene colours over the other groups, in which each dye requires a different process.

The origin of the name indanthrene is interesting. Being the first vat dye to be discovered after indigo, and its colour being similar, justified the "ind" portion of the name, and the fact that it was derived from anthraquinone gave the "anthr." and the termination "ene" completed the name. The anthraquinone vat dyes in general give very brightly-coloured vats, whereas the members of the indigoid series all give yellow to yellowish-brown vats. Further, the latter are suitable for dyeing animal fibres, whereas the anthraquinone dyes are, with few exceptions, applicable to vegetable fibres only. Generally speaking, also, the indigoid dyes are less fast than the anthraquinone dyes. Though the Thioindigo, Helindone, and Ciba colours are suitable for wool, they do not appear to have been greatly used for this purpose, though a large amount of khaki was dyed with these colours in America during the war.

For a long time the Badische Co. were without rivals in the domain of vat dyes. They appeared as pioneers in 1901-2 with Indanthrene Blue RS, followed rapidly by Indanthrene Yellow G (Flavanthrene) and Indanthrene Blue GC, which is fast to chlorine. In 1904 the GCD brand appeared, followed by Violanthrene, a dark blue. The years 1905 and 1906 saw important developments in the indigoid series in the production of Friendlander's Thioindigo Red B, by Kalle, and of Indigo MLB/T and R—directly substituted brom-indigos. The first Ciba colours made their appearance in Switzerland at this time also—Ciba Blue, Heliotrope, and Violet. The range of dyestuffs available then, when the first guaranteed fabrics (Sundour fabrics, first made by the British firm of Morton's Sundour Fabrics, Ltd., in 1906) were produced, was very small, and was practically confined to blues and greens, the latter being obtained with mixtures of Indanthrene Blue and Yellow, the Yellow being quite fast in mixtures, but not particularly so in self-shades. Reds were dyed with alizarine in very deep shades.

Competition Amongst Manufacturers.

Not until 1907 can competition in vat dyes be really said to have commenced. In that year Bayer introduced the Algol colours—Blue CF and 3G (dihydroxy indanthrene), Green B (di-amino dibrom indanthrene), and Red B; and Kalle brought out Thioindigo Scarlet. The first Helindone and Cibanone colours appeared in 1908, and the Hydron Blues in 1910. Additions were rapidly made to all classes, and by 1914 there were about 180 authentic vat dyestuffs on the market. The progress can be gauged from the following table—

Groups.	1902.	1906.	1910.	1914.	1922.
Indanthrene	2	10	27	51	55
Algol	—	—	20	33	35
Helindone	—	—	12	36	45
Thioindigo	—	1	7	20	26
Ciba	—	3	7	17	26
Cibanone	—	—	5	5	19
Hydron	—	—	2	6	31

Progress in the domain of vat dyes has not followed quite the same lines as in other classes of dyestuffs. In most cases the introduction of a new dyestuff by one firm is immediately followed by new competitive products—which may be new dyes or mixtures—by rival firms. In all cases the products are variants on the same chemical constitution. Among vat dyes, however, the rival manufacturers each pursued a separate main line of research. Thus the Badische Co. concentrated on the condensation of anthraquinone nuclei in the production of compounds such as indanthrone, flavanthrone, pyranthrone, and violanthrone, and the anthraquinone acridones; the Bayer Co., on the other hand, devoted most attention to comparatively simply constituted acylamino anthraquinones and anthrimides. The first Algol colours were, however, substituted Indanthrenes; while certain of the Indanthrene colours belong to the anthrimide class. The Cibanone colours are complex products of fusion of simple anthraquinone derivatives with sulphur. The Helindone range was mixed; some were allied chemically to the main Algol type; the remainder to the Thioindigo colours of Kalle. Regarded from another point of view, the Badische Co. devoted their attention mainly to hot dyeing colours, the Bayer Co. to cold dyeing colours.

The vat colours have to be considered more by groups than as individual colours, and the chemical properties of the groups differ so much that great discrimination is necessary in choosing suitable dyestuffs for mixing together. In the early days the range was so limited that dyers had to confine themselves to the products of one firm, but no difficulty is now experienced in choosing suitable colours for working together. Thus there are on the market to-day 41 vat blues (53, including Indigos), 25 violets, 28 yellows, 14 oranges, 66 reds, pinks, bordeaux, etc., 13 greens, 27 browns, 8 olives, 12 greys, 19 blacks. To-day the total number listed is about 460, and post-war development in the production of vat dyes is mainly the development of production in countries outside Germany. New vat colours have been very few, though there are recent signs of activity. The greatest advance has been made in Cassella's range of Hydron colours, to which about twenty additions have been made, covering the whole range of the spectrum. Scottish Dyes, Ltd., have succeeded in remedying the deficiency of a bright vat green. Their new product, Caledon Jade Green, which is probably the forerunner of others, stands in the first class, along with the Indanthrene Blues, for fastness.

* Abstract of paper read by Mr. J. I. M. Jones before the West Riding Section of the Society of Dyers and Colourists in Bradford on March 1. From the complete paper in the *Journal* of the Society (July, 1923).

German Post-war Developments.

An important post-war development in Germany, which is a direct outcome of the merging of all the big dye interests, is that the manufacture of any particular dyestuff is no longer confined to one firm. Thus we find Indanthrene Yellow G appearing as Algol Yellow GBA and Helindone Yellow JG; Indanthrene Violet RR as Helindone Violet J2R, etc. This has also spread to Switzerland, and the Society of Chemical Industry in Basle is now producing Indanthrene Blue RS and GC under the name of Cibanone Blue RS and G, and Indanthrene Violet R under the name of Cibanone Violet R.

A more interesting development, and a distinct step forward in the fast dye crusade is the action of the Badische Co. in re-naming all the vat dyes manufactured by them (including Algol and Helindone dyes) according to a definite system based on their fastness. The name Indanthrene is retained for the dyes of the first class, and Anthra for those of the second. Thus the Anthraflavones now become Anthra Yellows; Indanthrene Bordeaux B becomes Anthra Bordeaux R; Vat Heliotrope R becomes Anthra Bordeaux R; Vat Red B becomes Anthra Red B. Further, the designations of many of the original colours have been altered to indicate special properties. All cold dyeing colours, for instance, have the letter K added. Thus Indanthrene Red BN becomes Indanthrene Red RK; Algol Yellow R becomes Indanthrene Yellow GK; Algol Brilliant Orange FR becomes Indanthrene Orange RRK; Algol Blue K becomes Indanthrene Blue RK; Helindone Yellow RN becomes Indanthrene Yellow RK.

This is a very desirable step. Vat dyes are becoming more and more firmly established and widely used every year, and as there are good and bad vat dyes the indiscriminate inclusion of the latter among reliable products is apt to be misleading. There are over 2,000 recorded chemical compounds which have vat dyeing properties, of which little more than 10 per cent. find their way into commerce, either on account of high cost, difficulties in manufacture, or weakness in some or other of their fastness properties. An example of a bad vat dye is Helindone Scarlet S, which gives an exceptionally fine shade, which, unfortunately, is neither fast to light, chemic, nor rubbing.

British Progress in Vat-dye Manufacture.

The efforts made in the manufacture of vat dyes in this country have primarily been directed to the production of the well-established German colours; and new products have naturally been few. In the sphere of vat colours the first firm in the field was Solway Dyes, now Scottish Dyes, Ltd., who produced Indanthrene Yellow G and Blue RS under the names Caledon Yellow G and Blue R as early as 1915, followed by Indanthrene Dark Blue BO, Green B, Brown B, Black B and Violet R in 1917, and Indanthrene Red BN, Violet RN, and Violet RR in 1918. The output was, of course, limited, and the quality not all that could be desired, but time has remedied both these defects. The manufacture was also taken up by British Dyes, Ltd., with the Chloranthrene and Duranthrene colours; L. B. Holliday, with Hydranthrene, and recently the British Alizarine Co. with the Alizanthrene colours. The development in Britain is illustrated by the fact that in 1920 there were 17 chemically different British vat dyes available, and in 1922, 33. These products cover the whole range, and include the pick of the German vat dyes, and the quality on the whole is up to the German standard. In many cases, indeed, British manufacturers have succeeded in producing purer products than the German analogues.

The number of dyes of various brands produced in 1922 is as follows—

Caledon	20	Hydranthrene	6
Duranthrene	13	Alizanthrene	3
Durindone	6		

In America the Newport Chemical Co. and the Du Pont Co. are also manufacturing a wide range of reputable vat colours.

At present, on account of price, the really fast dyes can only be used for special purposes. The public are continually demanding faster products, but are not always prepared to pay the cost. The need is therefore to enlighten the public more as to the value of vat dyes, and so increase the demand. In this connection it is interesting to note that a retail establishment has recently been opened in Berlin, known as Indanthrene House, which deals solely in goods dyed with Indanthrene colours—shirts, dress materials, gowns, brocades, etc.

AMERICA AND THE GERMAN PATENTS.

PROGRESS OF THE SUIT AGAINST THE CHEMICAL FOUNDATION.

THE hearing of the evidence in the lawsuit which the American Government is taking against the Chemical Foundation Inc. was concluded on July 23. It will be remembered that the claim of the Government is for the return by the Foundation of 4,800 siezed German dye and chemical patents purchased from the Alien Property Custodian in 1919 for 250,000 dollars. The amount of testimony brought forward on both sides has been enormous and the proceedings have, on many occasions, been marked by considerable acerbity. The summing up by the counsel for both sides will not be heard until October 9, and it is believed that no matter what the final judgment on the case will be, the loser will appeal against the decision.

Experiments Performed by Order of Court.

The final hearings of the evidence were remarkable in that several witnesses for the Government who testified to it being possible to make certain chemicals commercially having no other information available than that given in the German patent specification, were ordered by the Court to perform these preparations under conditions of close supervision. Thus Dr. L. Freedman, a chemist formerly in the service of the Calco Chemical Company, was ordered to prepare cincophen by following the German patent formula. The test, which occupied 26 hours, took place in the laboratories of Swarthmore College, Wilmington, Delaware, and was under the supervision of observers for the plaintiff, defendant and the court. Dr. Freedman produced his sample, but was afterwards subjected to fierce cross-examination in which it was alleged that the yields obtained were useless, the product was not of marketable quality and that Dr. Freedman had not followed the German method as closely as he should have done.

Mr. W. G. Christiansen of the Harvard Medical School, and Dr. Chester N. Myers of the Metz research laboratories, both stated that they had made salvarson by following the German specifications reasonably closely, but here again it was held by the Counsel for the Foundation that material improvements upon the methods given in the patents had actually been made.

JAPANESE MATCH INDUSTRY.

A DECLINING TRADE.

THE match trade, in which Japan has taken in the past full advantage of cheap woman and child labour and freedom from factory legislative restrictions, has, nevertheless, not established itself in such a way as to show signs of permanence, states the Kobe correspondent of the *Chamber of Commerce Journal*. During the military occupation of Siberia it seemed sufficient reason for depression in the match trade that poplar wood could not be obtained from Siberia. Now that it is possible to trade again the situation seems to be in no way improved. Matches were exported during the first two months of the year to the value of only Yen 1,827,000, against Yen 2,621,000 in the corresponding two months of the previous year. The absorption of the Japanese match trade in a general world combine is only a matter of time. Negotiations have been going on for years now. The Japanese had their best opportunity in 1919, when a representative of the Diamond Company was over there from America, and the deal was on the point of being concluded on very handsome terms. But in the post-war boom the Japanese felt that the possibilities of trade expansion were unlimited, and put up their price. Representatives have been there since that date, but the Japanese manufacturers cannot now bring themselves to face the facts of the change in the situation. It will probably end in the combine—or the American branch of it—setting up a big factory in China, and leaving Japan only her domestic trade instead of the big Chinese zone that she could have secured in 1919.

Levers Purchase Norwegian Whaling Company.—The Norwegian whaling company, Norge Larvik, has, according to the *Aftenposten*, been transferred to Messrs. Lever Brothers for about seven million crowns.

THE OILS AND FATS INDUSTRY.*

SCIENTIFIC AND TECHNICAL PROGRESS IN 1922.

IT has been a very general opinion that the world's consumption of margarine would be largely increased by the greatly enhanced appreciation of its value as a foodstuff, arising from the experience gained of it during the war years, when it was practically compulsorily used as a foodstuff. There can be no doubt, however, that butter is still esteemed as the prime fatty food for man, and that even a large difference in price between it and its substitutes is no very appreciable aid to the increased consumption of the latter products. It is well known that our margarine factories now are working, in total, to little more than one-third of their maximum output, and that the same condition exists both on the Continent and in the United States. United States Government statistics show that during the financial year ending June 30, 1922, only 83,881 tons of margarine was produced in that country, as compared with over 125,000 tons produced in 1921. It has been asserted frequently that large quantities of maize and soya-bean oils are used by American margarine manufacturers, but the statistics of the Commissioner of Inland Revenue clearly show that this is not the case, since in 1921 maize and soya-bean oils formed only 0.4 per cent. and 0.2 per cent., respectively, of the total fats employed.

From the point of view of Imperial commerce it is gratifying to find that though our total import of linseed for eleven months of the year is lower than that of 1921 by no less than 110,000 tons, we have received from India over 140,000 tons, as against only 36,000 tons in the same period of 1921. There is little doubt that the absence of Russia as a producer is having a large effect upon the market for linseed. This is in considerable measure compensated for by an increased output from the Argentine, where it is estimated that a record crop of 1,500,000 tons will be available this year. This output, along with an increased internal production in the United States of no less than 300,000 tons, should make for lower prices and larger consumption in this country. The amount of cottonseed imported from India in 1922 was almost four times as great as that received in 1921, but much more is available from that source, and it is to be regretted that transport conditions in the country of its origin are probably the prime reason for so small a proportion of the actual production being utilised as a source of one of our most valuable oils.

Shea Butter and Fat.

As a possible, but very largely unworked, source of oil there is probably no greater in the world than that provided by the immense forests of *Butyrospermum Parkii*, which stretch behind the oil-palm belt in West Africa. In the form of shea butter the fat from the seeds of this tree is quite largely used in native cooking, and occasional shipments of both seeds and fat are made to Europe. Its use, however, has been limited by the peculiar rubber-like odour of the fat, and still more by the presence in it of a very variable and frequently large amount of unsaponifiable matter (up to 10 per cent). There is some reason for assuming that the amount of unsaponifiable matter is governed either by variety in the species of the trees, or by climatic or other conditions governing their growth. It is interesting to find that the Agricultural Departments of the West African Colonies are investigating the many problems which present themselves in connection with this product. Work has already been begun in Nigeria, and a report from the Gold Coast Colony, which states that shea trees now existing in that country are capable of producing 260,000 tons of butter annually, indicates that preliminaries for carrying out this work are now well advanced.

The development of coconut plantations on the communal system in the Gold Coast Colony will also be watched with much interest. That copra can be produced there is of course well known, and the success of this experiment seems assured if the phenomenal success of cacao-growing in the country is to be taken as a guide. The plantations now begun are expected to be in full bearing about 1935, but copra will, of course, be produced before that time. Besides the above evidences of keen Governmental interest in the oils and fats industries, and those remarked upon last year, it now appears that the Brazilian Government is so far interested in the oil-seed possibilities of the country that, after having had a complete survey of the northern part of the country made, it is recommended by the Department concerned that experimental stations be established at Para and Bahia. After a survey of the southern states is completed, it is probable that similar stations will be established in that area.

Preparation of Fatty Acids from Hydrocarbons.

The preparation of fatty acids from hydrocarbons still receives a great deal of attention, but little progress is indicated in the published details of the work. Much of this is in the form of patent specifications which cover processes for the preparation of mixtures, more or less suitable for use in the manufacture of soap, the raw materials being usually hydrocarbon residues or tars. Some of these processes are of a most elaborate nature, and seem of very doubtful commercial utility. H. Siebeneck, without attempting to distinguish the individual products of the reactions which take place, has investigated the oxidation of paraffin wax by means of air or oxygen at a temperature of about 135° C. Products of cracking were found in the early part of the experiments, but later, wax-like products were produced, the quantity of which, apparently, increased up to about 33 hours' heating. Thereafter, the ester value, which had increased to an extent equivalent to 70 per cent. of esterified acids, fell to 49.16, a change which was accompanied by a very appreciable slowing of the reaction and an increase in viscosity of the products to about five times the original value.

A. H. Salway and P. N. Williams (*Chem. Soc. Trans.*, 1922, 121,1343), who have investigated the catalytic oxidation of hexadecane by means of oxygen in presence of 2 per cent. of manganese stearate, clearly prove that the result of such like oxidation processes is to produce compounds which are as readily oxidised as the substances they produce. They suggest that the paraffin hydrocarbon is probably first converted into a fatty acid, which is then further attacked at several points in the carbon chain, with the ultimate production of a complex mixture of monocarboxylic acids of the fatty series, dicarboxylic acids of the malonic series, together with lactones, lactonic acids, formic acid, and carbon dioxide.

The interesting work of B. H. Nicolet and H. L. Cox (*J. Amer. Chem. Soc.*, 1922, 44,144) on the structure of linolic acid has led them to the conclusion that only two of the four possible stereoisomeric linolic acids occur, at least in important amounts, in linolic acid as usually prepared, these being the trans-trans and trans-cis forms. As the linolic acid examined was regenerated from the tetrabromide prepared from the fatty acids of cottonseed oil, and recognising the possibility of change during this preparation, it cannot yet be finally assumed that the structure of the linolic acid in this oil has been proved.

The Chemistry of Drying Oils.

A large amount of work yet remains to be done before our knowledge of the reactions involved in the drying of oils is complete, but we are carried several steps toward this end by the continued work upon the subject of S. Coffey (*Chem. Soc. Trans.*, 1922, 121, 17) and P. Slansky (*Z. Angew. Chem.*, 1922, 35, 389). It has been already established that the drying of linseed oil can be divided into two stages, an induction period which covers a considerable portion of the total time required for complete oxygen absorption, and a second stage in which the oil, having gelatinised rapidly, passes to its point of maximum oxidation. It has generally been accepted that the increased rate of oxygen absorption which results from the presence of "driers" such as the compounds of lead, manganese, cobalt, etc., in the oil has resulted merely from a speeding up of these processes, but the recent work of Coffey has established the fact that the induction period is so far reduced as to be almost eliminated, whilst the rate of the main oxidation is unaltered. This undoubtedly provides an explanation of the accelerating effect of a drier from the point of view of time, but until it is proved that the resulting "dried" products are the same it cannot be assumed that the course of the oxidation is identical in both cases. Coffey's results strongly support this view, and are corroborated in considerable measure by the previous work of R. S. Morrell. It would certainly appear that in presence of a drier the oxidation of linolic acid is restricted to the absorption of one molecule of oxygen instead of two, and there is probably a similar but more indefinite action in the case of linolenic acid. Such effects as this readily explain the fact that in every case the oxygen

* From article on "Oils, Fats, and Waxes," by Mr. John Allan, of Messrs. Joseph Crosfield and Sons, Ltd., Warrington, in the "Annual Report on the Progress of Applied Chemistry" for 1922. Published by the Society of Chemical Industry.

absorption recorded is lower than that observed when no drier is present, and the reaction surves are different.

Chinese Wood and Perilla Oils.

The fact that about 35,000 tons of Chinese wood oil was imported into the United States during 1922 makes it quite clear that this oil is now extensively used as a substitute for, or in partial replacement of, linseed oil. As both varieties of the species *Aleurites* occur in China and Japan it is highly probable that the imported oil is of mixed origin, and much of the published work on its composition is consequently of limited value.

The extending use of perilla oil, usually in admixture with linseed oil, lends interest to the results of the investigation of the fatty acids of the oil by K. H. Bauer (*Farben Zeit.*, 1922, 27, 2756). These are stated to be a mixture of 12 per cent. of solid acids, mainly palmitic acid, and 88 per cent. of liquid acids which apparently consist of a linolic acid and several geometrically isomeric linolenic acids.

The Fluorescence of Cottonseed Oil.

The fluorescence frequently exhibited by cottonseed oil expressed from seed of Indian and Chinese origin is undoubtedly to be attributed to some constituent of the seed, the presence of which is largely affected by climatic conditions during growth or harvesting. As fluorescent oil gives unsatisfactory results in the refining process, and is therefore depreciated in value as a foodstuff, it would appear to be desirable to ascertain the nature of the fluorescent substance, and establish means either to prevent its development in the seed, or to remove it from the refined oil. With the extension of cotton-growing in our Colonies this defect in oils of Eastern origin is the more worthy of attention.

Spontaneous Combustion of Dry Soaps.

It is well known that the rise of temperature resulting from the rapid oxidation of highly dispersed quantities of fatty acids less saturated than oleic acid or their glycerides, may bring about ignition of the mass. The observation of A. Welter (*Chem. Umschau*, 1922, 29, 151) that the soda soaps of these acids when dry, and in flake or powder form, are equally capable of oxidation and consequently heating, is of distinct technical importance. He quotes a case in which about half a ton of dry powdered soap, prepared from cotton-seed oil, developed such a rise in temperature that in half an hour it had charred to a coke-like mass. Olive oil soaps show no tendency to such an increase in temperature.

The Separation of Solid Glycerides.

The composition of the glycerides of which oils and fats are composed is of much interest, but no satisfactory method has been suggested yet whereby they may be isolated in anything approximating to quantitative measure from the natural mixtures in which they occur. It has been known for a long time that mixed glycerides occur in the various oils and fats, and there can be no doubt that the composition and proportion of these glycerides very markedly affect such properties as the texture and melting-point of solid fats. These properties are of great importance in the manufacture of margarine and other fatty mixtures, but for the present manufacturers are dependent upon experience and the results of trial blends when adjusting the proportion of the constituents of their products. Crystallisation from solvents has been tried as a means of separation by many workers, with very limited success.

Constitution of Montan Wax.

Montanic acid, to which the formulæ $C_{28}H_{56}O_2$ and $C_{29}H_{58}O_2$ have variously been ascribed, has hitherto been regarded as the only acid present in montan wax. By fractionating the methyl ester of the crude acid, H. Tropsch and A. Kreutzer have isolated two acids having the equivalent weights of 410.7 and 439.0, and m.ps. 82° C. and 86°-86.5° C., respectively. It is concluded that the former of these acids, for which the name carboceric acid is suggested, has the formula $C_{27}H_{54}O_2$. It is probably identical with an acid identified in Chinese wax by Gascard. The acid of higher melting point, having the formula $C_{29}H_{58}O_2$, was esteemed to to be pure montanic acid.

The Hardened Fats Industry.

It is interesting to find that the opinion expressed in the Reports of last year that the highly successful application of the process of hydrogenation to fats is now acting as a deterrent to its further extension, is very emphatically supported in a statement by W. Normann (*Z. Angew. Chem.*, 1922, 35, 437), who first discovered the possibility of hydrogenating glycerides in the liquid state. Normann states that the fat-hardening industry in America is in a parlous condition because the margin between the price of liquid oils and that of natural hard fats is less than the working costs of hardening. The author of this statement might well have gone farther by saying that since cottonseed oil, the oil which has been most largely employed in the hardening process in the United States, has been of the same value as lard, and for a period has even been dearer, the possibility of producing from it a hardened fat to compete with lard is obviously impossible.

The rapidity of the technical application of Normann's discovery has been phenomenal, as is made clear by the fact that only three plants were operating in 1910, and they were struggling with the various difficulties of the process, whereas after twelve years no less than about 75 factories have, by their very efficiency, restricted their own operation. Practically no developments of the process fall to be recorded during the year, but there is no doubt that, given the necessary stimulus provided by sufficient price margins in the oil and fat markets, progress will be made on the lines of a continuous process with a fixed catalyst capable of revivification *in situ*, delivering oil without appreciable loss of catalyst.

CANADIAN COBALT PRODUCTION.

OFFICIAL STATISTICS FOR 1922.

We have received from the Dominion Bureau of Statistics at Ottawa the following finally revised statistics on the production of cobalt in Canada during 1922. The major portion of the world's supply of cobalt for almost two decades has been derived from the silver-cobalt-nickel arsenides of the Cobalt district. During 1922 three smelters in Ontario treating ores and residues from this district marketed cobalt oxide, metallic cobalt, cobalt sulphate, cobalt carbonate, cobalt hydroxide, unseparated oxide and stellite (an alloy of cobalt used for high-speed tool metal). The cobalt residues from the cyanide process were mainly treated in Canada during 1922, although some of these, as well as smelter residues amounting in all to 518 tons containing 173,211lb. of cobalt, were shipped abroad for treatment.

Summary of Cobalt Production Statistics, 1922.

Cobalt ores and residues treated or in process, 3,719 tons.
Metallic cobalt content of the above (by assay), 536,400lb.

—	Output of Smelters.		Marketed.	
	Total.	Cobalt Contained.	Quantity.	Value as Reported by Smelters.
	Lb.	Lb.	Lb.	Dollars.
Metallic cobalt ...	106,274	106,274	109,067	282,602
Cobalt oxide	360,495	252,347	398,697	798,271
Mixed oxide.....	86,730	39,023	123,605	99,687
Residues exported..	*	172,311	1,036,000	156,402
Total—				
Quantity	—	569,960	—	1,336,962
Computed value	—	1,852,370	—	—

* Not given.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

"DARCO" DECOLOURISING CARBON.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Referring to the article in your issue of August 10 on "Activated Charcoal," we are surprised to read that your correspondent classes "Darco" decolourising carbon (made from lignite) as a poor filtering medium. The fact that "Darco" is used extensively by the leading oil refiners in America—and our sales in England are increasing—proves conclusively that "Darco" can be used without any trouble whatsoever.—Yours, etc.,

(*p.p.* The L. Martin Company).
G. W. Howing

6 and 7, Stonecutter Street, London, E.C. 4,
August 13, 1923.

ITEMS OF INTEREST.

Insulin Manufacture in Sweden.—The Aktiebolaget Leo, of Helsingborg, is stated to be co-operating with the Lövan chemical factory at Copenhagen for the manufacture of sufficient insulin for all the hospitals in Sweden.

British Coal Output.—The coal output at the mines of Great Britain for the week ended on the 4th inst. was 5,253,600 tons, compared with 5,111,700 tons for the previous week, and 5,121,600 for the corresponding week of last year.

Shellac Substitute Labels.—The U.S. Federal Trade Commission has ruled that it is unlawful to advertise and sell a shellac substitute as shellac or even without clearly indicating the percentage of ingredients used in the manufacture of such substitute.

Tariff Notes.—It is announced that potassium nitrate, B.P., imported into Australia from Germany is now brought under the operation of the Customs Tariff (Industries Preservation Act).—The Polish excise duty on acetic acid has been increased from 3,000 to 6,000 Polish marks per kilog.

Fuller's Earth Deposit in Cornwall. — Following the discovery by Mr. Stephen Clark of a rich deposit of Fuller's Earth on his estate at Treamble, it is expected that a considerable new Cornish industry will be established. One estimate puts the amount of the deposit at 1,000,000 tons, and it has been proved in places to go to a depth of fifty feet. Excavating machinery is already being installed.

Badische Directors Imprisoned.—Two of the directors of the Badische Anilin and Soda Fabrik have been sentenced to six years' imprisonment, and a fine of 150 million marks for having refused to assist in the removal of stocks of dyestuffs and fertilisers seized by the occupation authorities. Other members of the board of directors were each sentenced to eight months' imprisonment and a fine of 140 million marks.

North Broken Hill Scheme.—An Exchange Melbourne message states that Mr. Weir, general manager of North Broken Hill, Ltd., has announced that his company is negotiating the purchase of the British Australian Broken Hill Company's mine and other assets, payable partly in North Broken Hill shares and partly in cash. It is estimated that the British Australian shareholders will receive the equivalent of 23s. 6d. per share.

Commercial Uses of Hafnium.—According to a Copenhagen correspondent of the *Times*, it is expected that it will be possible to use hafnium in the manufacture of audion lamps in wireless telegraphy. A Dutch firm is now investigating the possibilities of its use in this manner. In Norway and Greenland minerals containing hafnium have been discovered. It is hoped that hafnium in great quantities may be found, and an expedition will probably be sent to Greenland to investigate the geological conditions.

The Cellulose Acetates.—In the article on this subject by "Investigator" last week, the following corrections should be made. On page 156, column 1, paragraph 4, line 1, for "benzene" read "benzine." On page 156, column 2, paragraph 5, line 8, for "trichlor-tertiary butyl alcohol (3 per cent.)" read "trichlor-tertiary butyl alcohol (30 per cent.)" In the formula for a 3 coat aeroplane dope given in paragraph 2, column 2, page 156, the weights expressed are in kilogrammes and the volumes are in litres.

American Diabetes Remedies.—It is announced by the American Chemical Society that Dr. Max Kahn of Columbia University has prepared and termed "intarvin" a glyceride of margaric acid ($C_{16}H_{33}COOH$), and has found that the substance is easily assimilated by diabetic patents without appearance of the symptoms of ketosis or glycosuria. Dr. Kahn claims that this is the first time that true margaric acid (as distinct from a mixture of palmitic acid and stearic acid) has been obtained and attributes its assimilation by diabetics to the fact that it is an odd-carbon fatty acid. It is also stated that a process for the large scale and cheap manufacture of margaric acid has been worked out by Dr. McKee, professor of chemical engineering at Columbia University.—With reference to the note on "glucokinin" in our issue of last week, it appears from correspondence in *Nature* that the occurrence and value of insulin-like substances in yeast extracts was observed in this country, by L. B. Winter and W. Smith of Cambridge University, before the discovery was made in America.

University News.—The University of Leeds has appointed Mr. J. A. S. Ritson Professor of Mining in the University, in succession to Professor Granville Poole, who has been elected to a professorship at Armstrong College, Newcastle-on-Tyne.

Canadian Wood Pulp Inquiry.—A Commission has been appointed by Mr. Mackenzie King, Prime Minister of Canada, to investigate the forest resources, with a view to determining the need or otherwise of an embargo on the export of wood pulp.

Russian Requirements of Dyestuffs.—A report from Moscow states that, according to the *Ost Express*, the Textile Trust of Russia has decided to effect its purchases of dyestuffs through the Textile Syndicate. The All-Russian Textile Syndicate is entitled to act independently on foreign markets, and has organised representation in Berlin and London.

Castor Seed Growing in Italy.—A conference has been held at the Italian Ministry of Agriculture to consider the question of growing castor seed in order to furnish lubricating oil for aviation and other transport purposes. It is believed a considerable crop of castor seed could be grown throughout the southern provinces of Italy. At present there is a large import of castor oil from British India.

Personal.—Dr. Percy Longmuir, the director of research to the British Cast-Iron Research Association, has had to resign his post owing to a serious breakdown in health.—Professor Dr. Paul Askenasy has resigned the editorship of *the Zeitschrift für Elektrochemie*, a post which he has held since 1910, and Professor Dr. Erich Müller has been appointed by the Deutscher Bunsen Gesellschaft to fill the vacancy caused.

Liquid Light.—An American chemist claims to have produced a radio-active liquid which when sealed in a bulb can be used for many years. Mr. Guido Blenso, who is credited with the invention, claims, according to reports, that his invention will eventually make coal, oil, and other power a thing of the past, and will be far superior to and more effective than electric light, while it will probably last for ten or fifteen years without attention.

Land Subsidence at Preesall.—There has been a land subsidence at Preesall, near Fleetwood, where the United Alkali Company has brine pumping works A crater has been formed about 120 feet in diameter, and the land in the neighbourhood is gradually sinking A dozen beech trees have gone down the crater, and there is some fear that a farm and out-buildings which are now only a score of yards from the edge of the crater may at any time be engulfed.

Soap Manufacturers' Failure.—The Official Receiver has now issued his report in the liquidation of Sapon Soaps, Ltd., Wharf Road, Cubitt Town, E. The statement of affairs shows as regards creditors liabilities expected to rank £48,119, and net assets £10,979. As regards contributories there was a total deficiency of £347,772. Since the winding-up the Receiver has sold the assets for a sum insufficient to discharge the first debenture claim.

Salters' Institute Awards. — The following awards for 1923-4 have been made by the Salters' Institute of Industrial Chemistry, and approved by the court of the company:—Fellowships are awarded to Mr. T. B. Philip, Mr. W. G. Sedgwick, and Mr. D. T. A. Townend. Fellowships are renewed to Mr. C. G. Harris, and to Mr. J. H. Oliver. Mr. W. Randerson, a Fellow for 1922-3, having been elected to an Albert Kahn Travelling Fellowship for 1923-4, is made an Honorary Fellow for the year.

A New Indicator for Acidimetry.—A very sensitive indicator posessing marked advantages over methyl orange is described by A. Reisenleitner (*Chemiker Zeitung*, August 11, 1923). It is the colouring matter of the wild carrot (*daucus carota*) a plant growing plentifully in Central Europe. The substance is blood red in acid solution and deep green in alkali solution, and the colour change is instant and unmistakeable even when working with decinormal solutions. The indicator is not sensitive to carbon dioxide, but it is preferable to carry out titrations with carbonates in a warm solution. It is also claimed to be suitable for the titration of organic acids. The indicator is made by extracting the dried red leaves of the plant with hot alcohol and neutralising the faintly acid extract very carefully with decinormal caustic soda solution. A few drops of the resultant deep red solution which possesses a green fluorescence is sufficient for a titration.

Pan-American Conference on Standardisation.—It is proposed to hold a Pan-American Conference on Standardisation at Washington next year, under the ægis of the Department of Commerce. The South American Governments are to be invited to participate, and presumably the governing idea will be to endeavour to obtain the adherence of the various American Governments to United States standards.

Cinchona Products in Japan.—The Hoshi Pharmaceutical Co., of Tokio, has decided to increase its capital by 30,000,000 yen to 50,000,000 yen by amalgamating with the recently formed Kyodo Pharmaceutical Co. The increased capital will be used to build a new plant near Tokio, where the company intends to manufacture cinchona alkaloids on a larger scale than at present.

Calcium Carbide in Algeria.—The consumption of calcium carbide in Algeria, which imports all of its needs for this product, is considerable, especially in outlying districts where electric current is not available, states an American Consular Report. Imports in 1913 amounted to 4,821 metric tons. In 1919, only 1,659 metric tons were received. By 1921 imports returned to normal, reaching 3,134 metric tons, and in 1922, 4,025 metric tons, were imported.

Industrial Research in China.—The Peking Technical College has organised an Institute of Industrial Research. The institute's work is that of collecting and classifying products, both raw and manufactured, from all over China, and investigating and comparing the nature and quality of material with a view to devising means for improvement or to extending its use. Collecting is being carried out by sending out circulars and publishing advertisements requesting samples and special information.

Mineral Production of South Africa.—The mineral output of South Africa last year was valued at £38,394,376., made up of: Gold, £32,189,587.; silver, £171,324.; diamonds, £2,266,631.; coal, £3,467,412.; copper ore and concentrates, £37,036.; metallic tin and tin concentrates, £59,393.; and other base minerals, £202,993. Compared with 1921 this shows a decrease of £12,871,125, of which gold alone contributed £10,575,560. Coal sales were 9,725,479 tons, against 11,389,015 tons; copper, 705 tons, against 158 tons; and tin, 612 tons, against 1,431 tons. Corundum also showed a considerable increase, but the output of asbestos declined some £20,000. in value.

Imports of Dyestuffs into British Malaya.—Statistics of the values of imports of dyestuffs into British Malaya, showing countries of origin, during 1921, 1922, and the first four months of 1923, show that, although the market for aniline dyes in British Malaya is not an important one, the figures are noteworthy as showing from what sources such supplies as are required are forthcoming.

	1921.	1922.	1923 (4 months).
United Kingdom	£398	£454	£243
British Possessions	770	697	6
Continent of Europe	7,771	4,597	6,044
U.S.A.	20	nil	nil
Japan	nil	9	nil
Other Countries	1,735	708	181
Total	£10,694	£6,465	£6,474

Trade of Principal Countries.—The latest accounts relating to the trade and commerce of certain foreign countries and British Possessions, compiled by the Board of Trade, contain the following summary table, showing the total imports and exports of merchandise of the principal countries for which the particulars can be given during the periods of the three months ended March, 1922 and 1923.

Three Months ended March.	IMPORTS. Thousand £ (000's omitted).		EXPORTS (Domestic). Thousand £ (000's omitted).	
	1922.	1923.	1922.	1923.
Finland	19,534	35,151	18,208	19,996
Denmark	15,360	25,784	13,529	19,089
Germany	61,616	74,394	46,581	54,467
Netherlands	40,432	41,724	23,599	24,422
France	209,351	278,962	195,209	259,965
Switzerland	16,908	21,198	16,084	16,247
Egypt	10,744	11,241	12,819	17,615
United States	143,564	214,874	175,815	201,319
Japan	59,405	51,503	30,530	33,864
British India	48,326	40,941	46,565	60,427
Australia	26,816	33,846	35,809	36,086
New Zealand	8,781	10,790	11,700	14,702
Canada	38,058	46,307	31,200	40,879
United Kingdom	204,937	244,870	186,063	185,370

BRITISH OVERSEAS CHEMICAL TRADE.

JULY IMPORTS AND EXPORTS.

In consequence of the dockers' strike there is a considerable falling off in the imports and exports of chemical and allied products during July, as compared with the previous month. Imports of chemicals, drugs, dyes, etc., comprised under Group N in Class III. of the Board of Trade returns, amounted to £796,366. in July, against £933,234. in June, and £831,976. in July, 1922. The value of British exports of these products amounted to £1,739,561 in July, compared with £2,385,072. in June and £1,444,643. in July of last year. In the table below are given the quantity figures of imports and exports for July and June.

IMPORTS—Increases on June Quantities.

		1923. July.	1923. June.
Borax	cwts.	7,450	2,610
Calcium carbide	,,	37,159	28,355
Cream of tartar	,,	4,588	2,064
Dyeing extracts	,,	8,533	8,070
Glycerine, crude and distilled	,,	2,209	362
Indigo, natural	,,	30	12
Petroleum, crude mineral	galls.	30,075,435	25,589,804
Potassium compounds (except nitrate)	cwts.	147,465	125,202
Potassium nitrate	,,	15,541	1,049
Pyrites, iron	tons	41,153	11,743
Sodium nitrate	cwts.	40,889	20,294
White lead	,,	8,453	7,427

Decreases on June Quantities.

Acetic acid	tons	752	987
Barytes, ground	cwts.	39,808	52,148
Bleaching materials	,,	1,608	4,981
Boron minerals	tons	375	1,824
Gums and resins (except rosin)	cwts.	23,963	30,690
Manganese ore	tons	37,296	39,467
Mercury	lb.	114,092	150,899
Nickel oxide	cwts.	1,860	3,614
Paraffin wax	,,	67,713	73,515
Phosphate of lime	tons	18,696	23,731
Rosin	cwts.	76,770	118,413
Sulphur	tons	715	17,670
Tanning extracts	cwts.	85,636	92,129
Tartaric acid	,,	2,680	4,616
Turpentine	,,	32,139	35,346
Zinc oxide	tons	484	811

EXPORTS—Increases on June Quantities.

Carbolic acid	cwts.	9,648	8,123
Dyestuffs, coal-tar	cwts.	15,023	9,191
Naphthalene	,,	19,856	19,303
Paraffin wax	,,	10,732	9,990
Salt (other than table)	tons	33,169	24,601
Sodium sulphate	cwts.	212,546	151,884
Tar, coal	tons	358	256

Decreases on June Quantities.

Ammonium chloride	tons	176	337
Ammonium sulphate	,,	20,586	24,065
Barytes, ground	cwts.	14,167	20,023
Benzol and toluol	galls.	67,763	247,393
Bleaching powder	cwts.	6,750	12,443
Caustic soda	,,	111,391	117,380
Cement	tons	54,924	57,629
Copper sulphate	,,	1,290	3,282
Disinfectants, insecticides, etc.	cwts.	23,634	31,488
Glue and size	,,	10,133	15,222
Glycerine, distilled	,,	3,986	5,815
Naphtha, coal-tar	galls.	9,281	39,020
Pitch, coal-tar	tons	4,542	18,499
Potassium chromate, and bichromate	cwts.	1,530	3,451
Potassium compounds (except chromate and bichromate)	,,	2,128	4,557
Soaps (total)	,,	90,972	111,844
Sodium carbonate	,,	414,608	564,615
Sulphuric acid	,,	1,961	2,779
Tar oil, creosote, etc.	galls.	2,029,275	8,577,741
Tartaric acid	cwts.	648	1,086
White lead	,,	15,811	18,775
Zinc oxide	tons	243	258

OUR BOOKSHELF.

Les Metaux Precieux (The Precious Metals). By Jean Voisin; 1922. Paris: Librairie J.-B. Baillierè et Fils, 19, Rue Hautefeuille. Pages, 264; paper backs; price, 25 francs (bound, 35 francs).

The work is one of the series on industrial chemistry published under the direction of M. Matignon, professor at the College de France, and with the patronage of the Union des Industries Chimiques de France and of the Société de Chimie Industrielle. The subject is treated from the triple standpoint of the properties of the precious metals, their industrial application and their economic rôle, and the metals dealt with are gold, silver, platinum, iridium, palladium, ruthenium, osmium and rhodium. Metallurgical and assaying problems come in naturally for detailed treatment, and it is probably from this and the economic standpoint that the book will be best received by the technical man. The sections on the industrial application of the metals such as for example those dealing with the manufacture of platinum apparatus and the use of platinum in catalysis are meant more for the general reader than the chemist. Still the work is primarily intended for the public and achieves its object creditably.

Betriebseinrichtigungen der Textilveredelung (Factory Building Design and Construction in the Textile Finishing Industry). By Dr. P. Heermann and Ing. G. Durst. 1922; Second Edition. Berlin: Verlag von Julius Springer; bound, 162 pages; price, 6s. 3d.

An excellent practical little volume, which although dealing specifically with the design and lay-out of plant for the dyeing, bleaching and finishing trades contains a volume of valuable information of quite general utility. Constructional details such as the use of steel, concrete and wood are dealt with and points such as the most suitable type and position of doors, windows, ventilators, etc., are discussed. Engineering questions such as the steam generating plant, steam piping, water piping, power transmission, lighting and fire prevention methods are reviewed, and the purification of the water supply and the disposal of waste effluents are the points finally dealt with. The work, which is excellently produced, contains 91 illustrations.

Elektrische Behandlung von Gasen (The Electrical Treatment of Gases). By Henri Silbermann; 1922. Leipzig: Verlagsbuchhandlung: Dr. Max Jänecke; paper backs; 348 pages; price, 8s. 6d.

Although principally a collection of patent specifications the book is of undoubted value. The first portion deals with the activation of oxygen-containing gases and more particularly with the preparation of ozone. The second and in our opinion most important section is devoted to the electrical precipitation of dust from gases and to the dispersal of mists. The third and last section deals with the effect of the electric current and the electric discharge upon mixtures of gases and deals with the synthesis of nitrogen oxides, ammonia, cyanogen, etc. The work is profusely illustrated, mainly with line diagrams as given in the patent specifications. Very little criticism as to the merits or demerits of the various types of process or plant is given, but as a compilation of the important relevant patents the volume should command a good number of interested readers.

Die Entwicklung der Chemischen Technik bis zu dem Anfangen der Grossindustrie. By Dr. Gustav Fester. 1923. Berlin: Verlag von Julius Springer; pp. 226; paper backs; price, 6s. 3d.; bound: price, 7s. 6d.

The title translated is "The Development of Chemical Technology up to the Foundation of the Heavy Chemical Industry." The work is based upon a course of lectures given by the author to the students at Frankfurt University in 1919 and is divided into three parts, the chemical technology of the ancients and of the Middle Ages, the chemical technology of the later Middle Ages to the beginning of the seventeenth century, and chemical technology from the seventeenth to the commencement of the nineteenth century. Both to the student of chemical history as such and to the student of modern technology the work should be of considerable interest. From the scientific standpoint the history of chemistry is well provided for in the literature, but a work dealing entirely with the technical aspect of such history has long been wanted. The total absence of illustrations is however to be regretted.

SOUTH WALES NOTES.

[Specially Contributed.]

There is a better demand for tinplates, some important orders having been secured for the Far Eastern markets. Production is well maintained, all the factories having restarted this week. There are numerous inquiries from Japan, and it is likely that much of this business will be placed in South Wales. Full employment is being given at the coke ovens and by-product plants. Cokes are in strong demand and prices remain very firm, Continental requirements having become much more pressing, not only for immediate delivery, but also for dispatch over the next four months. The patent fuel trade keeps moderately quiet. Small coals are plentiful, and slightly lower in price, but although there are good supplies of American pitch, the price is such that consumers of briquettes are not likely to obtain reductions at present. There are indications however, that pitch prices will be reduced in a few weeks' time. Lead workers have more employment, but copper workers are not fully employed, and there seems no likelihood of improved business. The nickel industry is fairly well off for orders and the by-products are selling well.

Included in the week's imports were 9,824 tons concentrates from Port Pirie, 200cwt. magnesite from Hamburg, 6,572 tons pitch from Pensacola, 38 tons lead ore from Toronto, 2 tons copper precipitate from Havre, 2,000 tons concentrates from Dunkirk, 2,019 tons zinc concentrates from Port Pirie to Swansea; 1,249 tons precipitate of copper from Huelva to Port Talbot; 426cwts. phosphorus from Montreal to Cardiff; and 3,300 tons of crude sulphur from Porto Empedocle to Newport.

NEW COMPANIES.

Stainless and Non-Corrosive Metals, Ltd.—Capital £5,000. Purchase consideration £1,000. Office: 14, Weaman Street, Birmingham.

Charles Morrison Compositions Company, Ltd.—Private company. Capital £5,000. Lead, paint, colour, and varnish manufacturers, etc. Office: 12, Great St. Helens, London, E.C. 3.

Hibbs and Wishart, Ltd.—Private company. Capital £5,000. Agents, manufacturers, merchants, shippers of oils, soap, and chemicals, etc. Office: 10, Exchange Buildings, St. Mary's Gate, Manchester.

Hydra Lime Products, Ltd.—Private company. Capital £3,000. (2,700 ordinary shares of £1. and 6,000 deferred ordinary shares of 1s.). Office: 25, Cross Street, Manchester.

John Musgrave, Ltd.—Private company. Capital £2,000. Dyers and finishers, etc Office: Grove Dyeworks, Meanwood Road, Leeds

Jopson, Bardsley and Jopson, Ltd.—Private company. Capital £75,000. (15,000 preference). Dyers and finishers. Office: Carr Dye Works, Nelson, Lancs.

National Carbonised Fuel and By-Products Syndicate, Ltd.—Private company. Capital £12,500. Office: Fitzalan House, 13, Arundel Street, London, W.C. 2.

Robinson, Nelson and Co., Ltd.—Private company. Capital £5,000., £1. shares (1,800 ordinary and 3,200 preference). Dealers in laboratory apparatus and furnishings. Office: 378, City Road, Manchester.

Thames Lubricants, Ltd.—Private company. Capital £1,000. Producers, refiners, storers, etc., of chemicals and oils, etc. Office: 11, Victoria Street, Westminster, London, S.W.

British Cast-iron Research.—The British Cast Iron Research Association in the monthly bulletin (June, 1923) of research in hand, states that important arrangements are being made for carrying out a thorough investigation upon foundry sands. The work will probably be done at the Birmingham University and in one of the large foundries. The Bureau of the Association are issuing a complete bibliography of sand literature. A Joint Research with the Electrical Research Association is being arranged to carry out investigations on sea-water resisting cast iron. It is estimated that the experimental work will occupy about two years and will be carried out at the coast and in tidal rivers. The Association consider that the time has arrived when a standard specification for Grey Iron Castings should be drawn up, and steps have been taken to have this carried out in conjunction with the B.E.S.A.

FERTILISER NEWS.

Nitrate of Soda.—The nitrate producers continue to maintain prices at the high levels fixed by the Committee in May last, and there has even been talk of a further increase during the current season. It is reported, however, that the Chilean Government has strongly opposed this step, the excuse for which was the unfavourable exchange conditions. As regards this difficulty, a draft Bill was prepared by the Minister of Finance in the late Government, which went out of office in June last, but it is learned that no further action in respect of controlling foreign exchange operations is contemplated. So far as the nitrate industry is concerned, the policy of the Chilean Government is to have nitrate selling prices as low as possible in order to encourage consumption, for the revenue of the country is mainly derived from the export duty on the fertiliser. It is hardly to be expected, however, that prices will be lower at present, although much dissatisfaction is being expressed by America, which is Chile's largest customer for nitrate. The demand in that country is much quieter, but will probably become stronger as the application season draws nearer, and cotton growers receive payment for the present crop. Strong efforts are being made in the States to obtain reductions in nitrate quotations, and many arguments savouring a little of "bluff" are being brought forward. To voice loud complaints that the sellers, and not the buyers, of a commodity fix the prices seems a little illogical, for an industry which fixed its selling prices on the advice of the consumer would not last very long. To threaten a monopoly like the Chilean nitrate industry with unlimited production of atmospheric nitrogen products, and, at the same time, make no move towards the development of such processes, is equally futile. So long as competition is restricted mainly to by-product sulphate of ammonia there will always be sufficient demand for nitrate to enable the Producers' Association to maintain prices at an unduly high level. The most effective attempts to combat the Chilean trust are, after all, being made in this country by Messrs. Synthetic Ammonia and Nitrates, Ltd., at Billingham, and Messrs. The British Cyanides Company, Ltd., at Oldbury.

Sulphate of Ammonia.—The very favourable position occupied by the British producers of sulphate of ammonia is strikingly emphasised in the recently published figures of the July exports. In spite of the dockers' strike, shipments have been maintained at 20,586 tons, compared with 24,065 tons for the preceding month, and 7,387 tons for July of last year. Aided by the position in America, by the political situation in Europe, and not the least by the policy of producing a really high-grade material, the world-demand for the British product continues strong. The most important facts to be noted in connection with the July exports are the entire disappearance of France from the list of customers and the increasing demand from Japan. The latter country indeed, leads the way by taking 8,272 tons out of the 20,586 tons exported last month, making a total of 28,664 tons since January 1 of this year. Considering that at this time last year, the seven months' figure reached only 51 tons, it is clear that the lack of American material of equal quality and price, and the absorption of heavy stocks of previously imported sulphate, have disposed the market in favour of the British product. Our next best customer on the month, Spain, took rather less than in June, although much exceeding the figure for July of last year. During last month 4,915 tons were dispatched, against 7,955 tons in the previous month, and 1,826 tons in the corresponding month of 1922. This brings the total for the current year, to date, to 44,611 tons. The British West Indies were lower at 808 tons in July, compared with 1,114 tons in June, but here, again, advantage has been taken of the general situation to sell 6,672 tons since the beginning of the year, against 2,778 tons last year. The imports of British sulphate into the Dutch East Indies have been considerably decreased, 766 tons being shipped in July, compared with 3,838 tons in June; nevertheless, the seven months' figure shows a 50-per-cent. increase on last year. In Italy, despite the large stocks of German reparation material and the energetic competition of other nitrogenous fertilisers, shipments of British sulphate of ammonia were maintained at 444 tons, compared with 360 tons in June, and 106 tons in July, 1922. Countries not specified accounted for 5,381 tons, a shade less than the June figure, but a considerable advance on the total for the same month of last year, 1,798 tons. In all, 144,146 tons of sulphate, having a value of £2,424,245., were exported during the seven months January 1 to July 31, against 74,099 tons worth £1,201,667., in 1922.

Other Fertilisers.—Basic slag during July was a diminishing trade, imports and exports sharing in the reduction. Exports during the month fell from 1,265 tons in June to 353 tons in July, while imports were lower at 4,366 tons last month, compared with 5,752 tons in the preceding month. The trade in superphosphate is of a better nature, 1,495 tons being exported in July, against 1,308 tons in June, and 318 tons in July last year. The total exports since January 1 amount to 7,864, just double the quantity for the corresponding period of 1922. Exports of compound fertilisers are well maintained at 3,604 tons, bringing the seven months' total up to 33,223 tons, compared with 18,258 tons last year. No imports of raw guano were made during July. In regard to other raw materials for the fertiliser industry, imports of phosphate rock declined from 23,731 tons in June to 18,696 tons in July, compared with 32,944 tons in July, 1922. Receipts for the period up to July 31 are lower than for last year by about 34,000 tons. It is interesting to note in connection with the development of the Moroccan phosphate deposits that the broad gauge railway leading from the deposits in the Oued Zen district to the silo built on the big breakwater at Casablanca will be open to traffic at the beginning of September. It is expected that the exports this year will reach 200,000 tons, while it is confidently anticipated that from 1924 onwards the annual export will be about 500,000 tons. Sulphur imports experienced a considerable drop to 715 tons in July, compared with 17,670 tons in June. Nevertheless, on the basis of seven months' shipments, the quantity imported is between two and three times the total for the same period of last year. Pyrites, on the other hand, were an improved trade at 41,153 tons, against 11,743 tons in June, and 35,961 tons in July, 1922. At the same time, the total imports for the year up to date indicate a slight falling off in comparison with last year.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

No week is quite like the week that has passed, and though no material improvement can be expected until autumn it is a fact that the position is slightly better temporarily. There is now some prospect of an increase of production in the hematite pig-iron trade, the expectation being that a furnace may be relighted at Cleator Moor which is one of those that consume the local coke, and in that event it may well be the case that the demand for coke may be somewhat larger than can be comfortably satisfied. One of the satisfactory features of an otherwise disappointing situation is that such furnaces as have been damped down have been those that are not ordinarily big users of other than East Coast coke, the result being of course that all the ovens with the exception of the Whitehaven ovens, which are still idle, have been kept in full operation whenever adequate supplies of small coal have been available. It is evident that the question of having at command all the coal that is wanted at times when the requirements of coke by iron smelters in the district are as great as can be met is one which sooner or later must engage serious attention. The time is not far distant, it may be stated, when some of the existing coking plants will have to be enlarged. And when that takes place it is easy to see that the new ovens will be those of the American type. One of the local collieries has already received a report by representatives who paid a visit to plants in America on the developments that are needed in Cumberland, and it seems certain that extensions will be made directly it is ascertained that the collieries themselves can be so developed that the increased output may be forthcoming. At the present time the coal production falls considerably short of what is aimed at, even after taking into consideration the stoppage at Whitehaven. As to coke itself the greater part of the production is being absorbed by the furnaces that are blowing at Workington and a little by a furnace or two in North Lancashire, the price quoted being 29s. to 33s. per ton according to carbon content. There is a strong Continental inquiry at 34s. to 40s. per ton, f.o.b., and the shipments to Hamburg and Bremen have risen almost to 2,000 tons per week. East Coast coke supplies this week are again 8,100 tons. Residuals are fairly active. All the tar is being taken by the chemical works. Sulphate of ammonia is moving away satisfactorily.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JULY.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of July, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended July 31.			Value. Month ended July 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Chemical Manufactures and Products (other than Drugs and Dyestuffs):						
Acids:						
Acetic (including Acetic Anyhdride) tons	105	371	752	4,697	15,311	35,257
Tartaric, including tartrates, not elsewhere specified.. cwts.	2,912	5,788	2,680	21,706	30,849	16,265
Bleaching Materials ,,	972	2,117	1,608	5,702	2,654	2,591
Borax ..... ,,	692	3,299	7,450	1,361	3,961	9,000
Calcium Carbide . ,,	17,932	20,648	37,159	16,276	15,130	25,001
Coal Tar Products not elsewhere specified ..... val.	—	—	—	70,868	1,081	35,541
Glycerine:						
Crude ..... cwts.	1,662	4,739	1,857	6,133	12,893	4,762
Distilled ..... ,,	129	239	352	712	947	1,328
Lead Compounds:						
Red Lead and Orange Lead ... ,,	405	1,944	5,046	795	3,181	8,120
Nickel Oxide .... ,,	2,086	—	1,860	11,510	—	8,648
Potassium Compounds:						
Nitrate (Saltpetre) ..... ,,	11,599	11,642	15,541	16,120	13,099	16,812
Other C'pounds ,,	10,649	124,602	147,465	24,134	52,473	31,476
Sodium Compounds:						
Nitrate ..... ,,	23,130	42,464	40,889	24,111	33,675	25,630
Other Compounds ,,	9,667	10,825	11,647	11,727	14,450	10,905
Tartar, Cream of ,,	4,095	4,124	4,588	24,333	20,914	20,332
Zinc Oxide ..... tons	350	465	484	11,823	14,469	17,522
All other Sorts .. val.	—	—	—	168,961	185,718	149,814
Drugs, Medicines, and Medicinal Preparations containing no Dutiable Ingredient:						
Quinine and Quinine Salts ..... ozs.	20,551	26,341	85,692	2,489	2,966	9,224
Bark, Chinchona (Bark, Peruvian, etc.) ..... cwts.	2,862	591	822	24,735	3,289	4,383
Other Sorts..... val.	—	—	—	117,647	85,460	63,072
Dyes and Dye Stuffs (except Dye Woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning						
Intermediate Coal Tar Products used in the manufacture of Dyes (including Aniline Oil and Salt, and Phenyl-Glycine) ..... cwts.	10	—	10	149	—	223
Finished Dye Stuffs obtained from Coal Tar:						
Alizarine ..... cwts.	33	152	734	1,276	3,070	6,971
Indigo, synthetic ,,	15	—	—	260	—	—
Other Sorts..... ,,	383	2,567	4,272	19,620	82,201	63,161
Extracts for Dyeing:						
Cutch ..... ,,	1,975	2,308	3,344	4,940	3,915	5,013
All other Sorts . ,,	6,221	6,660	5,189	32,314	27,478	20,244
Indigo, natural .. ,,	8	196	30	382	4,234	876
Extracts for Tanning (solid or liquid) ,,	35,768	72,786	85,636	38,271	77,858	82,190
Painters' Colours and Materials, not elsewhere specified:						
Barytes, ground (including Blanc Fixe) ..... cwts.	20,490	40,218	39,808	6,589	9,944	10,368
White Lead (basic carbonate) ..... ,,	7,884	12,405	8,453	17,557	20,823	15,104
Other Sorts..... ,,	34,251	63,058	54,611	54,068	89,933	96,230
Oils, Refined:						
Essential (other than Turpentine):						
Natural ..... lb.	118,090	193,599	192,481	28,612	52,968	44,828
Petroleum:						
Lamp Oil ..... galls.	12,940,684	16,586 107	9,223,947	588,670	416,138	180,122
Motor Spirit .... ,,	13,952 940	26,944 979	44,544 902	1,262 809	1,865 341	2,182,747
Spirit other than Motor Spirit ... ,,	840	—	—	111	—	—
Lubricating Oil .. ,,	3,545,107	7,270,568	6,561,552	300,624	421,515	374,263
Gas Oil ..... ,,	12,666,828	3,536,220	6,098,746	391,811	62,820	102,806
Fuel Oil ..... ,,	64,079,318	39,478 912	38,184,912	1,411 880	553,986	523,308
Other Sorts..... ,,	11,050	—	2,228	1,230	—	239
Total ..... ,,	107,196 767	93,816 786	04616287	4,057,135	3,320 100	3,363 485

Articles.	Quantities. Month ended July 31.			Value. Month ended July 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Soap, not containing Spirit:						
Soft ..... cwts.	57	120	78	113	268	138
Hard, Household and Laundry, in bars and tablets ..... cwts.	8,069	7,716	10,049	27,771	20,896	23,266
Polishing and Scouring ..... ,,	5,404	1,899	2,787	7,214	2,422	3,730
Hard, Toilet Soap and Shaving Soap ,,	3,659	4,120	3,594	27,546	25,761	15,009
Soap not elsewhere specified ..... ,,	396	526	47	510	1,447	106
Total ..... ,,	17,585	14,381	16,555	63,154	50,794	42,249
Turpentine..... ,,	30,393	40,083	32,139	118,362	147,188	119,359
Wax:						
Paraffin Wax ... ,,	58,965	102,406	67,713	78,883	83,944	55,998
Oils and Fats, refined edible:						
Animal (except Marine Animal), refined:						
Lard:						
From U.S.A. .... tons	8,138	9,364	6,687	623,708	635,884	408,096
,, Other C'tries ,,	1,386	1,151	1,845	105,486	76,069	117,752
Total ..... ,,	9,524	10,515	8,532	729,194	711,953	525,848
Lard, Imitation . ,,	770	548	144	48,459	35,967	8,802
Oleo - margarine and Oleo-oil and Refined Tallow . ,,	2,929	2,624	2,196	146,491	126,906	102,767
Vegetable, other than Essential, Refined:						
Coconut Oil, Refined ..... ,,	1,335	916	765	75,126	44,013	39,696
Cotton - seed Oil, Refined ..... ,,	949	263	181	53,437	12,053	8,053
Olive Oil, Refined ,,	476	700	275	70,347	60,413	20,861
Palm and Palm-Kernel Oil, Refined ,,	28	—	10	1,531	—	501
All other Sorts, Refined ..... ,,	1,037	508	455	74,643	32,577	31,035
Total ..... ,,	17,048	16,074	12,558	1,199,228	1,023 882	737,563
Seeds for expressing Oil:						
Castor ..... tons	2,165	2,697	2,448	31,033	44,680	50,924
Cotton:						
From Egypt .... ,,	21,135	7,201	5,105	240,519	85,562	57,886
,, Brit. India ,,	6,866	19,177	10,971	66,723	176,312	106,003
,, Other C'tries ,,	10,336	7,043	6,005	92,457	68,530	53,480
Total ..... ,,	38,337	33,421	22,081	399,699	330,404	217,369
Flax or Linseed:						
From Russia ... ,,	700	191	—	12,250	3,473	—
,, U.S.A. ... ,,	—	—	—	—	—	—
,, Argentine Republic ,,	7,500	10,090	—	133,512	203,224	—
,, British East Indies .. ,,	3,161	12,674	24,933	56,420	270,511	526,969
,, Canada .. ,,	—	—	—	—	—	—
,, Other C'tries ,,	550	1,370	740	8,237	27,169	13,571
Total ..... ,,	11,911	24,325	25,673	210,419	504,377	540,540
Rape:						
From B. East Indies ,,	1,000	1,815	7,551	19,750	33,317	125,336
,, Other C'tries ,,	44	—	30	742	—	855
Total ..... ,,	1,044	1,815	7,581	20,492	33,317	126,191
Sesame (or Sesamum, Benni, Gingelly or Teel):						
From China .... tons	—	—	—	—	—	—
,, Other C'tries ,,	28	—	—	711	—	—
Total ..... ,,	28	—	—	711	—	—
Soya Beans:						
From Russia ... ,,	—	9,563	—	—	119,671	—
,, China .... ,,	—	2,975	—	—	37,130	—
,, Japan ... ,,	—	4,427	—	—	57,399	—
,, Other C'tries ,,	—	—	—	—	—	—
Total ..... ,,	—	16,965	—	—	214,200	—
Other Sorts, including Sunflower ..... tons	488	5,526	3,818	6,968	70,705	45,190
Nuts and Kernels for expressing Oil therefrom:						
Copra ..... tons	4,061	2,499	4,144	112,871	62,642	111,068
Ground Nuts (Arachide, Pea, or Monkey Nuts) .. ,,	4,661	3,118	3,449	90,378	62,814	63,498
Palm Kernels ... ,,	19,590	19,548	17,718	444,524	351,523	317,680
Other Sorts..... ,,	327	81	1,201	7,745	2,098	40,727
Total ..... ,,	28,639	25,246	26,512	655,518	479,077	532,973

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JULY.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month of July, 1923, compared with 1921 and 1922. As from April 1, 1923, the export trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended July 31.			Value. Month ended July 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):						
ACIDS:						
Sulphuric ..... cwts.	2,226	1,278	1,961	2,987	1,743	2,354
Tartaric (including Tartrates not elsewhere specified) ..... ,,	199	278	648	2,483	1,804	4,463
AMMONIUM COMPOUNDS:						
Chloride ..... tons	121	437	176	6,446	17,744	6,737
Sulphate—						
To France..... ,,	—	243	—	—	4,078	—
,, Spain and Canaries .... ,,	662	1,826	4,915	10,413	31,701	73,180
,, Italy ..... ,,	—	106	444	—	1,729	7,563
,, Dutch East Indies ..... ,,	1,226	2,753	766	24,826	36,223	12,595
,, Japan ..... ,,	1,400	1	8,272	18,271	15	136,375
,, British West India Islands (including Bahamas) and British Guiana ,,	120	660	808	1,941	10,955	12,861
,, Other Countries ,,	3,102	1,798	5,381	51,230	29,229	85,680
Total ..... ,,	6,510	7,387	20,586	106,681	113,930	328,254
BLEACHING POWDER cwts.	4,660	26,811	6,750	4,983	17,261	4,190
COAL TAR PRODUCTS, not elsewhere specified:						
Anthracene..... cwts.	—	—	—	—	—	—
Benzol and Toluol galls.	—	8,557	67,763	—	1,161	6,829
Carbolic Acid ... cwts.	5,137	6,130	9,648	10,861	10,007	29,479
Naphtha ..... galls.	3,543	2,709	9,281	540	577	946
Naphthalene .... cwts.	2,784	1,516	10,856	2,702	1,469	12,463
Tar Oil, Creosote, etc. ..... galls.	868,287	2,607,337	2,029,275	33,824	75,909	79,376
Other Sorts ..... cwts.	25,683	24,889	39,291	17,065	13,168	17,864
Total ..... val.	—	—	—	64,992	102,291	146,957
COPPER, Sulphate of ..... tons	558	1,316	1,290	19,214	38,732	31,585
DISINFECTANTS, Insecticides, Weed-killers and Sheep and Cattle Dressings, except Tobacco Offal, containing no Dutiable Ingred'nt cwts.	14,191	13,640	23,634	43,890	35,489	60,700
GLYCERINE—						
Crude ..... cwts.	5,218	2,325	6,789	24,790	6,721	17,079
Distilled ..... ,,	2,862	3,180	3,986	18,191	12,851	16,595
Total ..... ,,	8,080	5,505	10,775	42,981	19,572	33,674
POTASSIUM COMPOUNDS:						
Chromate and Bichromate ..... cwts.	990	2,042	1,530	3,757	6,295	3,602
Nitrate (Saltpetre)						
British prepared ,,	489	1,200	714	1,243	2,539	1,638
Other Sorts ..... ,,	1,068	1,866	1,414	11,805	11,805	10,712
Total ..... ,,	2,547	5,108	3,658	16,805	20,639	15,952
SODIUM COMPOUNDS:						
Carbonate (including Soda Crystals, Soda Ash, and Bi carbonate) .. cwts.	52,408	528,377	414,608	24,109	110,169	117,586
Caustic ..... ,,	13,366	126,197	111,391	16,527	132,119	92,865
Chromate and Bichromate ..... ,,	2,314	3,630	1,775	7,577	8,546	3,569
Sulphate, including Saltcake .... ,,	26,779	119,610	212,546	18,092	25,840	50,512
Other Sorts..... ,,	28,243	36,027	29,168	92,509	62,413	42,860
Total ..... ,,	123,110	613,751	769,488	158,814	339,087	307,392
ZINC OXIDE ..... tons	50	318	243	2,371	10,458	10,306
CHEMICALS, all other Sorts ..... val.	—	—	—	155,642	213,839	224,278
DRUGS, MEDICINES, and MEDICINAL PREPARATIONS:						
Quinine and Quinine Salts ... ozs.	52,819	151,623	147,358	11,622	20,302	17,642
Opium, dried and powdered in the United Kingdom lbs.	71	1,049	—	55	723	—
Other Sorts..... val.	—	—	—	151,597	162,815	159,821
Total ..... ,,	—	—	—	163,274	183,840	177,463

Articles.	Quantities. Month ended July 31.			Value. Month ended July 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
DYES and DYESTUFFS (except Dye-woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning Products of Coal Tar ..... cwts.	2,511	3,668	15,023	£ 51,342	£ 60,273	£ 98,356
Other Sorts..... ,,	4,058	4,095	4,300	10,110	7,929	5,467
Total ..... ,,	6,569	7,763	19,323	61,452	68,202	103,823
PAINTERS' COLOURS and MATERIALS not elsewhere specified:						
Barytes, Ground (including Blanc Fixe). cwts.	804	12,334	14,167	561	5,653	5,161
White Lead (Basic carbonate) ..... ,,	10,952	19,997	15,811	26,503	43,042	36,411
Paints and Colours Ground in Oil or Water ..... ,,	16,104	22,054	25,545	50,614	53,224	65,093
Paints and Enamels Prepared (including Ready-Mixed) ,,	13,330	18,214	22,495	57,644	61,707	75,597
Other Sorts..... ,,	28,503	46,565	49,671	80,970	96,386	99,171
Total ..... ,,	69,693	119,164	127,689	216,292	260,012	281,433
CANDLES ..... cwts.	8,111	16,986	6,681	25,799	47,952	16,688
OILS, REFINED—						
*Lubricating Mixed galls.	—	41,149	56,855	—	7,249	7,384
Petroleum:						
Lubricating .... ,,	282,915	593,310	362,391	57,826	72,340	50,186
Other Sorts..... ,,	44,826	37,865	4,682,336	4,202	4,152	132,584
SOAP, not containing Spirit:						
Soft ..... cwts.	897	1,266	770	2,118	2,197	3,050
Hard: Household and Laundry, in bars and tablets:						
To China ..... cwts.	709	1,094	620	3,147	2,793	1,445
,, Other Foreign Countries ... ,,	19,577	18,936	20,154	51,431	45,372	40,222
,, British South Africa ..... ,,	17	26	407	40	127	912
,, British East Indies ..... ,,	28,267	18,913	26,825	62,102	40,159	49,324
,, Other British Possessions . ,,	36,680	23,025	31,628	93,227	52,916	62,805
Total ..... ,,	85,250	61,994	79,634	209,947	141,367	154,708
Toilet (including Shaving) ..... cwts.	2,834	4,240	4,585	34,676	48,516	42,237
Polishing and Scouring ..... ,,	387	1,459	1,690	1,150	3,850	5,184
Soap, not elsewhere specified.. ,,	1,968	3,841	4,293	7,032	18,499	20,070
Total of Soap ,,	91,336	72,800	90,972	254,923	214,429	225,249
VARNISH ..... galls.	74,181	95,289	107,607	54,187	63,567	57,691
WAX: Paraffin Wax cwts.	18,408	4,965	10,732	28,127	5,832	9,305
OIL-SEED CAKE:						
Cotton-seed Cake. tons	152	332	81	2,070	2,812	771
Linseed Cake .... ,,	441	987	922	6,897	11,452	9,960
Rape-seed Cake.. ,,	—	—	—	—	—	—
Soya Bean Cake.. ,,	—	85	71	—	942	653
All Other Sorts .. ,,	2,940	2,874	2,752	25,615	21,570	16,399
Total ..... ,,	3,536	4,278	3,826	34,582	36,776	27,783
OILS and FATS, refined, edible—Animal (except Marine Animal), refined:						
Lard ..... tons	9	18	23	936	1,657	2,306
,, Imitation .. ,,	13	50	61	990	2,936	3,377
Vegetable (other than Essential), refined:						
Coconut Oil ..... ,,	63	37	34	2,955	2,667	2,125
Cotton-seed Oil .. ,,	129	284	212	5,999	13,854	9,685
Oilve Oil ..... ,,	6	7	4	1,043	1,925	1,844
Palm Oil ..... ,,	8	31	59	352	1,140	2,208
Palm Kernel Oil . ,,	3	16	106	188	739	5,880
All other Sorts .. ,,	545	644	860	19,147	25,546	35,958
Total ..... ,,	776	1,087	1,359	31,610	50,464	63,383
SALT (other than Table Salt):						
To Sweden ..... tons	500	2,071	1,201	2,100	7,548	3,662
,, U.S.A. ..... ,,	100	395	684	475	1,469	2,459
,, Nigeria ..... ,,	1,264	6,303	6,516	9,260	30,500	29,592
,, Brit. E. Indies ,,	—	10,932	15,734	—	32,858	31,517
,, Australia..... ,,	—	541	322	—	2,233	1,255
,, New Zealand . ,,	1,583	1,510	1,302	7,091	5,525	5,067
,, Canada ..... ,,	2,795	3,073	1,811	8,678	8,460	4,013
,, Other Countries ,,	865	4,387	5,599	3,605	14,594	17,118
Total ..... ,,	7,107	29,212	33,169	31,209	103,187	94,683

* Included in "Oils, Refined: Petroleum—Lubricating" prior to 1922.

(To be concluded.)

REPORTS OF COMPANIES.

Centrifugal Separators, Ltd.

The third annual general meeting was held in London on Friday, August 10, Commander Sir Arthur Trevor Dawson presiding.

The Chairman, in moving the adoption of the report and accounts, said that a year ago he had stated that although the number of machines actually sold was not large they had quite a considerable amount of business in prospect. If he were to use these same words again he believed he would be summing up the position at this date quite correctly, and if he spoke with hope last year he certainly felt that he could do so now—probably not quite as regarded immediate results, but, viewing the prospect generally, he was advised that there were distinct indications of an improvement, given a maintained improvement in other trades. One satisfactory feature was that in industries regularly using the separators the machines were giving satisfaction. A testimonial had come to hand only this week from a very well-known firm who had had two of the machines working for two years. With regard to the subsidiary company referred to in the report, it had been formed to place upon the market an improved type of separator, and all the indications pointed to their being able to do a remunerative business in that direction. It would not compete with, but might even help the sale of, the Gee Separator. The China Clay Company, in which they were large shareholders, had since last year been manufacturing and selling china clay of a high quality. The clay which had been manufactured had been made by the Gee machines, and it was of a quality equal, if not superior, to the best china clay upon the market.

The report and accounts were unanimously adopted.

DIVIDENDS.

Bradford Dyers' Association.—Interim dividend for the year to December 31 next on the ordinary shares at the rate of 1s. per share, subject to income tax. At this time last year the interim distribution was at the same rate.

Goodlass, Wall and Co., Ltd.—Profit for year to June 30 £53,386., plus £13,066. brought in. Balance of formation expenses, £12,198, written off; dividend on ordinary of 12½ per cent., less tax; £1,794. written off vehicles, and balance, less corporation profits tax and management commission, carried forward.

Eastman Kodak Company of New Jersey.—Quarterly dividends of 1¾ per cent. (being at the rate of 6 per cent. per annum) upon the outstanding preferred stock, and of $1.25. per share upon the outstanding common stock (the same as a year ago).

National Lead Company.—A quarterly dividend of 2 per cent. has been declared on common stock.

British Oil and Cake Mills, Ltd.—Interim dividend on ordinary of 5 per cent. (less income tax) for current year.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," August 18, 1888.)

The Chemical Trade in Italy.—Milan is the centre of the Italian chemical industry, a branch which has of late years made very considerable progress. There are now in Milan two works manufacturing sulphuric, nitric, and hydrochloric acid, crude and chemically pure, as well as salammoniac and liquid ammonia; while three works at Milan and one at Brescia turn out citrate of magnesia to a total value of about £20,000. per annum. A camphor refinery, the first in Italy, was established last year. Another chemical works refines annually some 700 tons of glycerine, purchasing for this purpose a large proportion of crude glycerine from the Italian stearine works. There is one large quinine manufactory in Milan, which also makes iodide of potassium and other iodides. There is also another works in Milan which makes a speciality of iodides, bromides, bismuth preparations, salicylates, etc., besides producing various pharmaceutical articles. In Pavia a large manufactory of antiseptic surgical appliances exists, which have a large sale all over Italy. Tartar materials are treated in seven different manufactories, while in Milan there are no less than fifty manufacturers of common and toilet soaps, some of whom carry on a considerable wholesale and even an export trade. Vegetable-oil refineries are found in large numbers, no less than two hundred such establishments existing in the province of Lombardy alone.—*Oil, Paint, and Drug Reporter.*

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Glamorgan Patent Fuel, Ltd., Caerphilly.—Registered July 23, £4,000. deb., to Branch Nominees, Ltd., 15, Bishopsgate, London, E.C.

Hewett and Reynolds, Ltd., London, N.W., dyers.—Registered July 26, mort., to Barclays Bank, Ltd., securing all moneys due or to become due to the bank.

Industrial Silica, Ltd., London, W.C.—Registered July 21, £15,000. 1st debs. (secured by deed of conveyance and Trust Deed, both dated July 9, 1923).

Klensit Soap Company, Ltd., Ashton-under-Lyne.—Registered July 28, £504. mort., to Halifax Permanent Benefit Building Society.

Redaluma Paint Company, Ltd., London, E.C.—Registered June 30, £600. mort., to A. H. Relf, Torry Glen, Woodford.

Shankland (G. A.), Ltd., Eynsham, chemical manufacturers.—Registered July 19, £18,000. debs.

Travancore Minerals Company, Ltd.—Registered July 27, Trust Deed securing £35,000. debenture stock, to London City and Midland Executor and Trustee Company, Ltd., 5, Threadneedle Street, London, E.C.

Union Match Company, Ltd., London, E.C.—Registered July 27, charge, to Union Allumettière Société Anonyme, 97 and 99, Rue des Etangs Noirs, Brussels, securing all moneys due or to become due to chargees.

SATISFACTIONS.

Gilbert and Knowles, Ltd., London, E.C., chemical merchants.—Satisfaction registered July 30, £300., balance of amount registered September 1, 1921.

Hudson (R. S.), Ltd., Liverpool, soap makers. — Satisfaction registered July 27, £400,000., balance of amount registered July 28, 1908.

Klensit Soap Company, Ltd., Ashton-under-Lyne.—Satisfaction registered July 28, £500., registered February 19, 1920.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Kleenit Soap and Chemical Company, Ltd.—Resolved July 9, confirmed July 24: That the company be voluntarily wound up. P. Stapleton, 27, Waterdale, Doncaster, liquidator.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Blunt, W. H., and Son, 70, Snow Hill, Birmingham; chemists; £12. 8s. 7d. June 6.

British Colloidal Products Company, 2, Cooke Street, Hulme; dyestuff manufacturers; £11. 1s. 4d. June 27.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

South Africa.

The Municipal Council of Johannesburg are calling for tenders, to be presented by September 18, 1923, for the supply of white lead, oils, paints, varnishes, etc. (Contract No. 120.) (Ref. No. 11887/E.C./C.C./2.)

Norway.

A firm of commission agents in Christiania desires to secure the representation for Norway of British exporters of feeding stuffs, and raw materials used in the manufacture of soap, margarine, etc. (Reference No. 174.)

A commission agent in Christiania desires to secure the representation for Norway of British exporters of coal-tar pitch, etc. (Reference No. 176.)

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

July 30 to August 4 (inclusive).

Phosphorescent Zinc Sulphide. Allchemin Allgemeine Chemische Industrie Ges.; and Jahoda, R. 19,735.
Hydrolysis. Bamburg, G. 19,734.
Titanium Hydroxide. Blumenfeld, J. 19,612.
Filtration of Solutions. Blumenfeld, J. 19,977.
Insecticides. British Dyestuffs Corporation, Ltd.; and Lefebure, V. 19,829.
Reduction of Metal Oxides. Bruzac, A.; and Constant, G. 19,592.
Anhydrous Tin Chloride. Buss Akt.-Ges. 19,834.
Distillation of Liquids. Cabrier, A. 19,963.
Bleaching Earthy Minerals. Clarke, G. S. 19,762.
Improving Resins. Consortium für Elektrochemische Industrie Ges. 19,591.
Containers for Acids, etc. Cox, S. W.; and New Eccles Rubber Works, Ltd. 19,870.
Separation of Mixtures of Gases. Davies, W. E. 19,646.
Liquefaction and Saccharification of Starch. Dextrin Automat Ges. 20,048.
Acid-proof Alloys. Dreifuss, M. 19,746.
Silicates of Basic Dyestuffs. Eberlein, W. 20,045 and 20,046.
Treatment of Zinc-bearing Ores. Electrolytic Zinc Company of Australasia, Ltd. 19,605.
Electrolytic Recovery of Zinc. Electrolytic Zinc Company of Australasia, Ltd. 19,606.
Dyestuffs of the Anthraquinone Series. Farbenfabriken vorm. F. Bayer and Co. 19,495.
Indigoid Dyestuffs. Farbenfabriken vorm. F. Bayer and Co. 19,837.
Carburetted Water Gas. Humphreys and Glasgow, Ltd. (*Evans, Perry, and Eichengreen*). 19,974.
Purification of Gas. Humphreys and Glasgow, Ltd. (*Fulweiler*). 19,825.
Filtering-apparatus. Keene, E. W. W. 19,656.
Articles Requiring High Resistibility Against Corrosion by Ammonium-chloride Solutions. Krupp Akt.-Ges., F. 19,574.
Articles Requiring High Resistibility Against Attack of Sulphurous Acid. Krupp Akt.-Ges., F. 17,575.
Preservation of Wood. Moseley, J. W. 19,686.
Formaldehyde Condensation Products of Aliphatic Amines. Naugatuck Chemical Co. 19,595.
Reaction Product of Acetaldehyde and Aniline. Naugatuck Chemical Co. 19,600.
Aromatic Sulphonic Acids. Rheinsche Kampfer-Fabrik Ges. 19,981.
Soap. Schou, E. V. 19,845.
Resins. Soc. of Chemical Industry in Basle. 19,475

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. *in stamps to the Comptroller, Patent Office Sales Branch.* 25, *Southampton Buildings, Chancery Lane, W.C.*

1921.

Concentration or Drying of Solution. Plauson's (Parent Co.), Ltd. (*Plauson, Dr. H.*). 32,335. **200,998**
Chlorinating Liquids. Meter, J. W. van. 10,996. **201,214**
Rabbles or Rakes for Mechanical Calcining Furnaces. Squire, J. G. 11,204. **201,216**
Purification of Mineral Oils. Dunstan, A. E. 11,406. **201,223**
Precipitating Metals from Solutions. Marks, E. C. R. (*Merrill Co.*). 11,639. **201,231**
Separating the Constituents of Emulsions. Metcalfe-Shaw Corporation. 12,184. **179,194**
A Complex Aminoargentomercaptobenzene-carboxylic Acid. Bloxam, A. G. (*Farbwerke vorm Meister, Lucius, and Brüning*). 13,821. **201,302**
Camphor. Schindelmeiser, J. 15,741. **201,332**
Portable Apparatus for the Complete Technical Analysis of Coal-gas or the Like Combustible Gases. Macdonald, D. M. 20,990. **201,408**
Commercial Preparation of Aminophenyl-arsinic Acids. Etablissements Poulenc Frères. 22,440. **185,728**
Alloy of Lead with Calcium, Strontium, Barium. Mathesius, W.; and Mathesius, H. 25,609. **201,447**
Drying Gases. Naamlooze Vennootschap Algemeene Norit Maatschappij. 30,725. **188,666**
Continuous Chlorination of Ligno and Pecto-cellulose by Nascent Chlorine for the Purpose of Obtaining Pure Cellulose. Vains A. R. de. 34,618. **201,488**

1923.

Dye from Dioxyperylene. Pereira, H. 12,382. **197,932**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1922.

Cellulose Esters. Soc. de Stearinerie et Savonnerie de Lyon. 24,153. **201,510**

1923.

Hydrated Celluloses. Soc. Industrielle pour l'Application de Brevets et Procédés. 13,769. **201,526**
Salts of Barium and Strontium. Rhenania Verein Chemischer Fabriken Akt.-Ges. 14,663. **201,528**
Vulcanising Oils or Fats. Meulen, J. H. van der. 16,164. **201,531**
Sulphurised Dyestuffs. Soc. of Chemical Industry in Basle. 17,389. **201,540**
Vulcanisation of Caoutchouc. Chatelan, Dr. J. 19,311. **201,570**
Dyestuffs of the Anthraquinone Series. Farbenfabriken vorm. F. Bayer and Co. 19,495. **201,575**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Application of Chlorine. J. W. van Meter, San Francisco, California, U.S.A. British Patent, **199,052**, of 1921.

An apparatus for use in the application of chlorine and chlorine water in water purification, the preparation of dyes, bleaches, and laundry preparations and other purposes comprises an upper chamber adapted to receive a continuous supply of liquid, which is then fed to a lower transparent vessel in which is disposed a second transparent vessel, open at the bottom, graduated and having a bleeder port for the passage of chlorine to the outer vessel. In the production of chlorine water, water is continuously delivered to the upper chamber, while if dry chlorine is required, kerosene may be used. Figs. 3 and 4 show sections of the

FIG 3.

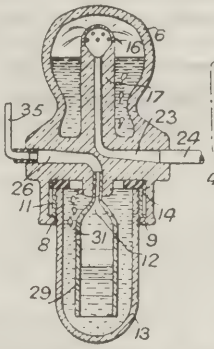
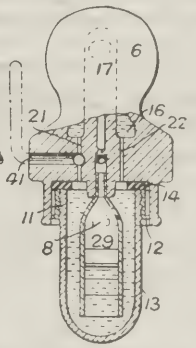


FIG 4.



apparatus at right angles to each other. Liquid is sprayed into the chamber 16 in a hollow casting 6 by means of a hose 24 fitted to a passage 23 passing through the tubular member 17. The liquid is fed by the tubes 21, 22 to a lower transparent vessel 13 screwed into a collar 11 with flange 12 against a rubber gasket 14, the collar being held in position by lugs 8, 9. A supply tube 35 delivers chlorine to a passage 26 and thence to a transparent funnel-shaped graduated vessel 29 with a bleeder port 31. The liquid and chlorine pass out of the apparatus together by the tube 41. In operation, the apparatus is first filled with liquid the level of which is observed in a sight bulb provided in the chlorine supply-tube 35. The chlorine valve is then opened and the depression of the liquid level observed measures the pressure of chlorine delivery, from which the rate of flow of chlorine may be deduced, knowing the size of the aperture 31.

Pyrazolone Derivative. O. Y. Imray, London. (Soc. of Chemical Industry in Basle, Basle, Switzerland.) British Patent, **198,829**, of 1922.

1 - (2¹-Methyl-3¹-sulpho-5¹-isopropyl-) - phenyl-3-methyl-5-pyrazolone is prepared by condensing the hydrazine from 2-aminocymene-6-sulphonic acid with ethyl acetoacetate. An example is given in which diazotised aminocymene sulphonic acid is reduced with sulphite and the hydrazine then condensed with ethyl acetoacetate. Monoazodyes which dye wool in yellow shades similar to those of tartrazine but faster to light are obtained by coupling the above described pyrazolone derivative with diazo compounds of the benzene or naphthalene series; in an example diazo-benzene is used.

Utilising Paper Waste. A. L. Burlin, Manchester. British Patent, **198,789**, of 1922.

Paper waste is de-inked and de-colourised by treatment for about ten minutes with soda ash at a temperature of 35° C., after which oxalic acid is added and the mass again agitated, the period of treatment usually ranging between fifteen minutes and one hour. Alternatively the soda ash and oxalic acid may be added together. The mass is washed with soda ash and oxalic acid. The pulped waste is agitated and may then be further treated with a small quantity of a bleaching substance. It is stated that 8lb. of soda ash and 2lb. of oxalic acid suffice for the treatment of 5cwt. of ordinary newsprint waste.

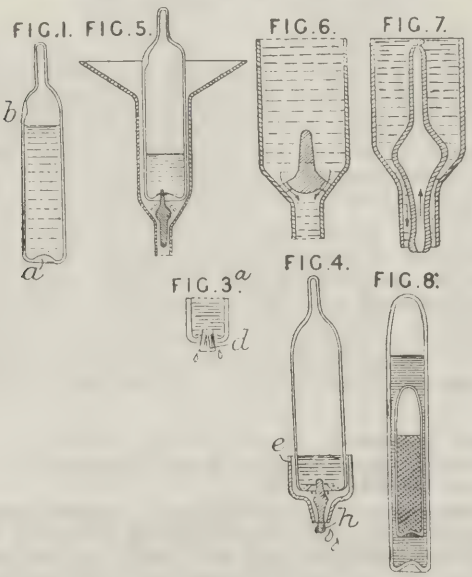
Recovering Coal from Sludge. T. Steen, Berlin. British Patent, **198,529**, of 1922.

The sludge resulting from washing coal is run on to a vacuum draining floor and is dried thereon. The stream of sludge may be divided, the fine coal being led to the floor with a minimum amount of water and the remainder of the sludge containing the coal dust being led to a settling tank or elsewhere for separate treatment, for example for reduction of the ash content. The thickened sludge from the settling tank, or the portion of the sludge which has been treated separately may be led to the draining floor with the main stream, or it may be dried separately. If the sludge contains much foreign matter, the fine coal may be completely separated, for example by means of a rake, and led to the draining floor in a stream of water, the residual sludge being concentrated separately and re-united with the fine coal before or after the latter reaches the draining floor. The separated fine coal may be transported to a storage tower and the sludge dried on the draining floor until it crumbles. Circular or annular drying troughs may be used. To remove salts such as magnesium chloride, fresh water is added to the partly-dried sludge on the floor, so as to wash out the residual water which contains dissolved salts.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Making Standard Solutions. F. W. Horst, Neckargemünd, Germany. British Patent, **198,993.** Convention date, June 6, 1922.

Reagents for making standard solutions are weighed and enclosed in airtight containers, each container containing a quantity corresponding with a particular volume, say 1



litre, of the solution to be prepared. The reagents may be mixed with a substance facilitating the weighing or having preservative properties such as a salt or colloid, and the weighing may be effected in an inert atmosphere. An excess of the substance may be first taken, the excess being removed by suction until the scale balances. The containers may be glass flasks having a weak portion, preferably in a recess adapted to be broken when the reagent is to be used. Such weakened part may be at the bottom *a*, Fig. 1, and a second weakened part *b* may be provided for more easily emptying the container. The weakened part may be broken by a tool or mandrel and the opening may be plugged with a material such as glass wool *d*, Fig. 3a, to retain fragments of glass. The mandrel may be arranged in a funnel *e*, Fig. 4, and may have an enlarged end *h* for preventing it falling out. The mandrel may be ribbed to allow the liquid to flow past it more easily, and may be tubular, Fig. 7, to allow of air entering the container as the liquid leaves. The mandrel may be attached to the funnel, Fig. 6, channels being provided for the liquid to pass through. The funnel may be shaped so as to guide the container, Fig. 5, the container being simply dropped into place. Several containers may be arranged one within another, having the weakened parts in line, Fig. 8, so that they may be fractured simultaneously. The reagents mentioned are permanganate, phthalic acid, aniline hydrochloride, betain hydrochloride, iodates for iodine determinations, sulphanilic acid for nitrite determinations, diazotised aromatic amines, nitraniline, dyes, and pharmaceutical preparations.

Catalytic Materials. C. Urfer, Geneva. British Patent, **199,030.** Convention date, June 12, 1922.

Catalytic materials, for use especially in the synthesis of ammonia, are obtained by heating a reducing metal with the halide of a metal capable of forming a nitride when heated in nitrogen and whose nitride decomposes when heated with hydrogen, and cooling the reaction mass *in vacuo*, nitrogen or hydrogen. The reducing metals mentioned are sodium, potassium and calcium, whilst the metals whose halides are employed comprise cerium, lithium, calcium, strontium, barium, lanthanum, thorium, glucinum, zirconium, vanadium and molybdenum. The product consists of the nitride-forming metal or its nitride in the pulverulent state mixed with the halogen compound of the reducing metal which functions as an inert support. The halide is generally the chloride, but bromides, iodides and fluorides may also be used; fluorides are employed when the chlorides are deliquescent. According to the example, equimolecular quantities of lithium chloride and sodium or potassium are heated *in vacuo* or in nitrogen.

Ammonia Synthesis. C. Urfer, Geneva. British Patent, **199,032.** Convention date, June 12, 1922

A catalytic material for the synthesis of ammonia comprises a mixture of (1) the nitride or amide of a metal, such as the alkaline earth metals and lithium, which gives a nitride or amide when heated with nitrogen or ammonia and whose nitride or amide is decomposed by heating in hydrogen; (2) an inert oxide, such as magnesia, alumina and lime, and (3) a metal, such as lead, cadmium, bismuth, antimony, commercial zinc (which contains bismuth, cadmium and lead as impurity), gold, copper and silver, which accelerates the decomposition in hydrogen of the nitride or amide. With the exception of zinc, all the meals mentioned under (3) above are prepared by heating the oxides in hydrogen, preferably in the presence of the inert oxide to prevent fusion. Ammonia is obtained by passing either a mixture of nitrogen and hydrogen or nitrogen and hydrogen alternatively over the catalytic material at a temperature less than 600° C. and at atmospheric pressure.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals. — Since the resumption of business there has been but little activity in this market, and it seems that the present dull period is likely to continue through August. Prices, however, show no sign of any further material move in buyers' favour. **Acetic Acid,** 80% technical, £47. to £48.; 80% pure, £50.; 98% glacial, £60. in casks and £75. in glass demijohns, ex wharf London; stocks are reported limited on spot, with prices fully maintained. **Acetone,** British Government specification, about £130. to £135. per ton, nominal; there are no stocks of any size to offer on spot, while inquiry is as good as ever; prices are

likely to go still higher, owing to a world shortage. **Arsenic,** Cornish, white powdered, about £72. to £73. per ton, for spot parcels; inquiry for these goods is still very small. **Alum,** lump, £10. to £10. 10s. per ton, in casks; dealers are offering imported material at about these figures; demand small. **Anhydrous Ammonia,** 99.95%, 1s. 5d. per lb.; the market has been quiet of late; prices quoted unchanged. **Barium Chloride,** 98—100%, £15. to £15. 5s. per ton, on spot; dealers find business still very slow. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; importers are offering at these rates for shipment, but do not seem to be selling much. **Borax,** commercial, granulated £26. 10s., crystals £27., powdered £28., extra fine £29.; B.P., crystals £31., powdered £32., extra fine £33. per ton, for home trade only, in 2cwt. bags (free), carriage paid to destination. British makers quoting at these unchanged rates for home trade only; their prices for export vary as to destination; dealers are offering for home consumption under similar conditions to makers at: Granulated £25. 10s., and powdered £27. per ton. **Borax Glass,** lump, £74.; powdered, £75. per ton, in tin-lined cases; British makers' prices, to home trade only, are unchanged at these prices, packages free, carriage paid in the United Kingdom. **Boric Acid,** commercial, crystals £50., powdered £52.; B.P., crystals £56., powdered £60., extra fine £62. per ton, in free bags, carriage paid to destination; British makers' quotations, for home trade only, are unaltered at these rates; dealers are quoting some grades on spot at competitive rates. **Cream of Tartar,** 99—100%, 90s. to 92s. per cwt., less 2½%, in one-ton lots; this market keeps very steady at these prices, with a fair volume of business passing. **Citric Acid,** B.P., crystals, about 1s. 6½d. to 1s. 7d. per lb.; these are the quoted prices, but, owing to the weakness of the market, the actual selling prices are a matter of negotiation. **Epsom Salts,** commercial quality, about £5. per ton, in bags; business in dealers' hands is still very quiet. **Formaldehyde,** 40%, about £95. per ton; this market is still very quiet. **Glauber's Salt,** commercial quality, £3. 15s. to £4. per ton, in bags; dealers are doing hardly anything in this product; prices unchanged. **Lead Acetate,** brown, about £41. to £41. 10s.; white, about £42. per ton; spot lots are offering, with the demand poor. **Litharge,** pure flake, British, about £37. per ton; imported material is quoted at about £36. per ton, and is moving off slowly. **Lithopone,** 30% Continental red seal, £22. to £22. 10s. per ton; this market keeps very steady, with a fair volume of business passing through dealers' hands. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; any demands on spot are for small quantities; prices seem fairly steady. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers' prices stated. **Oxalic Acid,** about 6d. per lb.; the position, so far as dealers are concerned, remains very dull. **Carbonate of Potash,** 90—92%, about £27. 10s.; 96—98%, about £31. per ton; the market is steady at these values, but business is still slow and small. **Chlorate of Potash,** crystals and granulated, about 3d. per lb.; it would probably be difficult to book orders at this price. **Caustic Potash,** 88—92%, on spot, £32. to £32. 10s. per ton, in drums; dealers are offering at these prices, with occasional business about. **Permanganate of Potash,** commercial quality, about 9d. to 9½d. per lb.; the spot position keeps very steady at about these values, with some little business about. **Prussiate of Potash,** yellow, about 1s. 2d. to 1s. 2½d. per lb.; spot offers are being made at these rates, with a fair volume of business being done. **Sulphate of Potash,** 96%, £11. 10s. per ton, ex ship; this market shows no change. **Mercury,** about £10. 5s. to £10. 10s. per bottle of 75—76lb.; prices seem steady, with the market quiet. **Red Lead,** imported, about £36. per ton; importers are doing a limited business at about this rate. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49.; medium, £43. to £43. 10s.; fine white crystals, £26. to £27. per ton; supplies are offering on spot at these rates, with business slow and small. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; export, about £5. 5s. to £5. 10s. per ton, f.o.b. **Acetate of Soda,** about £25. per ton; importers are quoting at about this price for forward delivery. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid to destination; British makers selling for home trade only at this price; their prices for export vary according to destination. **Soda Crystals,** £5. 5s. per ton, in bags, carriage paid to destination; British makers quoting at about this price, for home trade only; dealers are offering at competitive prices. **Caustic Soda,** 70—72%, £18. 10s.; 76—77%, £20. 10s. per ton, in drums, ex wharf shipping port; dealers quoting at these unchanged prices, with not much inquiry about; British makers' prices, for home trade only, show no change at £19. to £21. 10s. per ton, in drums; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers' prices for home trade only quoted, in free bags, carriage paid. **Bichromate of Soda,** home trade, 4½d. per lb.; export, about 5d. per lb.; British makers selling at these levels. **Cyanide of Soda,** 98—100%, export, about 8½d. to 9d. per lb.; home trade, about 10½d. per lb.; British makers' quoted rates show no change. **Nitrate of Soda,** 96%, £13. 7s. 6d. per ton, f.o.r. Liverpool; the position shows no change on the week; market steady. **Nitrite of Soda,** 100%, about £26. 10s. per ton; prices quoted are unaltered. **Prussiate of Soda,** about 6½d. per lb.; dealers continue to compete very keenly for what little business there is about. **Hyposulphite of Soda,** pea crystals, about £14. 10s. per ton, in 1cwt. kegs; commercial quality, £10. per ton, in casks; dealers are doing a little business at about these prices. **Sodium Sulphide,** 60—62%, solid, £14.; ditto, broken, about £15. per ton; dealers are offering Continental material at about these levels, with little moving off; 60—65% concentrated, £15. per ton, in casks. **Sulphate of Copper,** about £26. per ton; Continental offerings are still very cheap; business is slow. **Tin Crystals,** 1s. 4s. per lb.; the market shows no change on the week. **White Lead,** imported, about £43. per ton; importers are selling in small quantities at about this price. **Zinc Oxide,** B.P., about £51.; white seal, about £43.; 99.5%, about £37. 10s. per ton, f.o.r. makers' works; British makers quoting at about these prices

Pharmaceutical Chemicals.—A continuance of slow business of very limited size is reported from most quarters in this market. Prices are being fairly well maintained, and this week there is no change of importance to comment upon. **Acetanilid,** crystals and powdered, 1s. 5d. per lb.; the market is not firm at this figure; business quiet. **Acetyl-Salicylic Acid,** B.P., 3s. to 3s. 1d. per lb.; spot parcels of good brands are offering at these prices, with the demand poor. **Benzoic Acid,** B.P., about 2s. 3d. to 2s. 6d. per lb., nominal; no inquiry on the market. **Diethylbarbituric Acid,** B.P. (barbitone), about 20s. to 21s. per lb.; at these rates the market keeps up very well, although there is little doing. **Salicylic Acid,** B.P., about 2s. 2d. to 2s. 3d. per lb.; the market keeps very steady, but business is rather slow. **Tannic Acid,** leviss, about 3s. 3d. per lb.; the spot position is steady at this rate, with business quiet. **Amidopyrin,** about 14s. to 14s. 6d. per lb.; the prices quoted govern a steady but quiet market. **Ammonium Bromide,** 7d. to 7½d. per lb.; spot supplies are still being freely offered, with nothing much moving off. **Benzonaphthol,** about 5s. per lb.; nominal; the market remains idle. **Benzaldehyde 03,** about 3s. per lb.; quoted rates on spot are unchanged; market dull. **Betanaphthol,** resublimed, about 1s. 10d. per lb.; the market remains rather dull, with quoted prices unaltered. **Calcium Lactate,** about 1s. 9d. per lb.; this market is much steadier after the recent big drop in values. **Chloral Hydrate,** duty paid, about 4s. per lb.; the spot position is well maintained at this rate, and some business has been done. **Creosote Carbonate,** about 8s. 6d. per lb.; this market remains quiet, with quoted values level on the week. **Creosote, B.P.,** about 2s. 2d. per lb.; this market is very steady, although there has not been much doing of late. **Guaiacol Carbonate,** about 8s. 3d. per lb., nominal; market still idle. **Hexamine,** about 3s. 10d. per lb.; there is no sign of any further break in the spot price of this product. **Hydroquinone,** about 3s. 6d. per lb.; the spot market keeps well up to this figure, although business has been rather slower. **Methyl Salicylate,** 2s. 5d. to 2s. 6d. per lb.; prices are quoted very steadily at these levels; business moderate. **Methyl Sulphonal,** about 15s. per lb.; the market shows but little life; prices quoted unchanged. **Paraformaldehyde,** 3s. 9d. to 4s. per lb.; this market is much steadier, and some little business has been done. **Paraldehyde,** about 1s. 5d. per lb.; the spot position is still rather unsteady, with not much business about. **Phenacetin,** about 6s. per lb.; this is the average price asked, but some large quantities might be offering at slightly less. **Phenazone,** about 7s. 6d. per lb.; last week's recovery is well maintained on spot. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; the little offering is firm at these rates. **Piperazine,** 4s. 6d. per oz.; the spot offer from dealers is generally at about this rate for small quantities. **Potassium Bromide,**

crystals and granulated, 6½d. to 7d. per lb.; prices quoted by dealers holding spot material are varying very much, and competition for the little business about is very keen. **Potassium Permanganate,** B.P., 10d. to 10¼d. per lb.; the market keeps well up to these figures on spot, with business better. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; no interest being shown in dealers' spot offers at about this figure. **Salol,** 2s. 8d. to 2s. 9d. per lb.; nothing offered here below these rates. **Sodium Benzoate,** about 2s. 6d. per lb., nominal; market still lifeless. **Sodium Bromide,** crystals and granular, 7d. to 7½d. per lb.; on spot material seems very plentiful, and holders seem willing to cut their prices in order to effect sales. **Sodium Diethylbarbiturate,** about 19s. per lb.; on spot dealers are quoting this rate, with business limited. **Sodium Salicylate,** powder, about 2s. 5d.; crystals, about 2s. 9d.; flake, about 2s. 11d. per lb.; dealers holding spot supplies of good quality are firm at these rates. **Sulphonal,** about 14s. 6d. per lb., nominal; no interest is shown in importers' offers at this price. **Terpin Hydrate,** about 1s. 9d. per lb.; the spot position keeps very steady, but business is slow. **Thymol,** about 15s. per lb.; dealers offering imported material at about this figure.

Coal-tar Products, Intermediates, Etc.—Business has remained on the quiet side in these articles during the past week. Prices quoted show very little change, but in some directions the market is rather unsteady. **Aniline Oil,** about 9d. to 9½d. per lb., drums free; prices quoted are level, with the market quiet. **Aniline Salt,** 9½d. to 10d. per lb., casks free; the market is maintained at this quoted figure. **Beta-naphthol,** 1s. 1d to 1s. 2d. per lb.; any business would probably be at slightly less. **Benzol,** 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; this item is now very steady, and the price is not likely to change again for some time. **Toluol,** 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; a steady tone is maintained, despite the poorness of business. **Xylol,** pure, 2s. 3d.; commercial, about 1s. 6d. per gallon, drums extra; the demand for this product remains small; quoted rates unaltered. **Naphtha,** about 1s. 5d. per gallon; the price as quoted seems difficult to maintain, with the market dull. **Solvent Naphtha,** 90/160, 1s. 5d. per gallon, drums extra; prices quoted are the same; inquiry very poor. **Heavy Solvent Naphtha,** 90/190, 1s. 4d. per gallon, drums extra; the market is still flat, with quoted rates unsteady. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; there is no change in the position on the week. **Burning Oil,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; business remains very small, and prices are level on the week. **Creosote Oil,** 10d. per gallon, f.o.b.; this market shows but little activity, but values are fully maintained. **Carbolic Acid,** crystals, about 1s. 2d. per lb., f.o.b.; at this price the position is now very sound. **Naphthalene,** £20. per ton; prices are being kept up to this level fairly well, with business poor; crude, £7. to £13.; crystals, £21.; powder, about £17.; balls, £28.; candles, £34.; tablets, £34. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; inquiry continues, with quoted prices unchanged. **Pyridine,** 19s. to 20s. per gallon; nominal; it is doubtful if there are stocks of any size to meet the good inquiry on the market; prices are very sound. **Hexamethylene,** 4s. to 4s. 3d. per gallon; the spot prices are well up to these levels. **Pure Methyl Alcohol,** £100. per ton, ex wharf London; the market here keeps very steady at this rate. **Pitch,** about 135s. per ton, spot London; a steady market seems to have set in here; inquiry is limited.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £63. 15s. to £63. 17s. 6d., cash; £64. 10s. to £64. 12s. 6d., three months; electrolytic, £69. 5s. to £69. 15s. **Tin**: Standard, £184. to £184. 5s., cash; £185. 5s. to £187. 7s. 6d., three months; Straits, £187. 10s.; English, £184. 15s. **Lead,** soft foreign, £23. 17s. 6d., prompt; English, £25. 5s.; chemical sheet, 34s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £31. 17s. 6d.; hard, £25. 15s. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. 5s. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. 6d. to 12s. 9d. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust,** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. Wednesday.

Business generally continues on the dull side, with a steady decline in values, and there are no signs of improvement. Quotations for **Alkali** products are maintained at recent rates: 70% Caustic Soda, £20.; **Ammonia Alkali** 58%, £7. 12s. 6d.; **Bicarbonate of Soda,** £10. 10s., bags, on rails works. **Soda Crystals,** £5. 5s., carriage paid. **Glauber's Salt,** easy at £4., carriage paid. **Bleaching Powder,** soft-woods, unchanged at £11. 7s. 6d. on rails. **Chlorates** are dull; **Potash** at 3d., and **Soda** 2¾d. per lb. **Bichromate of Potash,** 5¾d.; **Soda,** 4½d. per lb. **Copper Sulphate** is only moving off slowly, and price nominal at £26., f.o.b. Liverpool. American **Sulphur,** steady at £5. 5s. on rails. Quotations for **Phosphate** and **Hyposulphite of Soda** are lower, and demand small. **Nitrite of Soda,** firm at £26. 10s., ex store. White powdered **Arsenic,** scarce and dear at £75., delivered, for Cornish makes. Yellow **Prussiates** are weak; **Potash** 1s. 2¼d., and **Soda** 6½d. per lb. **Caustic** and **Carbonate Potash** have a downward tendency. Grey and brown **Acetate of Lime** are unaltered in position or value. Miscible **Wood Naphtha,** steady at 6s. 6d. per gallon. **Acetone,** firm at £125. per ton. **Acetate of Soda,** scarce at £24. 10s., ex store. **Acetic Acid,** in fair inquiry at recent rates. **Lead Salts** are unchanged: White **Acetate** £41., brown £43.; and **Nitrate,** £42 delivered. **Barium Chloride,** £15. per ton on rails. **Copperas** is moving off steadily, but values rule low. **Oxalic Acid,** lower at 5¾d. to 6d. per lb. **Permanganate of Potash,** 9¾d. to 10d. per lb.

SWANSEA MARKET REPORT. Wednesday.

More activity was displayed in **Tinplates,** and prices were firm on the basis of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets,** fairly active on the average quotation of £17. 17s. 6d. per ton. **Copper,** moderately active at £63. 17s. 6d. per ton for prompt, and £64. 2s. 6d. three months. **Tin,** quiet and steady at £182. 7s. 6d. per ton prompt, and £183. 12s. 6d. three months for foreign; English, £183. 7s. 6d. per ton cash. **Lead** quiet, with better offers at £24. 2s. 6d. per ton cash, and £23. 17s. 6d. three months for soft foreign; English, £25. 7s. 6d. **Spelter** steady, with better inquiry; prompt, £30. 17s. 6d.; three months, £31. 2s. 6d. **Zinc Sheets,** easier at £38. 12s. 6d. per ton, on rail at works. **Sulphate of Ammonia,** quiet at fixed trade prices. **Sulphate of Copper,** dull at £26. 7s. 6d. per ton, less 5%. **Nitrate of Soda,** in better call at £13. 7s. 6d. per ton. **Bone Meal** steady, with prompt Indian at £9. 2s. 6d. per ton. **Linseed Oil** quiet, with raw, prompt, at £2. 3s. 3d. per cwt., net, in barrels. **Cottonseed Oil,** fair demand, with common edible at £2. 3s. 3d., and deodorised £2. 6s. 3d. per cwt. **Rape Oil** dull; prompt, refined, £2. 5s. 3d. per cwt., net, in barrels. **Cocoanut Oil,** very quiet at £1. 18s. 9d. per cwt. for Ceylon, prompt. **Olive Oil,** steady but quiet at £66. 17s. 6d. per ton. **Palm Oil,** quiet; Lagos, £33. 2s. 6d.; softs, £32. 12s. 6d. prompt, and forwards £32. 15s.; mediums, £32. 17s. 6d.; and hards, £33. 2s. 6d. per ton. **Turpentine** quiet, with American, prompt, at £3. 14s. 3d. per cwt. **Oxalic Acid,** dull at 6¼d. per lb. **Sulphuric Acid,** in fair demand at late rates. In the **Coal** trade, business seems to be settling down to normal, and full outputs are now to be expected: Best Admiralty smokeless £1. 9s. 6d., seconds £1. 8s.; ordinaries £1. 7s., all per ton, f.o.b. **Anthracite** trade good: Best large £2. 10s., seconds £2.; Paris nuts, £3. **Patent Fuel,** fairly active at £1. 10s. 6d. to £1. 14s. 6d. **Cokes,** less active at £2. 15s. 6d. for export; foundry, £2.; and furnace, £1. 10s. per ton.

LIVERPOOL CHEMICAL MARKET. Wednesday.

A somewhat freer inquiry for chemicals of the heavier kind has been noticeable, due apparently to the resumption of work in chemical-using industries after the stoppage in the early part of the month, for holidays, cleanings, and repairs. Shipments for foreign ports have been on a larger scale, and transactions in relation to them have helped to brighten up the market. **Bleaching Powder** has been rather more inquired for, and is £10. to £11. per ton, for use in the United King-

dom; and £11. per ton for export. **Calcium Chloride** has been in very fair request, business in this product being helped by the prevailing summer temperature; the price is £5. 17s. 6d. per ton. **Caustic Soda** has had a quietly steady sale on United Kingdom account, and has again had a very fair shipment for foreign ports; it is £20. 7s. 6d. to £21. 7s. 6d. per ton for 76% carriage paid, for home-trade uses; and £20. 10s. per ton for export. **Bicarbonate of Soda** has been in fair request for the home trade, and has been shipped more freely for export; it is £10. 10s. per ton, carriage paid, for use in the United Kingdom. **Soda Crystals** have had a moderate sale, and are £5. 5s. per ton for home-trade uses. **Nitrate of Soda** has had a steady though small sale, and is £13. 5s. to £13. 10s. per ton. **Borax** has been more in request for use in the United Kingdom; commercial crystals are £27. per ton, and powdered is £28.; higher grades are—crystals £31., and powdered £32. per ton, carriage paid in the United Kingdom. **Saltcake** has been quieter, and is £4. 10s. to £5. per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has been in moderate demand, and is 4½d. per lb., c.i.f. to usual ports. **Ammonia Alkali** has been steadily called for on home-trade account and has had a fairly large shipment on foreign account; the price is £7. 12s. 6d. per ton for home-trade use, and £8. per ton for export. **Hyposulphite of Soda** has been in rather good demand, and is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial; and £15. to £16. per ton in 1cwt. kegs for photographic. **Sulphide of Soda** has been very quiet; solid is £16. per ton, and crystals £10. 10s. to £11. per ton. **Chlorate of Soda** has been inactive, and is 3d. to 3½d. per lb. **Phosphate of Soda** continues very quiet, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has had a slightly freer inquiry, and is 7d. per lb. **Yellow Prussiate of Potash** has had a steady inquiry, and is 1s. 2½d. to 1s. 3d. per lb. **Red Prussiate** has been but little in demand, and is 3s. 6d. to 3s. 9d. per lb. **Carbonate of Potash** has had a limited inquiry, and is £25. to £32. per ton, according to quality. **Nitrate of Potash** has been in fair request, and is £33. to £35. per ton for refined. **Chlorate of Potash** has been neglected, and is 3½d. to 4d. per lb. **Caustic Potash** continues quiet, and is £32. to £33. per ton. **Permanganate of Potash** has been more in request, and is 9¾d. to 10d. per lb. **Bichromate of Potash** has been but little inquired for, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been quiet; first quality is £63. per ton, second quality is £60., and third £57. **Sulphate of Ammonia** has had a slow sale for use in the United Kingdom, but has had a fair shipment; at date, the reduced price of £14. 5s. per ton for neutral of 25¾% is quoted, but from August 18 onwards to the end of September the price of neutral will be £14. 10s. per ton for use in the United Kingdom. **Carbonate of Ammonia** has been rather more inquired for, and is 4d. per lb. **Muriate of Ammonia** has been very quiet, and is £32. to £33. per ton. **Magnesia** has been more inquired for; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. per ton. **Alum** has had a quietly steady sale, and is £12. per ton for home-trade uses, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has had a moderate inquiry, and is £8. to £11. per ton, according to quality. **Sulphur** has been in fair demand; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s. per ton, and American £5. to £5. 10s. per ton. **Tartaric Acid** has sold more readily, and is 1s. 2¼d. to 1s. 3d. per lb. **Cream of Tartar** continues in very fair request, and is £4. 12s. to £4. 15s. per cwt. **Boric Acid** has again had a quietly steady sale; commercial crystals are £52. per ton, and powdered is £58., £2. per ton extra being charged if in casks. **Citric Acid** has had a moderate inquiry, and is 1s. 7d. to 1s. 9d. per lb. **Oxalic Acid** has been but little in request, and is 6d. to 6¼d. per lb. **White Acetate of Lead** has moved but slowly, and is £42. to £43. per ton. **Sulphate of Copper** continues quiet in the home branch and in the export branch of the trade; it is £26. to £26. 5s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been but little inquired for; white powdered is £71. to £72. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

A little more activity has again been noticeable in the Glasgow market during the week, and business, though still of small dimensions, is considered as having a more hopeful tone. The usual day-to-day demand for chemicals on home account is maintained, but inquiries for export are still of a limited character. Prices generally are steady. Quotations, at Glasgow, are as follows:—**Alum**, quiet, and in small demand; prices steady at £12. 5s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; the quotation is reduced to £76. 10s. per ton net on spot. **Barium Chloride** remains very quiet, despite the recent reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax**, granulated, is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride**, 70—75%, solid, £5. 12s. 6d. per ton. **Citric Acid** is a quieter market, with the price maintained at 1s. 7¼d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure of £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar** steady, with better inquiry at £4. 8s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in fair request; brown steady at £41. per ton, net; and white better at £41. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid** is 6¼d. per lb. **Paraffin Wax** experiences a fair export trade at 2¾d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the steady figure of 1s. 3½d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1 11s. per cwt., but business is nominal. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic**, 43—44%, in fair request at 1s. 1½d. **Tartaric Acid** still shows a quieter tendency at 1s. 2¾d. per lb., less 5%, Glasgow.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).
Bls.	Bales.	Css. or Cs.	Cases.	Hf. pps.	Half pipes.	qr.	Quarters.
Brls.	Barrels.	Cks.	Casks.	Hhds.	Hogsheads.	lb.	Pounds.
Bgs.	Bags.	Chts.	Chests.	Kgs.	Kegs.	Rnlts.	Runlets.
Btls.	Bottles.	Cylds.	Cylinders.	Oz.	Ounces.	Sks.	Sacks.
Bdls.	Bundles.	Drms.	Drums.	Pkgs.	Packages.	Slbs.	Slabs.
Bskts.	Baskets.	Djns.	Demijohns.	Pns. Puns.	Puncheons.	Tcs.	Tierces.
Bxs.	Boxes.	Frkns.	Firkins.			t. c.	Tons. Cwts.

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending August 11.

ACETIC ACID—
Bremen, 11 cks.

ALBUMEN—
Shanghai, 34 cs.

BARYTES—
Antwerp, 100 bgs.
Bremen, 110 bgs.

BLEACHING POWDER—
Hamburg, 138 cks.

CAUSTIC POTASH—
Hamburg, 41 drms.

DEXTRINE—
Hamburg, 300 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Marseilles, 75 cs.

GLUE—
Antwerp, 50 bgs.

LEAD ACETATE—
Hamburg, 4 cks.

LITHOPONE—
Bremen, 40 cks.
Hamburg, 20 cks.

RED LEAD—
Genoa, 166 cks.

SALT—
Bremen, 732 bgs., 3 lots.
Hamburg, 450 bgs.

SOAP—
Hamburg, 12 cs.; Marseilles, 136 cs.; Melbourne, 600 cs.

SODIUM HYPOSULPHITE—
Marseilles, 60 cks.

SULPHUR—
Catania, 710 bgs., 133 brls.

GOOLE.

Week ending August 11.

BARYTES—
Antwerp, 74 cks.

BONE FERTILISER—
Amsterdam, 105 bgs.

CAUSTIC POTASH—
Hamburg, 16 drms.

FORMIC ACID—
Hamburg, 298 crbys., 1 cs.

HYDROGEN PEROXIDE—
Ghent, 80 crbys.

LITHOPONE—
Antwerp, 8 cks.

MAGNESIUM CHLORIDE—
Hamburg, 35 drms.

POTASH (*otherwise undescribed*)—
Copenhagen, 21 cks.

POTASSIUM CARBONATE—
Bremen, 21 cs.

POTASSIUM SALTS (*otherwise undescribed*)—
Bremen, 1,000 bgs.

WHITE LEAD—
Antwerp, 17 brls., 10 drms., 40 cks.

GRANGEMOUTH.

Week ending August 11.

LITHARGE—
Rotterdam, 3 cks.

LITHOPONE—
Rotterdam, 52 cks.

MAGNESITE—
Yerakins, 800 t.

MAGNESIUM SULPHATE—
Antwerp, 10 t.

POTASH (*otherwise undescribed*)—
Antwerp, 56 drms.

POTASSIUM NITRATE—
Antwerp, 100 cks.

RED LEAD—
Rotterdam, 16 cks.

SODIUM HYDROSULPHITE—
Antwerp, 5 t.

STEARINE—
Rotterdam, 25 bgs.

GRIMSBY.

Week ending August 11.

LITHOPONE—
Rotterdam, 8 cks.

HULL.

Week ending August 11.

AMMONIUM SALTS (*otherwise undescribed*)—
Hamburg, 24 t.

CALCIUM CARBIDE—
Antwerp, 35 t.

CHEMICALS (*otherwise undescribed*)
Amsterdam, £397., 1 t. 5 c.; Antwerp, 5 t.; Bremen, £46.; Genoa, 10 t.; Hamburg, 8 t. 5 c.; New York, £272.; Rotterdam, £21.

DEXTRINE—
Amsterdam, 2 t.
Rotterdam, 1 t. 2 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 19 c.
Rotterdam, 220 lb.

DYESTUFFS (NATURAL)—
Logwood
New York, 385 t.

FERRO CHROME—
Gothenburg, 55 t.

FERRO SILICON—
Arendal, 120 t.
Porsgrund, 33 t.

GELATINE—
Bremen, 7 c.

GLUE—
Antwerp, 10 c.

LEAD COMPOUNDS (*otherwise undescribed*)—
Rotterdam, 100 t. 14 c.

PHOSPHATE (*otherwise undescribed*)
Bona, 2,138 t.

POTASSIUM NITRATE—
Rotterdam, 2 t.

ROSIN—
Bordeaux, 8 t.; Lisbon, 25 t. 10 c.; Pensacola, 55 t. 13 c.

SALT—
Hamburg, 160 t.

SOAP—
Marseilles, 11 t. 10 c.

STEARINE—
New York, 19 t. 10 c.
Rotterdam, 5 t.

SULPHUR—
Catania, 33 t.

TANNING MATERIALS—
Sumac
Palermo, 18 t. 8 c.
Valencia, 9 t. 18 c.

LEITH.

Week ending August 11.

BONE FERTILISER—
Rotterdam, 113 bgs.

CASEIN—
Dunkirk and Rouen, 67 bgs.

CREAM OF TARTAR—
Amsterdam, 24 cks.

CRYOLITE—
Copenhagen, 300 bgs.

GLUCOSE—
Amsterdam, 40 cks.

GLUE—
Dunkirk and Rouen, 20 bgs.
Nantes and Bordeaux, 20 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 16 drms.

METHYL CHLORIDE—
Dunkirk, 2 cylds.

RED LEAD—
Rotterdam, 6 cks.

SALT—
Antwerp and Ghent, 30 bgs.
Hamburg, 700 bgs.

SOAP—
Copenhagen, 15 cs.

SODIUM NITRATE—
Calcta Coloso, 11,144 bgs.
Iquique, 11,184 bgs.

STEARINE—
Antwerp and Ghent, 25 bgs.

WHITE LEAD—
Dunkirk and Rouen, 41 brls.

LIVERPOOL.

Week ending August 11.

ALBUMEN
Hankow, 200 cs.

ARGOLS—
Genoa, 285 bgs.
Oporto, 303 bgs.

BEESWAX—
Santonio, 59 pkgs.
Valparaiso, 33 bgs.

BORATE OF LIME—
Buenos Aires, 2,556 bgs.

CARBON BLACK—
New Orleans, 509 cs.

CASEIN—
Buenos Aires, 417 bgs.

CHEMICALS (*otherwise undescribed*)
New York, 3 brls.; Rotterdam, 38 brls.; Rouen, 1 cs.

CREAM OF TARTAR—
Barcelona, 182 brls.; Bordeaux, 140 kgs.; Genoa, 100 kgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Genoa, 13 brls.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 450 bxs.
Fustic
Havre, 36 cks.
Logwood Extract
New York, 278 cks.
Unspecified
Havre, 70 cks.
Philadelphia, 5 brls.

ESSENTIAL OILS (NATURAL)—
Citronella
Batavia, 21 drms.
Colombo, 7 drms.

FERRO SILICON—
Malta, 448 drms.

GELATINE—
Rouen, 200 bgs.

GLUE—
Antwerp, 211 bls.
Rouen, 200 bgs.

IRON OXIDE—
Malaga, 209 pkgs.

KIESELGUHR—
Oran, 2,188 pkgs.

LEAD NITRATE—
Genoa, 148 cs.

LEAD ORE—
Buenos Aires, 1,200 bgs.

LITHOPONE—
Rotterdam, 120 cks.

MAGNESITE—
Rotterdam, 125 pkgs.

MANGANESE ORE—
Calcutta, 4,000 t.
Larnaca, 565 bgs.

MINERAL COLOURS (*otherwise undescribed*)—
Malaga, 69 pkgs.

PARAFFIN WAX—
Baltimore, 425 brls.; New Orleans, 185 brls.; Philadelphia, 125 brls.

PHOSPHATE (*otherwise undescribed*)
Bona, 2,540 t.

PLUMBAGO—
Genoa, 50 cks.

POTASSIUM BITARTRATE—
Bilbao, 259 bgs.
Bordeaux, 211 bgs.

RED LEAD—
Genoa, 76 cks.
Rotterdam, 69 cks.

ROSIN—
Jacksonville, 1,625 brls.; New Orleans, 1,320 brls.; Savannah, 2,951 brls.

ROSIN SIZE—
Jacksonville, 50 brls.

SALTPETRE—
Rotterdam, 48 kgs.

SILICON—
Malta, 994 cks.

SOAP—
Amsterdam, 100 cs.
Genoa, 5 cs.
New Orleans, 125 brls.
New York, 70 cs.
Rotterdam, 121 cs.

SODIUM ACETATE—
Antwerp, 80 kgs.

SODIUM BICHROMATE—
Baltimore, 6 cks.

SODIUM CHLORATE—
Genoa, 79 cs.
Tarragona, 200 brls.

SODIUM NITRATE—
Iquique, 5,648 bgs.

STEARINE—
Rotterdam, 63 bgs.

TALLOW—
Buenos Aires, 92 cs.
New York, 680 brls.
Philadelphia, 100 brls.

TANNING MATERIALS—
Chestnut Extract
Genoa, 53 cs.
Mangrove Bark
Rotterdam, 500 bgs.
Myrabolans
Calcutta, 6,109 pkgs.
Quebracho
Buenos Aires, 13,644 bgs.
Valonia
Smyrna, 800 bgs.
Unspecified
Bordeaux, 119 cks., 85 bgs.

TARTARIC ACID—
Genoa, 4 brls.

TURPENTINE—
Jacksonville, 250 brls.
Savannah, 500 brls.

WAX (*otherwise undescribed*)—
Baltimore, 151 brls.; New Orleans, 1,314 brls.; New York, 23 brls.; Philadelphia, 350 brls.; Rangoon, 1,200 bgs.

ZINC DUST—
Antwerp, 18 cks.

ZINC OXIDE—
Antwerp, 80 brls.

LONDON.

Week ending August 11.

ACETIC ACID—
Germany, 64 pkgs. V. Blagden

ACETONE—
Germany, 10 t.
Poland, 4 16 c. Mann

ALUMINIUM SULPHATE—
France, 800 pkgs.

ANTIMONY—
China, 25 t. M. H. Cawson

ANTIMONY REGULUS—
China, £27. A. J. Humphrey
,, 104 t. Cookson

ARGOLS—
Italy, 96 pkgs. Fellows, Morton & Clayton
Spain, 861

BARYTES—
Germany, 76 cks. L. Berger
,, 34 W. Harrison
,, 150 bgs. G. Elliott
,, 25 cks. Dexters

BEESWAX—
Aden, 33 bls. J. W. Cook
Germany, 10 cs. Scheuer

CALCIUM CARBIDE—
Jugo-Slavia, 75 t. 5 c.

CASEIN—
Denmark, £23.
France, £2,400. Brit. Xylonite
,, £780. Guedon
,, £100. Jones, Moore
,, £93.
Latvia, £25.

CAUSTIC POTASH—
Sweden, 20 pkgs. J. B. Ballantyne

CHEMICALS (*otherwise undescribed*)
Germany, £6. T. Christy
,, £48.
,, £15. J. Bailey
,, £19. H. W. Winter
,, £14. J. J. Griffin

CHEMICALS (*otherwise undes.*)—*
——— £719.

COAL TAR PRODUCTS—
Benzol
U.S.A., £1,105. W. Waugh
,, £190. W. R. Smith
,, £147,886. Anglo-Amer. Oil
Naphthalene
Belgium, £121.
Pitch
France, 1 pkg.

CREAM OF TARTAR—
Spain, 105 brls. Leach

DEXTRINE—
Germany, 6 t. 7 c.
Holland, 27 18 K. J. Mulder

DISINFECTANTS (*otherwise undes.*)
France, £19. F. Stahlschmidt
N.Z., £270. Shaw, Savill & Albion

DYESTUFFS (ARTIFICIAL)—
Unspecified
Germany, £609.
,, 15 pkgs. Greeff

DYESTUFFS (NATURAL)—
Annatto
Denmark, 2 pkgs.
Cutch
Holland, 50 pkgs.
Indigo
Brit. India, 7 chts. Parsons & Keith
Turmeric
Brit. India, 4 pkgs. Litchfield & Saundy
Unspecified
U.S.A., £93. H. W. Peabody
,, £74.

* Entered under the Safeguarding of Industries Act

FUSEL OIL
Austria, 1 drm. Honeywill

GELATINE
France, £19.
Germany, £246. Crowe

GLUE—
Austria, £596. G. E. King
,, £17. Allison
,, £12.
Belgium, £1,560. Cazaly, Mills
,, £202.
France, £300. A. J. Malicet
Holland, £58. H. Smart
Hungary, £350. ,,

GLYCERINE—
Holland, £464.
,, £23. Van Oppen

ISINGLASS—
Brit. Guiana, 8 cs.
Burmah, 18
French-Indo-China, 10 W. M. Smith
France, 5 bls. J. L. Lyon
Straits Setts. 13 cs. E. Bensted

LITHOPONE—
Holland, 60 cks. M. Ashby
,, 120 F. T. H. Nye

MAGNESITE—
Holland, £272. Scheuer
Brit. India, £40. Paul & Preston

MINERAL COLOURS (*otherwise undescribed*)—
Spain, 34 cks. Houlder
,, { 22 brls. E.
,, { 2 sks. Decbaine
,, 14 brls. Ramon Aguye
,, { 37 Taylor &
,, { 300 bgs. Cox
,, 70 brls. S. Bramwell

OCHRE—
France, 22 cks. Taylor & Cox
Spain, 80 Jenson & Nicholson

OZOKERITE—
Czecho-Slovakia, 25 bgs. E. G. Boize
Germany, 10 E. Friedlander

PARAFFIN WAX—
Burmah, 52 t. Asiatic Petr.
U.S.A., 78 9 c. H. Hill
,, 40 3 A. C. E. Garnham
,, 50

PLUMBAGO—
Japan, 750 cks.
Ceylon, 142 brls. A. Branwell

POTASSIUM CARBONATE—
Germany, 35 pks. J. M. Steel

POTASSIUM CHLORATE—
France, 500 kgs. E. J. Brash

PRUSSIAN BLUE—
Holland, 3 cks. Stancourt & Muir

ROSIN—
France, 10 cks.
,, 30 Lowden, Connell
U.S.A., 200 brls. W. E. Taylor

SHELLAC—
Brit. India, 37 t. 10 c. Dunlop
,, 232 2 J. W. Cook
,, 7 7
Germany, 2 E. Friedlander
Siam, 2 Litchfield & Saundy

SOAP—
Denmark, £807.
France, £550.
Germany, £72. E. Friedlander
,, £5.
Holland, £300. Litchfield & Saundy
Spain, £17. A. C. Lloyd

SODIUM SALTS (*otherwise undes.*)
Germany, 4 t. 4 c. A. C. Lloyd

SULPHUR—
Belgium, £88. J. D. Hewett
Italy, £86.
,, £85. E. J. Brash

TALLOW—
Argentine, 24 t. 13 c. F. H Harris
N.S.W., 40 brls. H. Hill
N.Z., 1 t. 9 c. Anning & Cobb
,, 25 17 H. Hill
,, 270 10
,, 25 10 Weber, Smith & Hoare
,, 27 Goad, Rigg
U.S.A., 59 14

TANNING MATERIALS—
Divi-Divi
Brit. India, 112 pkgs. Flack & Chandler
Myrabolans
Brit. India, 4,000 pkgs.
Sumac
Italy, 1,250 pkgs. J. Kitchin
,, 84 Fisher, King
Unspecified
Natal, 100 t. I. I. Williams

THYMOL—*
——— £341.

ULTRAMARINE—
Holland, 1 ck. Stancourt & Muir

WAX (*otherwise undescribed*)—
France, £15.
Germany, £40. C. W. Hartrodt

WHITE LEAD—
Belgium, 55 cks.

ZINC OXIDE—
Germany, 150 cks. Stephens
Holland, 140 F. T. H. Nye
,, 75 M. Ashby

MANCHESTER.

Week ending August 11.

ACETIC ACID—
Hamburg, 167 crbys.

AMMONIA—
Hamburg, 10 cylds.

CALCIUM CARBIDE—
Drammen, 46 drms.
Rotterdam, 50 drms.

CARBON (DECOLOURISING)—
Amsterdam, 110 bgs.

CAUSTIC POTASH—
Hamburg, 131 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 36 drms., 3 cks.
Montreal, 188 drms.

CREAM OF TARTAR—
Hamburg, 5 cks.

DEXTRINE—
Baltimore, 2,170 bgs.

DYESTUFFS (NATURAL)—
Unspecified
Philadelphia, 75 brls.

FERRO SILICON—
Gothenburg, 52 cs., 50 brls.
Sarpsborg, 100 brls.

GLUCOSE—
Hamburg, 67 brls.
Norfolk, 300 brls.

GLUE—
Antwerp, 60 bls.
Rotterdam, 30 bgs.

LEAD ACETATE—
Hamburg, 57 brls.
Rotterdam, 6 cks.

LITHOPONE—
Antwerp, 40 cks.
Rotterdam, 480 cks.

MAGNESITE—
Amsterdam, 200 bgs.
Rotterdam, 125 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 178 drms.

OCHRE—
Norfolk, 158 brls.

OXALIC ACID—
Rotterdam, 18 cs.

PARAFFIN WAX—
Philadelphia, 125 brls.

POTASSIUM CHLORATE—
Hamburg, 50 brls.

POTASSIUM PRUSSIATE—
Hamburg, 17 kgs.

SALAMMONIAC—
Rotterdam, 14 cks.

SOAP—
Rotterdam, 89 kgs.

SODIUM ACETATE—
Hamburg, 4 cks.

SODIUM BICARBONATE—
Baltimore, 70 cks.

SODIUM NITRITE
Hamburg, 9 cks.
Rotterdam, 43 cks.

SODIUM PHOSPHATE—
Hamburg, 34 cks.

SODIUM PRUSSIATE—
Rotterdam, 17 cks.

SODIUM SULPHATE—
Amsterdam, 135 bgs.
Hamburg 300 bgs.

STEARINE—
Antwerp, 51 bgs.

TALLOW—
Fredriksstad, 60 brls.

TARTARIC ACID—
Genoa, 98 kgs.
Rotterdam, 40 kgs.

TIN OXIDE—
Hamburg, 10 cks.

TURPENTINE—
Pensacola, 100 brls.

ULTRAMARINE—
Rotterdam, 51 cks.

WAX (*otherwise undescribed*)—
Norfolk, 500 brls.
Philadelphia, 250 brls.

WHITE LEAD—
Antwerp, 32 cks.

ZINC DUST—
Antwerp, 20 cks.

ZINC OXIDE—
Antwerp, 60 cks.
Rotterdam, 10 cks.

NEWCASTLE-ON-TYNE

Week ending August 11.

ANTIMONY—
Rotterdam, 2 cks.

CALCIUM CARBIDE—
Christiania, 300 drms.

LEAD ASHES—
Copenhagen, 1 ck.

LITHOPONE—
Rotterdam, 60 cks.

MAGNESITE—
Rotterdam, 100 bgs.

POTASSIUM NITRATE—
Hamburg, 385 t.

SALT—
Hamburg, 300 t.

SILICON—
Christiania, 78 cs.

SOAP—
Copenhagen, 4 cs.

N. & S. SHIELDS.

Week ending August 11.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 11.

ALUMINIUM SULPHATE—
Lisbon, 2 t.

AMMONIUM CARBONATE—
Aalesund, 10 c.; Buenos Aires, 1 t. 19 c.; Calcutta, 10 c.; Montreal, 2 t.

BITUMEN—
New York, £242.

CHEMICALS (*otherwise undescribed*)
Adelaide, 30 pkgs.; Algoa Bay, 1,002 pkgs.; Antofagasta, 11 pkgs.; Auckland, 150 pkgs.; Bombay, 11 pkgs.; Brisbane, 20 pkgs.; Calcutta, 20 pkgs.; Cape Town, 20 pkgs.; Colombo, 3 pkgs.; Delagoa Bay, 3,667 pkgs.; Durban, 124 pkgs.; East London, 435 pkgs.; Genoa, 42 pkgs.; Gothenburg, 50 pkgs.; Lyttleton, 3 pkgs.; Madras, 370 pkgs.; Melbourne, 148 pkgs. Montreal, 1,310 pkgs.

CHEMICALS (*otherwise undescribed*)
Natal, 158 pkgs.; New York, 880 pkgs.; Punta Arenas, 250 pkgs.; Perth, W.A., 52 pkgs.; Vancouver, 11 pkgs.

COAL TAR PRODUCTS—
Creosote
Natal, 20 t.
Creosote Oil
Durban, 5 t. 6 c.
Pitch
Bombay, 102 brls.; Delagoa Bay, 1 t.; Durban, 5 t. 3 c.; Pt. Said, 70 brls.
Tar
Cochin, 16 c.; Colombo, 15 t. 6 c.; Durban, 35 t.; East London, 5 c.; Karachi, 35 brls.; Lisbon, 4 t. 4 c.; Mombasa, 6 t.; Mauritius, 3 t. 5 c.; Natal, 55 t.; Pt. Said, 55 brls.; Rangoon, 75 brls.
Unspecified
Alexandria, 70 t. 15 c.; Lisbon, 183 t. 3 c.; Natal, 9 t.; New York, 44 t. 13 c.

DISINFECTANTS (*otherwise undes.*)
Algoa Bay, 11 c.; Bombay, 2 t. 11 c.; Cape Town, 9 c.; Durban, 9 t. 2 c.

FERRO MANGANESE—
Sydney, N.S.W., 750 t.

GELATINE—
Karachi, 3 c.

GLUE—
Vancouver, 1 t. 19 c., 3 cs.

LITHARGE—
Auckland, 10 c.
Delagoa Bay, 5 t.

MAGNESIA—
Cape Town, 1 c.
Gothenburg, 2 t.

NITRIC ACID—
Basra, 6 c.

PARAFFIN WAX—
Alicante, 2 t.; Antofagasta, 46 t. 6 c.; Gijon, 17 t.; Leghorn, 41 t. 10 c.; Lisbon, 7 t.; Melbourne, 22 t.; Mollendo, 4 t. 7 c. Oporto, 3 t.; Pasages, 5 t. 10 c.

PHOSPHATE (BASIC)—
Gijon, 30 t.
Santander, 22 t.

POTASSIUM BICHROMATE—
Alexandria, 1 t. 19 c.; Bombay, 10 c.; Gothenburg, 16 c.; Sydney, 5 t. 2 c.

SHEEP DIP—
Delagoa Bay, 15 c.
Durban, 3 t. 1 c.

SOAP—
Ahwaz, 11 c.; Alexandria, 13 c.; Algoa Bay, 9 t. 3 c.; Basra, 6 c.; Beira, 2 t. 18 c.; Cape Town, 3 t. 3 c.; Calcutta, 18 t. 8 c.; Colombo, 1 t.; Durban, 1 t. 13 c.; Natal, 3 t. 3 c.; Philadelphia, 1 t. 12 c.

SODA CRYSTALS—
Bombay, 1 t. 4 c.
Calcutta, 17 t. 8 c.

SODIUM BICHROMATE—
Bombay, 1 t. 5 c.; Dunedin, 4 t.; Marseilles, 5 t. 4 c.; Melbourne, 19 c.

* Entered under the Safeguarding of Industries Act.

SODIUM BISULPHITE—
Lisbon, 19 c.

SPERMACETTI WAX—
Genoa, 6 c.

TANNIC ACID—
Lisbon, 5 c.

WAX (*otherwise undescribed*)—
Cape Town, £30.; Montreal, £41.; Sydney, 5 c.; Valparaiso, 3 c.

ZINC OXIDE—
Delagoa Bay, 1 t.

GRANGEMOUTH.

Week ending August 11.

AMMONIUM CARBONATE—
Christiania, 5 c.

COAL TAR PRODUCTS—
Carbolic Acid
Rouen, 3 t. 9 c.
Creosote
Rotterdam, 2 t.
Naphtha
Rouen, 2,590 galls.
Naphthalene
Rotterdam, 20 t. 7 c.
Tar
Christiania, 5 t. 10 c.

PARAFFIN WAX—
Rouen, 6 t. 1 c.

POTASSIUM BICHROMATE—
Dunkirk, 2 t. 8 c.
Rouen, 5 t. 7 c.

SODIUM BICHROMATE—
Rouen, 11 t. 2 c.

HULL.

Week ending August 7.

NIL.

LEITH.

Week ending August 11.

ALBUMEN—
Copenhagen, 5 cs.

AMMONIUM SULPHATE—
Hong Kong, 21,120 bgs.

GLUE—
Hamburg, 100 bgs.

PARAFFIN WAX—
Kobe, 613 cks.

SODIUM BICARBONATE—
Copenhagen, 5 cks.

SODIUM BICHROMATE—
Aarhus, 1 ck.

STEARINE—
Copenhagen, 122 bgs.

WOOD PRESERVATIVE—
Copenhagen, 15 drms.

LIVERPOOL.

Week ending August 9.

ALUM—
Duala, 1 t. 5c., £16.

ALUMINIUM SULPHATE—
Calcutta, 35 t., £310.

ALUMINOFERRIC—
Durban, 19 t. 17 c., £134.

AMMONIA (ANHYDROUS)—
Calabar, 3 c. 2 qr., £26.

AMMONIUM CARBONATE—
Brisbane, 1 t., £38.
Buenos Aires, 4 t. 18 c., £170.
Demerara, 6 c., £13.
Hamburg, 3 t. 3 c., £95.
Melbourne, 1 t. 10 c., £58.

AMMONIUM CHLORIDE—
Melbourne, 10 c., £16.; Porto Alegre, 6 c., £12.; Sydney, 1 t., £43.

AMMONIUM SULPHATE—
Colombo, 100 t., £1,476.; Demerara, 500 t., £7,415.; Hong Kong, 50 t., £635.; Las Palmas, 70 t., £1,040.; Lisbon, 25 t., £360.; Orotava, 20 t., £310.; Teneriffe, 20 t., £280.

ANTIFOULING PAINT—
Constantinople, 6 t. 8 c., £628.

ARSENIC—
Seville, 1 t., £15.

BLEACHING POWDER—
Bombay, 50 t., £619.; Christiania, 20 t. 4 c., £179.; Calcutta, 58 t. 18 c., £490.; Copenhagen, 3 t. 3 c., £58.

BONE FERTILISER—
Las Palmas, 2 t., £14.

BORAX—
Auckland, 5 c., £7.; Barcelona, 2 t., £54.; Hong Kong, 15 c., £27.; Karachi, 1 t. 5 c., £35.; Madras, 9 t. 15 c., £278.; Rangoon, 3 t. 15 c., £107.; Rio de Janeiro, 1 t. 19 c., £57.; Sydney, 7 t. 2 c., £191.; Santiago de Cuba, 1 t., £27.

BORIC ACID—
Barcelona, 3 t. 1 c., £164.
Durban, 10 c., £27.

CALCIUM CHLORIDE—
Bombay, 5 t. 4 c., £32.
Nantes, 10 t. 3 c., £50.

CARBONATE OF LIME—
Sydney, 1 t. 1 c., £18.

CHEMICALS (*otherwise undescribed*)
Alexandria, 50 t., £447.; Amsterdam, 1 t., £28.; Bombay, 4 t., 3 c., £37.; Bergen, 1 t., £28.; Cape Town, 2 t. 16 c., £30.; Hamburg, 16 t. 14 c., £446.; Havana, 5 t., £141.; Hong Kong, 10 t. 8 c., £323.; Lisbon, 1 t., £27.; Madras, 15 t. 7 c., £155.; Rotterdam, 9 t. 10 c., £266.; Rio de Janeiro, 1 t. 9 c., £53.; Shanghai, 10 t., £270.

CHLOROFORM—
Halifax, N.S., 2 qrs., £31.

CHLORSULPHONIC ACID—
Switzerland, 2 t. 10 c., £70.

CITRIC ACID—
Barcelona, 1 t., £170.

COAL TAR PRODUCTS—
Carbolic Acid
Kobe, 5 t., £800.
Creosote
Durban, 3 t. 3 c., £87.
Paranitraniline
Montreal, 3 t. 2 c., £687.
Tar
Accra, 1 t. 5 c., £16.
Unspecified
Shanghai, 10 c., £49.

COBALT OXIDE—
Seville, 1 c. 2 qr., £27.; Shanghai, 1 c. £31.; Swatow, 3 c. 2 q., £144.

COBALT SULPHATE—
Santos, 5 c., £87.

COPPER OXIDE—
Trieste, 1 t., £74.

COPPER SULPHATE—
Monte Video, 32 t., £804.
Sydney, 1 c., £2.

CREAM OF TARTAR—
Albany, 10 c., £50.; Antwerp, 5 c., £23.; Newcastle, 3 t., £312.; Sydney, 3 t. 5 c., £390.

DISINFECTANTS (*otherwise undes.*)
Bombay, 5 t., £51.; Calcutta, 3 t. 1 c., £105.; Durban, 1 t. 3 c., £19.; Grand Canary, 4 c., £35.; Lyttleton, 7 c., £113.; Luderitz Bay, 1 t. 7 c., £56.; Montreal, 2 t. 16 c., £123.; Melbourne, 1 t. 7 c., £71.; Napier, 8 t., £532.; Puerto Colombia, 6 c., £44.; Santos, 13 c., £58.; Teneriffe, 14 c., £11. Wellington, 9 c., £20.; Walvis Bay, 1 t. 7 c., £56.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 3 t. 10 c., £390.
Indigo
Hankow, 32 t. 15 c., £4,125.; Hong Kong, 2 t. 19 c., £375.; Shanghai, 31 t. 17 c., £4,012.
Unspecified
Barcelona, 1 c. 1 qr., £12.; Lisbon, 1 t., £155.; Montreal, 15 c., £238.; Madras, 2 c. 1 qr., £23.; Melbourne, 1 t. 4 c., £389. Rangoon, 1 c. 1 qr., £16.; Sydney, 2 c., £30.; Santos, 1 t. 3 c., £400. Shanghai, 1 t. 12 c., £399.; Yokohama, 12 c., £183.

ESSENTIAL OILS (SYNTHETIC)—
Cape Town, 1 t., £363.; Durban, 2 t. 18 c., £2,220.; Rotterdam, 2 qr., £72.

GLYCERINE—
Batavia, 2 c., £10.; Havre, 4 t. 18 c., £396.; Hong Kong, 15 t. 9 c., £1,286.; Lisbon, 4 t. 19 c., £330.; Salonika, 10 c., £36.

LEAD NITRATE—
Montreal, 5 t. 4 c., £219.

MAGNESIA—
Sydney, 1 t., £46.

MAGNESIUM CARBONATE—
Boston, 25 t., £637.
Halifax, N.S., 2 c. 2 qr., £10.

MAGNESIUM SULPHATE—
Burutu, 1 c., £3.; Montreal, 1 t. 2 c., £9.; Sandakan, 1 c., £2.; St. John's, N.F., 1 t., £22.; San Juan del Sur, 5 c., £6.

MANGANESE SULPHATE—
Antwerp, 4 c., £10.

NICKEL SULPHATE—
Sydney, 6 c., £13.

PHOSPHATE (*otherwise undescribed*)
Aalborg, 1 t., £60.

PLATING SALTS (*otherwise undes.*)
Lisbon, 4 c., £48.; Melbourne, 2 c. 1 qr., £42.; Shanghai, 5 c. 1 qr., £33.

POTASSIUM CITRATE—
Sydney, 5 c., £65.

POTASSIUM IODIDE—
Pt. Harcourt, 4 c., £116.

POTASSIUM SULPHATE—
Las Palmas, 2 t., £22.

SHEEP DIP—
Auckland, 19 c., £64.; Algoa Bay, 7 t., £355.; Buenaventura, 18 c., £82.; Buenos Aires, 48 t. 17 c., £1,648.; Durban, 1 t. 13 c., £109.; Delagoa Bay, 1 t. 3 c., £99.; Gisborne, 16 t. 1 c., £1,175.; Maracaibo, 3 c., £12.; Melbourne, 14 t. 3 c., £523.; New Plymouth, 10 c., £39.; Puerto Colombia, 13 c., £63.; Rosario, 4 t. 14 c., £175.; Sydney, 3 t. 15 c., £172.; Timaru, 16 t. 3 c., £1,060.; Wellington, 16 t., £1,067.

SULPHURIC ACID—
Pt. Said, 11 t. 10 c., £875.

SUPERPHOSPHATE—
Las Palmas, 4 t., £16.
Seville, 99 t. 5 c., £299.

TANNING MATERIALS—
Unspecified
Antwerp, 11 t. 4 c., £120.
Hong Kong, 1 t. 8 c., £31.

TARTARIC ACID—
Newcastle, 13 c., £79.
Singapore, 4 c., £27.

TIN CRYSTALS—
San Fernando, 10 c., £68.

WOOD PRESERVATIVE—
Fremantle, 2 t. 9 c., £68.

ZINC SULPHATE—
Shanghai, 1 c., £17.

Week ending August 10.

CAUSTIC SODA—
Acapulco, 20 pkgs.; Adelaide, 210 drms.; Alexandria, 3 cs.; Algoa Bay, 592 drms.; Bangkok, 5 cs.; Beira, 17 cs.; Bombay, 160 drms.; Brisbane, 254 pkgs.; Calcutta, 80 drms.; Cape Town, 50 drms.; Cheribon, 25 pkgs.; Christiania, 240 drms.; Corral, 30 pkgs.; Durban, 679 pkgs.; E. London, 256 drms.; Ede, 358 drms.; Genoa, 41 pkgs.; Hamburg, 854 drms.; Hankow, 1,086 drms.; H.Kong, 40 drms.; Huelva 5 drms.; Johannesburg, 30 drms. Kingston (Ja.), 7 drms.; Kobe, 667 drms.; La Guaira, 20 drms.; Lourenco Marques, 20 drms.; Manzanillo, 100 drms.; Melbourne, 34 cs., 1,028 pkgs.; Monte Video, 110 drms.; Newcastle, 90 drms.; Oporto, 60 drms.; Piraeus, 5 drms.; Rangoon, 64 drms.; Rio de Janeiro, 20 drms.; Rotterdam, 354 drms.

CAUSTIC SODA—
Singapore, 10 cs., 30 drms.; Santos, 30 drms.; Sierra Leone, 16 drms.; Sourabaya, 550 drms.; Suez, 150 drms.; Sydney, 148 cs., 48 drms.; Tampico, 90 drms.; Trinidad, 5 drms.; Valparaiso, 67 drms.; Vera Cruz, 207 drms.; Vejle, 20 drms. Wanganui, 15 cs.; Wellington, a qty.; Yokohama, 434 drms.

CHINA CLAY—
Los Angeles, 188 t.
Monte Video, 2 t.

COAL TAR PRODUCTS—
Mirbane Oil
Auckland, 1 pkg.
Sydney, 5 drms.

FERRO MANGANESE—
Baltimore, 2,422 t.
Calcutta, 2 t.

GLUE, SIZE, AND GELATINE—
Auckland, 15 pkgs.; Bombay, 25 cks.; Boston, 100 cks.; Dunedin, 20 pkgs.; E. London, 25 cks., 20 pkgs.; Havana, 20 pkgs. Lisbon, 20 pkgs.; Montreal, 20 bgs.; New York, 25 pkgs.; Pt. Elizabeth, 10 cks. Shanghai, 100 bgs.

LAMP BLACK—
Talcahuano, 6 cs.

LEAD ASHES—
Antwerp, 10 t.

MINERAL WHITE—
New York, 48 t.

PITCH (VEGETABLE)
Valparaiso, 8 pkgs.

ROSIN—
Bremen, 492 bgs.

SALT—
Accra, 1 t.; Adelaide, 20 t.; Algoa Bay, 4 t.; Antwerp, 12 t. 10 c.; Antigua, 2 t.; Auckland, 400 bgs., 8 t. 18 c.; Barcelona, 3 t.; Beira, 7 t.; Calcutta, 3,713 t.; Calabar, 104 t.; Christiania, 150 t.; Duala, 4 t. 9 c.; Dunedin, 66 t.; Durban, 3 t.; East London, 15 t.; Halifax, N.S., 20 t.; Havana, 1 t.; Iddo, 1,310 t.; Lagos, 34 t.; Lyttleton, 47 t.; Riga, 30 t.; Sydney, 91 t. 5 c.

SALTCAKE—
Dunedin, 4 pkgs.

SHELLAC—
Bordeaux, 5 cks.

SOAP—
Accra, 633 pkgs.; Addah, 87 pkgs.; Adelaide, 6 pkgs.; Alexandria, 616 pkgs.; Algoa Bay, 69 pkgs.; Amboina, 1,221 pkgs.; Amoerang, 200 pkgs.; Ampenam, 200 pkgs.; Amsterdam, 26 pkgs.; Antwerp, 550 pkgs.; Arrecife, 60 pkgs.; Arzila, 125 pkgs.; Auckland, 160 pkgs.; Axim, 100 pkgs.; Bahia, 3 pkgs.; Balik Pappan, 230 pkgs.; Banda Neira, 125 bxs.; Bandjermassin, 429 pkgs.; Bangkok, 68 pkgs.; Banjoewangie, 50 bxs.; Barbados, 777 pkgs.; Batavia, 2,920 pkgs.; Batjan, 80 bxs.; Beira, 301 bxs.; Belawan, 1,126 pkgs.; Benoa, 120 bxs.; Bermuda, 336 pkgs.; Bilbao, 10 cs.; Blinjoe, 125 bxs.; Boela, 120 bxs.; Boeleleng, 200 bxs.; Bombay, 3,663 pkgs.; Buenos Aires, 2,002 cs.; Burutu, 105 pkgs.; Bwool, 50 bxs.; Calabar, 2 bxs.; Callao, 2 bxs.; Cape Town, 1 bx.; Cheribon, 130 pkgs.; Calcutta, 996 pkgs.; Christiania, 1,549 bxs.; Colombo 225 bxs.; Colon, 44 pkgs.; Copenhagen, 1,185 pkgs.; Corinto, 200 pkgs.; Curacao, 225 pkgs.; Dado, 50 pkgs.; Djambi, 400 pkgs.; Djeboes, 30 pkgs.; Dobo, 50 pkgs.; Dunedin, 160 bxs.; Durban, 98 bxs.; Dominica, 32 pkgs.; Duala, 1 pkg.; Fak Fak, 75 pkgs.; Falklands, 1 pkg.; Falmouth (Ja.), 18 pkgs.; Germany, 31 cs.; Geser, 50 pkgs.

SOAP—
Gibraltar, 264 pkgs.; Gorontalo, 160 pkgs.; Grand Bassam, 15 pkgs.; Guayaquil, 1 pkg.; Havana, 1 bx.; Hong Kong, 1 bx.; Iddo, 455 pkgs.; Iquique, 26 pkgs.; Jacmel, 2 pkgs.; Kingston (Ja.), 1,017 pkgs.; Koepang, 100 pkgs.; Kokas, 25 pkgs.; Kotka Baroe, 50 pkgs.; Kuala Lumpur, 1,855 pkgs.; Labocan Hadji, 10 pkgs.; Larache, 365 pkgs.; Lagos, 2,267 bxs.; Langsa, 50 pkgs.; Las Palmas, 814 bxs.; Lho. Seumaweh, 75 pkgs.; Libreville, 10 pkgs.; Limon, 50 pkgs.; Liroeng, 15 pkgs.; Macassar, 1,601 pkgs.; Madras, 21 cs.; Malacca, 420 bxs.; Malta, 126 pkgs.; Manta, 112 cs.; Manila, 10 bxs.; Marseilles, 15 cks.; Melilla, 250 bxs.; Menado, 1,890 bxs.; Meulabah, 2 cs.; Monte Video, 165 pkgs.; Monte Video, 73 pkgs.; Muntok, 40 bxs.; Napier, 160 cs.; Nassau, 40 cs.; New York, 90 pkgs.; Olehleh, 238 pkgs.; Opobo, 500 bxs.; Padang Bali, 35 bxs.; Palembang, 1,530 pkgs.; Palmerston North, 160 cs.; Panama, 126 pkgs.; Panarockan, 50 bxs.; Penang, 1,400 bxs.; Petta, 50 bxs.; Pontianak, 270 pkgs.; Pt. Antonie, 14 cs.; Pt. Louis, 32 bxs.; Pt. Harcourt, 301 cs., 500 bxs.; Pt. Said, 200 bxs.; Port Swettenham, 72 bxs.; Quittah, 50 cs.; Rangoon, 2,081 bxs., 2 cs.; Rotterdam, 9 bxs., 3 cs.; Sabang, 50 bxs.; Samarang, 350 bxs.; Samarinda, 130 pkgs.; San Julian, 25 cs.; Saparoea, 250 bxs.; Sapele, 70 cs.; Sekondi, 1,417 cs.; Segli, 50 cs.; Shanghai, 80 cs.; Sierra Leone, 9 cs.; Singapore, 864 bxs.; Siauw, 60 bxs.; Sinoe, 100 bxs.; Soembawa, 35 bxs.; Sourabaya, 1,541 pkgs.; St. John's, N.F., 15 cs.; St. Kitts, 200 bxs.; St. Lucia, 50 bxs.; Stockholm, 895 cs.; St. Vincent, 60 bdls.; Tajoelandang 20 pkgs.; Tandjong Balei, 407 bxs.; Tandjong Pandang, 85 bxs.; Tapatocan, 20 cs.; Taroena, 80 bxs.; Teneriffe, 363 bxs.; Ternate, 226 bxs.; Tetuan 125 bxs.; Timor Dilly, 50 bxs.; Tocal, 75 bxs.; Trinidad, 180 pkgs.; Tumaco, 50 bxs.; Vera Cruz, 10 cks.; Victoria, W.C.A., 20 bxs.; Wellington, 644 cs.

SODA ASH—
Adelaide, 238 pkgs., 270 bgs.; Brisbane, 177 bgs., 511 pkgs.; B.Aires, 1078 cks.; C'cutta, 14960 bgs.; Constantinople, 100 pkgs.; Dunedin, 39 pkgs.; Delagoa Bay, 500 pkgs.; Durban, 30 pkgs.; Hankow, 5,810 pkgs.; H. Kong, 2,655 bgs.; Kinkiang, 5,600 bgs.; Kolee, 4,475 bgs.; Lyttleton, 20 bgs.; Melbourne, 370 pkgs.; Moji, 3,246 bgs.; Norrkoping, 50 bgs.; Piraeus, 50 pkgs.; Rangoon, 1,700 bgs.; Rosario, 38 cks.; Salonika, 100 bgs.; Singapore, 375 cks.; Sourabaya, 1,000 bgs., 4 kgs.; Stavanger, 50 bgs.; Stockholm, 25 drms.; Sydney, 507 pkgs.; Tampico, 2,000 bgs.; Tsingtao, 1,120 bgs.; Wellington, 56 cks.; Yokkaichi, 1,082 bgs.; Yokohama, 2,678 cks.; Zante, 50 bgs.

SODA CRYSTALS—
Antofagasta, 100 pkgs.; Beira, 20 pkgs.; Bombay, 5 brls.; Cape Town, 100 pkgs.; Colombo, 1 pkg.; Durban, 242 pkgs.; Kingston (Ja.), 50 bgs.; Melbourne, 590 bgs.

SODIUM ARSENATE—
Sydney, 13 cks.

SODIUM BICARBONATE—
Algoa Bay, 12 pkgs.; Antwerp, 858 pkgs.; Auckland, 47 pkgs.; Bourgas, 50 kgs.; Brisbane, 626 pkgs.; Calcutta, 4,300 pkgs.; Christiania, 60 pkgs.; Colombo, 76 pkgs.; Constanza, 40 pkgs.; Dunedin, 107 pkgs.; Durban, 42 pkgs.; East London, 130 pkgs.; Hamburg, 200 pkgs.

SODIUM BICARBONATE—
Kobe, 2,154 bgs., 754 pkgs.; Manila, 225 pkgs.; Malta, 40 kgs.; Melbourne, 260 pkgs.; Naples, 70 kgs.; Rangoon, 150 pkgs.; St. John's, N.F., 100 kgs.; Stockholm, 80 kgs.; Sydney, 536 pkgs.; Vera Cruz, 100 pkgs.; Wellington, 17 bgs., 91 pkgs.; Yokkaicht, 538 bgs.; Yokohama, 1,077 bgs.

SODIUM BICHROMATE—
Alexandria, 21 cks.

SODIUM CITRATE—
Sydney, 1 cs.

SODIUM CYANIDE—
Sydney, 78 drms.

SODIUM HYDROSULPHITE—
Antwerp, 3 pkgs.

SODIUM SILICATE—
Adelaide, 124 pkgs.; Alexandria, 40 t.; Algoa Bay, 53 pkgs.; Barranquilla, 20 cks.; Buenos Aires, 24 drms.; Durban, 105 pkgs.; Hankow, 164 pkgs.; Melbourne, 4 drms.; Monte Video, 14 drms.; Newcastle, 128 bgs.; Rangoon, 19 pkgs.; Sydney, 33 cks., 29 bgs.; Tampico, 250 pkgs.; Wellington, 58 drms.; Yokohama, 32 cks.

SODIUM SULPHIDE—
Rio de Janeiro, 41 drms.

SODIUM SULPHITE—
Algoa Bay, 10 pkgs.

TALLOW—
Hamburg, 65 pkgs.

TURPENTINE—
Monte Video, 80 drms.

VEGETABLE WAX—
Sydney, 1 cs.

LONDON.

OFFICIAL AMENDMENT.

From return for week ending April 25 *deduct*—

BORAX—
Durban (F.), 1 t., £27.
Havana, 10 c., £47.

Week ending August 8.

AMMONIA (ANHYDROUS)—
Bombay, 3 cylds., £33.

AMMONIUM CARBONATE—
Antwerp, 4 t., £135.

AMMONIUM NITRATE—
Rotterdam, 16 t., £432.

ANTIMONY SULPHIDE—
Antwerp, 2 cks., £14.; Bilbao, 3 cks., £48.; Hamburg, 7 cks., £70.; Trelleborg, 5 cks., £58.

BARIUM PEROXIDE—
Rotterdam, 41 drms., £450.

BISMUTH SUBNITRATE—
Piraeus, 1 cs. (pt.), £31.
Sydney, 2 cs., £205.

CADMIUM SULPHIDE—
Antwerp, 1 cs., £31.

CALCIUM CHLORIDE—
Zanzibar, 1 t. 5 c., £15.

CAUSTIC SODA—
Dunedin, 4 c., £17.

CHEMICALS (*otherwise undescribed*)
Calcutta, 10 pkgs., £50.; Constanza, 150 pkgs., £405.; Irish Free State (F.), 1 pkg., £12.; Limon (F.), 2 pkgs., £5.; Salonika (F.), 2 pkgs., £11.; Salonika, 8 pkgs., £22.; Sydney, 2 pkgs., £35.

CITRIC ACID—
Bombay, 2 c., £11.; Christchurch, 2 c., £19.; Colombo, 2 c., £21.; Gothenburg, 6 c., £51.; Rotterdam, 1 t., £192.; Stockholm, 5 c., £42.

COAL TAR PRODUCTS—
Creosote Oil
Delagoa Bay, 109 drms., £700.
Hamburg, 862 t., £8,206.
Napthhalene
New York, 500 bgs., £563.
Pitch
Lagos, 12 cks., £27.
Rouen, 84 brls., £237.

COAL TAR PRODUCTS—
Tar
Channel Islands, 100 cks., £220.
Tar Oil
Jamaica, 5 brls., £19.

CREAM OF TARTAR—
Fremantle, 1 t., £88.

DISINFECTANTS (*otherwise undes.*)
Malaga, 11 c., £15.
Melbourne, 1 c., £12.
Rosario, 7 t., £282.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Irish Free State (F.), 1 cs., £23.

FERTILISERS (*otherwise undes.*)—
Gothenburg, 1 t., £25.

IODINE—
Paris (F.), 20 kgs., £1,756.
Piraeus, 1 cs., £103.

MERCURY OXIDE—
Amsterdam, 2 cs., £77.

METHYL ACETATE—
Paris (F.), 18 drms., £340.

NITRIC ACID—
Huelva, 3 c., £13.

POTASSIUM IODIDE—
Piraeus, 1 cs. (pt.), £18.

PRUSSIAN BLUE—
Brussels, 3 cks., £75.
Rotterdam, 10 cks., £101.

SALICYLIC ACID—
Brisbane, 2 cs., £25.

SALTPETRE—
Amsterdam, 1 t. 5 c., £54.
Vigo, 10 c., £20.

SODIUM BICARBONATE—
Paris, 2 c., £7.

SODIUM BISULPHITE—
Rotterdam, 10 t., £213.

SODIUM SALTS (*otherwise undes.*)
Sydney, 4 c., £8.

SULPHURIC ACID—
Aden, 3 c., £17.
Channel Islands, 15 c., £20.

TARTARIC ACID—
Gothenburg, 10 c., £64.; Lisbon, 10 c., £64.; Paris, 1 c., £18.; Rotterdam (F.), 10 c., £65.; Stockholm, 4 c., £26.

Week ending August 11.

BENZINE—
Reval, 33,568 galls.

FULLER'S EARTH—
Rotterdam, 50 t.

GLUE, SIZE, AND GELATINE—
Adelaide, 1 c.; Amsterdam, 2 c.; Christiania, 1 t. 8 c.; Rangoon, 1 c.

LEAD ASHES—
Antwerp, 3 t.

PLUMBAGO—
Pt. Elizabeth, 1 t.

SALT—
Gothenburg, 2 t. 8 c.
Valparaiso, 8 c.

SHELLAC—
Italy, 1 t. 17 c.

SOAP—
Accra, 1 t.; Addah, 2 t. 3 c.; Adelaide, 1 c.; Bagdad, 2 c.; Bombay, 18 c.; Christchurch, 1 c.; Cuba, 3 c.; Gibraltar, 2 c.; Limon, 1 c.; Lisbon, 2 c.; Melbourne, 6 c.; Paris, 1 t. 17 c.; Perth, 1 c.; Rangoon, 1 c.; Rotterdam, 13 c.; Sekondi, 15 t.; Winnebah, 4 t. 15 c.

TALLOW—
Dusseldorf, 10 t. 7 c.; Hamburg, 10 t. 2 c.; Pasages, 3 t. 1 c.; Rotterdam, 10 t.

WHITE LEAD—
Belize, £13.

MANCHESTER.

Week ending August 10.

ALUM—
Montreal, 10 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
France, 14 cks.

BARIUM CHLORIDE—
France, 100 bgs.

BLEACHING POWDER—
Gothenburg, 3 kgs.

CALCIUM CHLORIDE—
St. John, 30 drms.

CHEMICALS (*otherwise undescribed*)
Basrah, 8 kgs.; Canada, 250 kgs.; Denmark, 20 drms.; France, 30 bgs.; Jersey, 440 sks.; Sweden, 4 cs., 25 drms.; U.S.A., 25 drms.

COAL TAR PRODUCTS—
Anthracene
Rouen, 1 kg.
Naphthalene
Cologne, 694 bgs.
Philadelphia, 650 bgs.
Unspecified
Czecho-Slovakia, 1 cs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
France, 4 cks.
Rouen, 11 pkgs.
Unspecified
Rouen, 1 cs., 12 cks.

ESSENTIAL OILS (*otherwise undes.*)
Antwerp, 1 cs.

FERRO MANGANESE—
Baltimore, 1,110 t.
Philadelphia, 241 t.

GLUE AND SIZE—
Falls River, 8 cks.; France, 12 brls., 3 cks.; Montreal, 20 bgs.

IRON OXIDE—
Canada, 11 cks.
Germany, 3 cks.

LEAD NITRATE—
France, 12 cks.

SALT—
Calcutta, 295 t.; Montreal, 1,600 sks.; Quebec, 2,048 sks.; St. John, N.B., 2,800 sks., 25 drms., 90 brls.

SOAP—
Cairo, 31 cs.

SULPHUR—
Treport, 14 drms.

ZINC CHLORIDE—
France, 27 cks.

ZINC SULPHATE—
France, 3 cs.

NEWCASTLE-ON-TYNE

Week ending August 11.

ANTIMONY—
Antwerp, 15 cks., 90 kgs.

BLEACHING POWDER—
Copenhagen, 36 cks.; Gothenburg, 16 cks.; Rotterdam, 62 cks.

CAUSTIC SODA—
Christiania, 10 cs.; Copenhagen, 30 drms.; Gothenburg, 97 drms.

COPPER OXIDE—
Gothenburg, 14 cks.

DISINFECTANTS (*otherwise undes.*)
Gothenburg, 1 cs.

GELATINE—
Christiania, 2 cks.

LITHARGE—
Antwerp, 140 kgs., 12 cks.; Christiania, 20 cks.; Gothenburg, 40 cks.; Rotterdam, 12 cks.

MAGNESIA—
Antwerp, 20 cs., 250 bgs.

RED LEAD—
Antwerp, 390 kgs.; Bergen, 6 cks.; Christiania, 58 cks.; Copenhagen, 6 cks.; Gothenburg, 94 kgs.; Rotterdam, 153 cks.

WHITE LEAD—
Copenhagen, 19 cks.

ZINC OXIDE—
Gothenburg, 22 cks.

N. & S. SHIELDS.

Week ending August 11.

NIL.

PRICES CURRENT.

WEDNESDAY, AUG. 15, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. *at makers' works, but it must be understood that the prices in different localities may vary.*

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23	6	& 47/-
Acetic, (Glacial, B.P.) in carboys	*ton	66	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	50	0	0
Citric	lb.	0	1	8½
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	9
Tarteric (crystals)	lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	7	2	6
Pyridin	gallon	9	19	6
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	125	0	0
Alum, loose lump (delivered)	*ton	12	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	5	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	71	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	15	0	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	10½
Bleaching Powder, 35%	*†ton	11	7	6
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	28	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	26	0	0
Formaldehyde, 40%	ton	98	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	0	0
Lead Acetate (brown)	ton	43	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	19	10	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	37	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	46	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	32	0	0
Potassium Permanganate (commercial)	lb.	0	0	9¾
Potassium Prussiate (yellow)	lb.	0	1	2
Potassium Prussiate (red)	lb.	0	3	9
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/-	&	57/-
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d.	to	9d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	21	10	0
Sodium Hydrate (70% C. Soda)	†ton	20	0	0
Sodium Hydrate (60% C. Soda)	†ton	19	0	0
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	10	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	26	0	0
Sodium Hyposulphite (commercial)	†ton	10	0	0
Sodium Hyposulphite (photographic)	ton	14	0	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	7	6
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	6¼
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	15	0	0
Sodium Sulphide Crystals (casks)	†ton	8	10	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	5	0
Sulphur (Roll Brimstone)	ton	8	5	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	63	12	6
Lead (Chemical Sheet), delivered	cwt.	1	14	0
Lead (Foreign Pig)	ton	24	0	0
Nickel	ton	130	0	0
Silver	oz.	0	2	7½
Tin, English Ingots	ton	183	10	0
Zinc (Spelter)	ton	31	15	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	41	0	0
Linseed, Raw	*ton	42	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	38	0	0
Turpentine	cwt	3	11	6

* *Packages extra or returnable*; otherwise prices usually include (packing ...

† Makers' prices for home consumption only

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
The Formaldehyde Decision.	211
The Declining Superphosphate Industry	212
Industrial Oxygen in America	212
Low-temperature Carbonisation in Vertical Retorts	212
Modern Electrical Pyrometry	213
Physico-Chemical Standards	216
Safeguarding of Industries Act	217
The Manufacture of Sodium Hypochlorite	218
Casein in the Paints Industry	220
Industrial Pitches	221
Alpha and Beta Naphthols	221
Menhaden Oil Production	222
Methyl Alcohol in Ethyl Alcohol	223
Correspondence	224
Legal Intelligence	224
Thirty-five Years Ago	224
Items of Interest	225
Italian Customs Duties	226
Reports of Companies	228
Trade Inquiries	228
New Companies	228
Fertiliser News	229
Publications Received	229
Imports of Chemicals and Allied Products in July	230
Exports of Chemical and Allied Products in July	231
Cumberland Coking and By-product Industries	231
South Wales Notes	231
Gazette News	232
The Patent List:—	
Applications for British Letters Patent	232
Complete Specifications Accepted	232
Complete Specifications Open to Public Inspection before Acceptance	232
Abstracts of Latest Complete Specifications	232
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	233
Market Reports:	
London "Open Market" Report	234
London Metal Market	235
Manchester Chemical Market	235
Swansea Market Report	236
Liverpool Chemical Market	236
West of Scotland Chemicals	236
Imports of Chemical Products	237
Exports of Chemical Products	239
Prices Current	242

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CURRENT TOPICS.

THE FORMALDEHYDE DECISION.

ELSEWHERE in this issue we print the full text of the decision in the formaldehyde case. As will be noted, the referee has found the material to be neither an analytical reagent, a synthetic organic chemical, nor a fine chemical, and in consequence not to be entitled to the protection afforded by Part I. of the Safeguarding of Industries Act. He recognises, however, that formaldehyde is one of those border-line cases upon which different opinions will inevitably be held. With regard to the analytical-reagent point, few will be disposed to disagree with the referee's finding, and the weight of the evidence that was presented was certainly against formaldehyde being considered a fine chemical. Yet we venture to suggest that had a referendum been taken amongst chemical manufacturers, merchants, and chemists two or three years ago, before attempts had been made to define the term "fine chemical" and when no financial interests were at stake, formaldehyde would have been held to be a fine chemical by a large majority. The case, however, centred mainly round the meaning to be attached to the words "synthetic chemical." From the purely logical and etymological standpoints, the position taken by the complainants and adopted by the referee in this and previous cases, that the term synthesis is confined exclusively to operations involving the bringing together of elements or radicles to form a more complicated body, is no doubt quite valid. The idea underlying this view is that any accepted synthesis in organic chemistry involves the addition of at least one extra carbon atom. Yet there are cases in which chemicals which are quite generally accepted as synthetic are produced by processes in which no extra carbon atoms are added to the molecule of the raw material. Alizarin as made from anthracene is a case in point, and there is little doubt that were the nature of alizarin investigated by the referee, he would be compelled to find the dyestuff not a synthetic organic chemical. In the literal sense of the word, production of an organic compound by the controlled and regulated oxidation of another organic compound may not be a synthesis, but we think that when the term "synthetic organic chemical" was adopted by the framers of the Safeguarding of Industries Act the intention was that it should have the somewhat broader meaning which certainly includes formaldehyde within its scope.

THE DECLINING SUPERPHOSPHATE INDUSTRY.

The gravity of the situation with which British manufacturers of superphosphates are confronted is daily becoming more pronounced. Exports, it is true, have been a little better this year than in 1922, but the total quantity exported has been too small to make any marked difference to the position. Before the war, the British manufacturers had a very substantial export trade with South Africa, Australia, and New Zealand, but during the war period these colonies increased their manufacturing capacity to such an extent as to render them practically independent of imported supplies. In Australia, indeed, the Commonwealth Government has subsidised the industry by providing a bounty on the production of sulphuric acid to be used in the manufacture of the fertiliser, in place of the heavy import duties on sulphur which have been removed recently. It does not appear too pessimistic a view to assume that these markets must be regarded as permanently lost. The main cause of the prolonged depression in the British industry, however, is to be ascribed to the changing conditions in home consumption. The low and steadily depreciating value of the franc enables Continental manufacturers to sell here at prices actually below the cost of production in this country. It should be explained that the principal factor in favour of the Continental manufacturer is that the exchange has, generally speaking, fallen by sharp steps, with a fairly steady period in between each fall. The Continental manufacturer of superphosphate has thus always been able to calculate on a further fall in exchange before the previous fall has had time to become fully effective in increasing costs. Consequently he has been able to accept a lower and lower sterling price for his superphosphate without actual loss to himself. Prices which are now being quoted for the 30 per cent. grade, for example, are in some cases actually below the pre-war figure, and it is quite clear that such prices must entail a heavy loss to the home manufacturer. The question is, therefore, as to what steps should be taken to revive this industry which is so heavily handicapped by unfair foreign competition. A tariff on imported material would undoubtedly meet with strong opposition from the agricultural community, while assistance from the State in the form of a subsidy would add further to the heavy burden now carried by the British taxpayer.

INDUSTRIAL OXYGEN IN AMERICA.

Interest in the problem of the manufacture of cheap oxygen and of its large-scale utilisation in metallurgical operations has not been confined to this country, but a considerable amount of investigation on the subject has also been carried out in the United States. Some time ago the American Bureau of Mines appointed an Advisory Committee to consider the question of the application of oxygen in the metallurgical and allied industries, and this committee has just issued a report which contains several interesting points. It will be remembered that Mr. T. Campbell Finlayson in the paper he presented to the Institution of Chemical Engineers in June last showed that consequent upon the long series of investigations carried out by the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., it was concluded that there was no simple process capable of producing oxygen at a price not exceeding 1s. per 1,000 cubic feet at a low capital cost. The American committee, however, has arrived at the conclusion that to serve metallurgical processes directly, large oxygen-manufacturing plants can be built which, by virtue of their large production and correspondingly increased efficiency, together with the fact that no compression in cylinders, storage, transport, or service will be required, will be capable of delivering oxygen for the processes at a cost not to exceed three dollars per gross ton. The oxygen is to be of about 99 per cent. purity and, for purposes of comparison with Mr. Finlayson's figure, the American cost works out at a little over 6d. per 1,000 cubic feet. The details that have enabled the American committee to estimate this surprisingly low figure are not yet available, but the committee is apparently confident in its expressed opinion. The British conclusions were only arrived at after a most comprehensive survey of the whole problem, and although the American forecast may eventually be proved to be too optimistic, yet the difference between the two prices is so great as to merit the closest attention in this country.

LOW-TEMPERATURE CARBONISATION IN VERTICAL RETORTS.

The possibility of using some form of vertical retort for low-temperature carbonisation and so arriving at mechanically operated continuous working with a consequent saving in labour costs, has always been an attractive one, and if the preliminary results that have been obtained by the Fuel Research Board in its work on this subject are any guide, the possibility would seem certain of eventual realisation. The Board has just published these results, which have been obtained in the plant of four Glover-West vertical retorts originally provided for experimental work in connection with ordinary coal-gas manufacture. Naturally the construction of these retorts, especially their lining of refractory material, is not particularly suitable for carbonisation at temperatures in the neighbourhood of 600° C., where rapidity of heat transference and maximum utilisation of the available heat are essentials. The results, however, have proved of the utmost value in providing data for the design of special vertical retorts for low-temperature work. Several of these special retorts have already been erected, and the detailed results obtained by working with them will be awaited with interest. Meanwhile the preliminary work has demonstrated clearly that results quite comparable to those obtained with horizontal retorts may be expected. On one point, indeed—namely, the production of ammonia—it would appear that the vertical retorts are likely to give the higher yield, particularly with a moderate amount of steaming.

MODERN ELECTRICAL PYROMETRY.

By David Brownlie, B.Sc., M.I.Mech.E.

THE accurate measurement of high temperature being a matter of particular importance to the chemical industry, an account of the great developments that have taken place in electrical pyrometry should not be without interest. Experience in methods of temperature indicating and recording in many industries, especially in connection with coal carbonisation and gasification, foundry work, furnaces of every description, and in the generation of steam and power, has demonstrated clearly the many advantages that this type of instrument possesses in practice. These include extreme accuracy at very wide ranges of temperature, comparative freedom from breakdowns, and convenience, the use of an electric current lending itself particularly well to both indicating and recording instruments, whilst the readings can be taken at almost any distance.

Limitations of Glass Mercurial Thermometers.

For continuous high-temperature work, say above 600° F., and especially above 900-1,000° F., glass mercurial thermometers are of course not suitable. It is true that we can use a special very tough and resistant boro-silicate glass, protected by a heavy metal case and stem, and with the space above the mercury filled with nitrogen, or other inert gas under high pressure, whilst recording mercurial thermometers are also available, but in practice this general type of instrument is nothing like so suitable as the electrical pyrometer. Glass mercurial thermometers are too fragile, the glass softens at high temperatures, and inaccuracies due to permanent distortion of the bulb are very liable. Another type of mercurial pyrometer, somewhat more satisfactory, is a steel pointer, consisting essentially of a bulb of mercury, with a capillary tube in the form almost of a wire, attached to a hollow tube as a flat hollow spring. The whole circuit is filled with mercury, and on heating the pointer the expansion of the mercury causes the spring to uncoil so that it actuates a pen mechanism. It may be stated also that the old-fashioned pyrometer, depending on the expansion of different materials—one common example being the iron and graphite pyrometer—can now be regarded as obsolete.

The Two Main Types of Electrical Pyrometers.

Electrical pyrometers may be divided into two main classes, the thermo-electric and the electrical resistance. The thermo-electric pyrometer, originally introduced by the distinguished French scientist, Le Chatelier, is based on the principle that if two dissimilar metals are joined together, the circuit completed by a wire and the junction heated, a very small electric current flows round the circuit. Different metallic couples—and Le Chatelier originally used platinum and rhodium—produce a different amount of current, but for any given couple the amount of current flowing is directly proportional to the temperature of the junction, although in practice temperatures of less than about 100° F. cannot be determined by this method.

Principles of the Thermo-Electric Type.

A thermo-electric pyrometer, therefore, consists essentially of a steel pointer containing the couple inside at the end, connected by wires to a delicate galvanometer which measures the amount of current flowing in the circuit by means of a pointer over a scale (indicating) or a pen upon a chart (recording), the graduations being direct as degrees of temperature instead of in electrical terms. Thermo-electric pyrometers, whether indicating or recording, can also be divided into two general types, depending on the composition of the thermo-couple.

For the very highest temperatures—from, say, 1,500-3,000° F.—the best metals are undoubtedly those of the highly resistant platinum group, such as platinum-platinum iridium alloy, or platinum-platinum rhodium alloy. These junctions are practically indestructible, and apart from the necessity of their use for very high temperatures, my own experience has been that they are much preferable in practice even for much lower temperatures—say, 500° F. and over—in the case of constant work. Of course, since the war it has been almost impossible to obtain the platinum metals, but this situation cannot be permanent. It must be remembered also that, although the initial cost is very high, the net expenditure spread over many years—and I myself have used platinum-platinum iridium couples more or less continuously for ten years—is practically nil, whilst the metal, like gold, always has a high market value, so that the expenditure is really more in the nature of an investment.

For temperatures below about 1,500° F., however, it is more usual to employ for one element, other alloys which are the speciality of the various firms, typical examples being "Titan" and "Constantan" alloys, using as the other

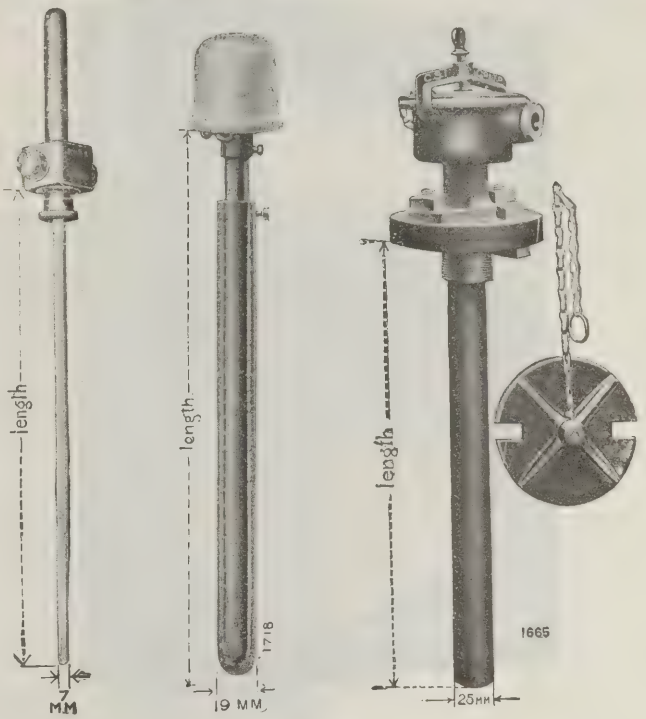

FIG. 1.

element generally copper, or sometimes iron. Probably the most widely known base metal, thermo-couple, is the "Chromel-Alumel" couple, which was introduced by Hoskins many years ago. In this couple one element is an alloy of nickel and chromium, and the other element practically pure nickel. Its composition is identical with that of "Titan." Such couples in time oxidise and disintegrate under the influence of the continued heat, especially when over 1,000° F., and have to be replaced, although the initial cost is naturally very much lower than that of the platinum metals.

Types of Thermo Couples.

In general, the thermo couple is constructed in the form of wires fused together and contained in a tube or segments of porcelain or silica ware tubing within the steel pointer for insertion in the source of heat. If the temperature is very high or the atmosphere corrosive, the pointer may be constructed of fireclay, or even of fused silica ware. The head of the pointer is equipped with two screw terminals to which are attached the wires (covered with canvas or rubber) connected to the galvanometer, which, provided the wires have been standardised, may be a fair distance away, say 25-50 yards. The instrument can be calibrated for accuracy in the usual way by using the vapour of any substance boiling at a high temperature, such as aniline, naphthalene, or even metals, and it is best to carry out the test using a standard length of wire, which must then always be used, being coiled up if the distance is short.

In the accompanying illustration (Fig. 1) three types of thermo couples made by the Cambridge and Paul Instrument Company Limited. are shown. The one on the left is the standard thermo couple for laboratory use. Here the wires are only protected by a single tube of porcelain or quartz, and the head is so constructed that new tubes can be readily fitted. The standard length is 12 inches. The

thermo couple in the centre is of the iron-constantan type for temperatures up to 800° C. The wires are protected by a steel tube and an outer removable steel sheath. The thermo couple on the right is for measuring temperatures in hot air mains and of the outgoing gases of blast furnaces. The wires are protected by a quartz tube and a steel sheath which fits into a flanged socket; this socket is threaded 1½in. gas for screwing into the main. The couple has an enclosed

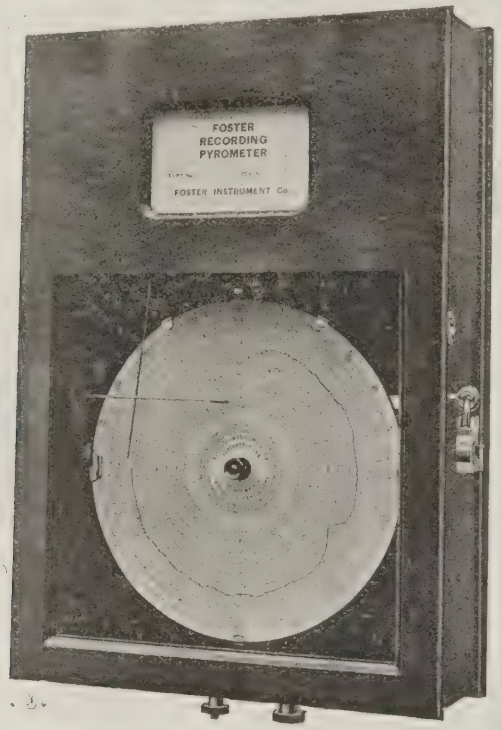

FIG. 2.

head, the cover being provided with a cap which can be quickly removed for making or inspecting connections.

The galvanometer, which may be either portable or of the wall type, is usually of a very robust construction, the dead-beat sensitive moving coil being pivoted between two jewel bearings, and contained in a cast-iron case, having in the case of indicating instruments a silvered metal scale protected by glass, over which the needle moves. Considerable differences in detail exist between the various makes of

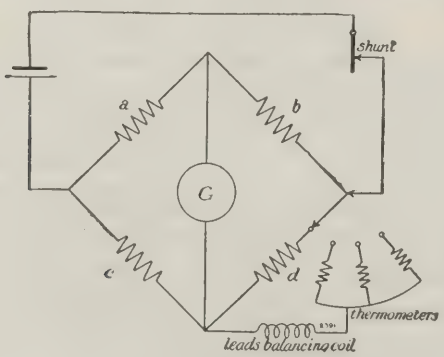

FIG. 3.

instrument on the market. Figure 2 represents one of the types manufactured by the Foster Instrument Company. For wall instruments a switch can be provided, so that any number of pointers may be used wired up to a central switch-board, although, as already stated, the range is somewhat limited as regards distance.

Distance Electrical Pyrometers.

Distance electrical pyrometers, as their name implies, are adapted more particularly for indicating or recording small or moderate temperatures at a considerable distance from the galvanometer, and are also specially suitable for permanent installation. In the case of a considerable length of wire being necessary, the amount of current generated by thermo-electric means is not sufficient for accurate results, and consequently in the distance pyrometer an entirely different system is adopted. The principle depends on the fact that the resistance of a coil of platinum or other wire varies with the temperature according to a well-known law. Consequently a comparatively strong current from an accumulator is sent continuously through the complete circuit, thus obviating all troubles due to the length and resistance of the circuit. A standard coil is contained in the end of the pointer, in which, when heated, the resistance to the passage of the current varies in proportion to the temperature. Generally the wiring for a permanent installation is such that the pointer forms one of the four arms of a considerably modified "Wheatstone" bridge, which is coupled to the galvanometer, the other three arms being composed of some material the resistance of which is not affected by the temperature, these three arms being of course at ordinary atmospheric temperature and away from the source of heat. Figure No. 3, of the Cambridge and Paul Instrument Company, Limited, illustrates diagrammatically the principle of the distance electrical pyrometer.

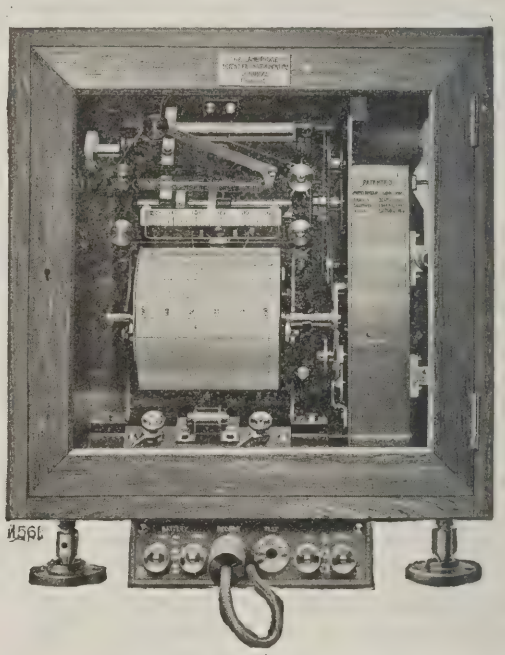

FIG. 4.

The circuit is supplied by a small 2-volt. or 4-volt. accumulator, which is recharged as required, and when all four arms are at an equal temperature—as when the pointer is in the atmosphere—an equal current flows down each side of the circuit, consisting of two of the arms, and the galvanometer in the centre is not affected. Since the current is divided in this way equally into two in the "Wheatstone" bridge, any variation in the strength of the current does not affect the needle of the galvanometer. If now the pointer is heated, the resistance of the standard coil alters, and more or less current flows down one side of the circuit, and since this means an inequality in the two arms, some current flows through the galvanometer and causes the needle to move. The instrument is so constructed that this movement is proportional to the temperature, and the galvanometer—in the case of an indicating instrument—is graduated direct in degrees F. or C. Figure 4 represents a recording distance electric pyrometer manufactured by the Cambridge and Paul Instrument Company.

This type of instrument differs also from the thermo-electric type in that the range of temperature is very

different, generally about — 350° F. to + 1,750° F. as compared + 100° F. to + 3,000° F. That is to say, the electrical distance pyrometer will measure with great accuracy, at any distance, all temperatures from as low as — 350° F. to about 1,750° F. because the resistance of the coil varies proportionately within these limits, whereas a thermo-electric pyrometer operating only at a comparatively short distance is not suitable for low temperatures, but has the advantage of being applicable to extremely high temperatures. It might be mentioned here that the Foster Instrument Company make a type of distance electric pyrometer which does not require adjustment to "test point" for change in battery voltage.

A Typical Boiler and Power Plant Installation.

A typical installation of the electrical distance pyrometer is a boiler and power plant. The indicating galvanometer is mounted on a black enamelled slab panel, and wired to the accumulator near at hand. The panel is provided with any number of plug holes, and each of the small insulated metal casings in which these holes are situated are wired permanently to different pointers at various portions of the plant. For example, take the case of an installation of two-water-tube boilers and accessories such as air heaters, superheaters, and economisers, and driving a pass-out steam turbine, a typical installation for a very modern chemical works. Pointers made of any desired length, from several inches in the case of pipe circuits to six or seven feet for flues, are inserted in all the necessary positions, such as in the flue gases after the boiler and superheater, after the economiser, and after the air heater (6 pointers for the two boilers), and perhaps also one pointer in the final chimney base. As regards water, the positions would be, say, before and after the economiser on each boiler, together with the condenser water inlet and outlet, 6 pointers in all, whilst four other pointers are required for the air supply (before and after heating) on each boiler. Then as regards the steam, there would be one pointer in the outlet pipe from each boiler installation, and one at the stop valve of the turbine to keep a check on the temperature drop in the steam from the boiler to the turbine. This would make in all 20 pointers, which would each be separately wired up to one panel with 20 plugs, or still better perhaps to two panels of 12 plugs each, giving a number of spare plugs. The whole of the temperatures can then be logged in a few minutes by inserting a hand plug in each of the holes in succession and reading the galvanometer accordingly. The arrangement is extremely convenient, and has the further advantage that since a current is always flowing any defect in the circuit is made obvious at once. A switch panel for distance electric thermometers as made by Negretti and Zambra, Ltd., is illustrated in Figure 5.

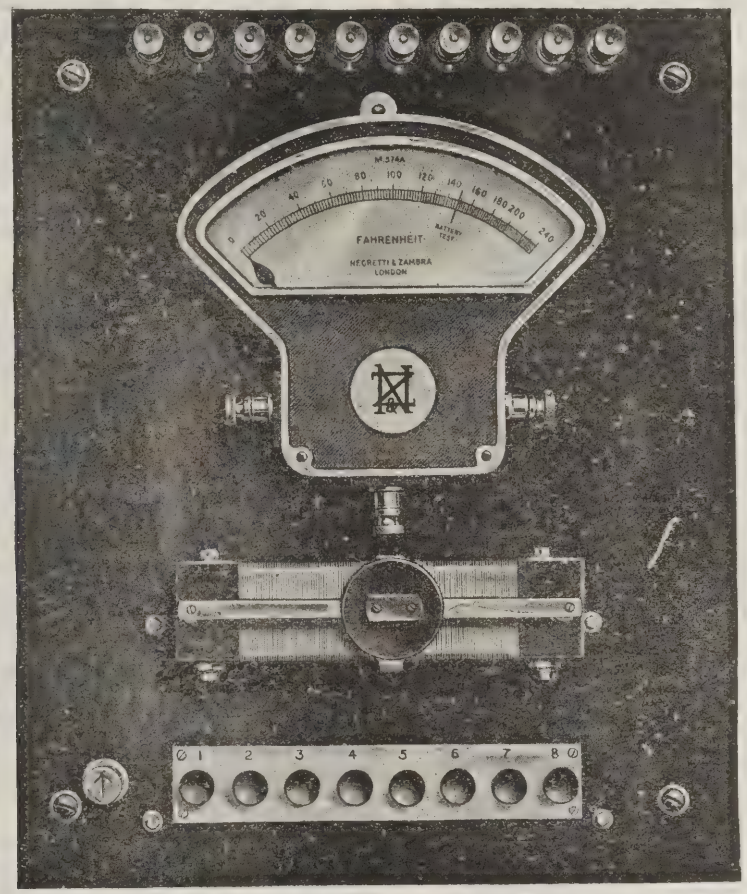

FIG. 5.

Typical Thermo-Electric Pyrometer Installations.

As typical also of the many possible applications of modern thermo-electric pyrometers to the chemical and similar industries Fig. 6. shows an installation by Messrs. The Foster Instrument Company of six different pyrometers, which can be coupled to one central switchboard. No. 2 could be a tar still or vessel containing varnish, bitumen or various oils with a temperature range of 0-750° F. (0-400° C.), having a 36in. pointer of $\frac{5}{8}$in. with a collar (U^3), protected by an outer sheath (P^{25}) of any desired material resistant to the conditions. No. 3 is a typical pointer installation for flues, enamelling ovens, biscuit ovens and similar work, with a temperature range of, say, 0-750° F. (0-400° C.). In this case the pointer is 36in. long inserted in the top of the flue as shown, held in position, by a flange (K^3) of $4\frac{3}{4}$in. outside diameter, with a "connecter" C^1 at the top of the pointer. Installation No. 4 is for apparatus such as oil tempering baths, varnish vats, or comparatively low temperature molten salts or metals with a temperature range of 0-1,200° F. (0-650° C.) having a bent pointer L for convenience attached to the bath by a clamp hook J^3. No. 5 is a typical installation for a hot gas main, say producer gas, water gas, or blast furnace gas, with a range up to 1,200° F. (650° C.) or 1,900° F. (1,050° C.), having for convenience a bent pointer of steel sheathing. Installation 6 is for baths of lead, aluminium, and general low temperature alloys and

for molten salts up to 1,652° F. (900° C.); and this type of installation is also supplied for temperatures up to 2,400° F. (1,300° C.) as in barium chloride baths. Finally, No. 7 is a general installation for small furnaces, such as hardening, tempering, and general experimental work, with a range up to 1,900° F. (1,050° C.), having a bent pointer.

Advantages of Recording Instruments.

For special requirements, particularly when only a few pointers are necessary, as in the case for example in many chemical reactions such as sulphonations, nitrations, or general rectification or autoclave work, the arrangement can be made recording. That is to say, the galvanometer is of the recording type, on the principle, for example, of a needle or short pointer depressed at very short intervals, giving a row of dots on a chart. By the use also of different coloured ribbons and an automatic arrangement, one galvanometer can be used for two or three pointers, each pointer operating a different coloured ribbon, or twin galvanometers, giving, say, 4 records, can be obtained in one casing.

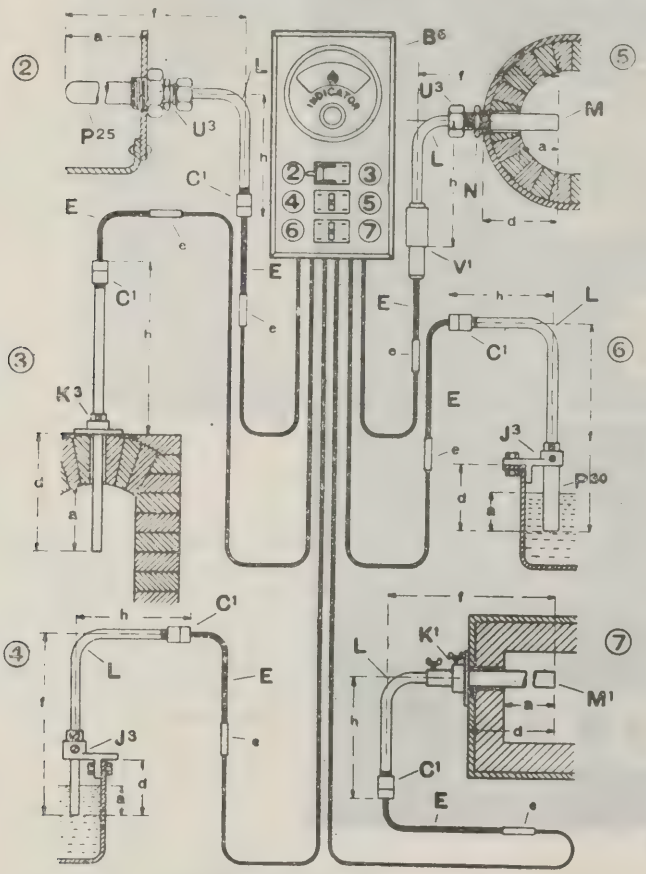

Fig. 6.

In general, there seems to be a considerable amount of prejudice against the use of recording electrical pyrometers, and, in spite of the extending use of modern indicating pyrometers, nothing like sufficient use is yet made of these invaluable aids to efficiency. Represented by the recording type, they are usually regarded as being too complicated and liable to breakdown, and also in the nature of an expensive luxury. It can only be stated that recording pyrometers of reputable make are no more trouble than many other scientific instruments in general use in the chemical industry, and a continuous record of temperature for many operations is very desirable. In return for the advantages secured and the fine workmanship necessary in the construction, the capital outlay is infinitesimal, and altogether a recording electrical pyrometer is a striking indication of the fact that the relatively small cost of most instruments of precision is entirely out of all proportion to the benefits received by the user.

Electric Radiation Pyrometers.

It may also be stated that the electrical principle has been adopted in connection with radiation pyrometers, although this is a very special section of the subject. Briefly speaking, however, a modern radiation pyrometer, such as constructed by Messrs. The Foster Instrument Company, consists essentially of a receiving tube or telescope, which is held up in front of the hot body—as, for example, a mass of white hot steel, or the interior of a kiln or other furnace—at a considerable distance away. This receiving tube is wired by flexible connections to an indicating galvanometer, which is graduated to read direct in degrees Fahrenheit or Centigrade. Expressed shortly, the principle consists in the fact that in the receiving tube or telescope there is a series of lenses or mirrors, which focus the heat on to a central spot, which then generates current in a special delicate thermo-electric couple, and this current is a measure of the amount of heat, affecting the galvanometer in the ordinary way.

PHYSICO-CHEMICAL STANDARDS.

BELGIAN AND AMERICAN MATERIALS AVAILABLE.

THE Bureau of Physico-Chemical Standards, established by the International Union of Pure and Applied Chemistry, with headquarters at the University of Brussels, has samples of the following standard substances available for distribution to the chemists of those countries belonging to the Union:

(A) Standard substances prepared at Brussels and intended primarily for the calibration of low-temperature thermometers.

The freezing points of the following substances reproduce to 0.1° C., the scale of the helium thermometer of the Cryogenic Laboratory of the University of Leyden [*Compt. rend.*, 174, 365 (1922)]:

	°C.		°C.
Carbon tetrachloride	−22.9	Carbon bisulphide...	−111.6
Chlorobenzene	−45.2	Ether (stable form)	−116.3
Chloroform	−63.5	Ether (metastable	
Ethyl acetate	−83.6	form)	−123.3
		Methylcyclohexane..	−126.3

Fifty cubic centimetre samples of each of these substances are available at 25 Belgian francs per sample. All orders should be addressed directly to the bureau.

(B) Supplementing the preparations of the bureau are the following standard materials prepared by the U.S. Bureau of Standards at Washington and obtainable directly from that bureau [*Bur. Standards, Circ.* 25]: cane sugar, for calorimetry and saccharimetry; naphthalene, for calorimetry, benzoic acid, for calorimetry; sodium oxalate, for oxidimetry; dextrose, for use as a reducing agent; benzoic acid, for acidimetry; tin, zinc, aluminium, copper, and lead, with stated melting point, for use in thermocouple calibration.

The Bureau of Physico-Chemical Standards intends to act as a centre for the study of pure materials, and it requests that authors of papers in this field send reprints of their papers to the bureau. It also hopes that industrial organisations may be willing to contribute to the bureau materials which may be used as the starting point for the preparation of highly purified substances.

Available Chlorine in Bleaching Powder.—S. Ochi (*J. Chem. Ind.*, Japan, 1923, 26, 185) states that for the determination of available chlorine in bleaching powder Penot's arsenite method is generally considered to be the only trustworthy method, while Wagner's iodine method is held to give high results owing to the action of chlorate upon potassium iodide in the presence of hydrochloric acid. The author has found that by using 2—4 c.c. of dilute acetic acid (1 pt. of glacial acetic acid to 1 pt. of water) for 25 c.c. of the testing solution, the influence of chlorate in the iodine method is completely avoided. The arsenite method gives slightly lower results than the true value, while the iodine method gives somewhat high results. The accuracy of the two methods is of the same order, but when the testing solution or the standard solution is dilute, the iodine method is the more accurate.—*J.S.C.I.*

SAFEGUARDING OF INDUSTRIES ACT.

THE REFEREE'S DECISION IN THE FORMALDEHYDE CASE.

As reported briefly in our issue of last week, the referee has directed that formaldehyde be withdrawn from the list of dutiable articles compiled by the Board of Trade under Part I. of the Safeguarding of Industries Act. The withdrawal took effect from Monday, August 20. The proceedings at the hearings of the complaint were reported fully in the issues of the *Chemical Trade Journal and Chemical Engineer* of June 22 (page 756), June 29 (page 785), and July 6 (page 6). Below we give the full text of the referee's decision:

The question in this reference is whether formaldehyde is properly included in the list of articles dutiable under the Act. The case has troubled me a good deal because it raised three distinct questions as to every one of which I was asked to depart from, principles I had already laid down for my guidance. I do not say that I regard myself as bound by what I have said before. If I am satisfied in the light of further evidence that what I have said should be modified I will be quite ready to act on that conviction. But unless and until I am satisfied that the evidence given and accepted by me in earlier cases was wrong or that I misunderstood it I propose to adhere to the lines I have laid down.

It is said by the Board of Trade that the inclusion in the list of formaldehyde is justified: (1) Because it is an analytical reagent; (2) because it is a synthetic organic chemical; and (3) because it is a fine chemical.

Not An Analytical Reagent.

(1) It is very difficult to say when a chemical which has a use as an analytical reagent is within the Act, but of this I have no doubt, that unless a chemical compound has a real and substantial use as distinct from a nominal or occasional use as an analytical reagent it ought not to be included as such in the list. I am satisfied that the use of formaldehyde as an analytical reagent is too trifling to jusitfy its inclusion in the list as an analytical reagent.

Looseness with which the Word "Synthetic" is Used.

(2) I think that a good deal of confusion may arise unless one bears in mind that neither chemists nor books speak of synthetic chemicals. The expressions "synthetic perfumes" and "synthetic dyestuff intermediates" are doubtless in common use, but I think that the word "synthetic" is used quite loosely in the former case, and I am told by Sir Arthur Colefax and Mr. Parry that the expression "synthetic intermediates" has a special meaning referring to bodies from which synthetic dyestuffs can be obtained. The use of the word in this connection, therefore, throws but little light upon its meaning in the Act.

Various writers have defined the word "synthesis." The word describes certain methods of production of chemical compounds. I am asked by the opponents to say that if a chemical can be produced synthetically, that chemical is a synthetic chemical without regard to the question whether in any particular case the substance has been, in fact, so produced. In my opinion that is not the meaning of the Act. I think that the expression "synthetic organic chemical" means such chemicals as have, in fact, been produced synthetically. The results of the contrary view, if logically worked out, are so startling that I shrink from its adoption.

In my opinion the question to be determined in each particular case resolves itself into this. Has the substance on the importation of which it is claimed that duty is payable, in fact, been produced synthetically?

It is of course common ground that the synthesis of an organic chemical includes its "building-up" (to use Thorpe's expression) or its "formation" (to use Richter's expression) from its elements. It is equally clear that synthesis includes the "building up" or "the formation" from such carbon derivatives as can be obtained from the elements, but if the carbon derivative actually employed in the latter case as the raw material is one which, although, it could be, has not, in fact, been produced synthetically, it is contended, at least I understand that it is contended, that the resulting compound is synthetically produced without regard to the nature or character of the further building-up or formation from that raw material.

I am assisted in the decision of this point by the fact that there is no evidence to support the contention. Dr. Ormandy and Mr. Parry are at one on the point. To quote the former "the raw material must be one which could in case of necessity be produced through all the steps from its elements and the further step must itself be synthetic." I accept that view.

The Oxidation of Methyl Alcohol Not a Synthesis.

There then remains to be decided the question whether the step taken, namely the oxidation of methyl alcohol in the presence of a catalyst is truly described as synthesis. By this oxidation the methyl alcohol loses two atoms of hydrogen. Does this step partake of the nature of synthesis?

In two earlier cases great stress has been laid upon the contention that the essence of synthesis was a building-up or at any rate a bringing or placing together. The truth of that contention was one of the main issues in the camphor case. I quote the following passage from the opening remarks of Sir Arthur Colefax: "The Board of Trade are actually driven to this incredible position. Synthesis I have always until now understood merely as a matter of definition involved, adding something to or putting something together. But they are driven by the logic of their argument to this truly remarkable position, that synthesis is no longer to be putting two things together, but it is to be actually applied to a case where you take something away. It is a most remarkable use of the word synthesis, and certainly I should have thought nobody has ever held it." And later he put to his main witness the question: "Mere oxidation would never be talked of as a building-up?" He also asked the question in argument: "Where is the case that they can point to in which you can find general acceptance of the term synthesis, where the change does not involve an addition of a carbon atom?" I quote these passages to show how clearly the contention was raised on the one side in that case.

On the other side the Board of Trade submitted that the meaning of a synthetic organic chemical was a chemical produced by controlled processes resulting in molecular changes of any kind. Dr. Forster, called for the Board of Trade, objected to the expression "building-up" and argued that the true meaning was "placing together." He agreed that the generally understood meaning of synthesis was the bringing together of the component elements. He agreed that by the vast number of chemists to-day the bringing together of elements or radicles to form a more complicated body was their understanding of the term. On the evidence given in that case and on the arguments of Sir Arthur Colefax I accepted the view that synthesis, as generally understood, involved the bringing together of elements or radicles to form a more complicated body. I definitely rejected the contention that synthesis, as generally understood, included any molecular change so long as it was produced by controlled processes. I thought, and still think, that it is my duty to give to the words their commonly accepted meaning. Doubtless many chemists hold a different view.

Referee's Views from Earlier Cases Unmodified.

It is obvious that I cannot decide that the steps necessary for the formation of formaldehyde from methyl alcohol are synthetic without ignoring or reversing the view I took in the camphor case. It is to be noticed that no evidence was called by the Board of Trade or those supporting their view as to the meaning of synthetic or as to whether formaldehyde was or was not a synthetic chemical. Dr. Ormandy dealt with it in cross-examination only. He did not take quite the same view as Dr. Forster. He expressed the opinion that an operation was synthetic if it was a controlled reaction and it it gave proper yields—an entirely new suggestion. It is sufficient to say that no evidence has been given which satisfies me that the view I took in the camphor case was wrong. Incidentally that view is entirely consistent with the evidence given in the calcium carbide case.

No Evidence to Prove Formaldehyde a Fine Chemical.

I frankly admit that I should like to be able to decide that formaldehyde is a fine chemical. My difficulty is that I cannot find any ground upon which I can do so, consistently with what I believe to be the true principles applicable. It is quite clear on the evidence that this substance has not been commonly regarded as a fine chemical. The *Chemist and Druggist* definitely treated it as heavy; it appeared as heavy in Harris, Hart and Co.'s advertisements. Several lists were put in in which formaldehyde was classified as technical or general as opposed to fine. This may not amount to very much, but, on the other hand, not a single instance could be given of formaldehyde being called a fine

chemical or being classified as such before the Act of Parliament. An American paper of 1923 was produced in which it was classified as fine and the list of British fine chemicals published in 1922 includes it. Dr. Ormandy was not asked about it. Mr. Allen, called by the opponents, could only say that he did not regard it as a heavy chemical and that he did not understand the meaning of "fine."

No one was called from any of the big fine-chemical manufacturers. Two or three gentlemen were called who expressed the opinion that it was a fine chemical, but there was not any evidence at all that when this Act was passed formaldehyde had been regarded as a fine chemical in any branch of the trade. According to my decision in the tartaric acid case this finding ought to settle the case; but I think that one is driven to the same conclusion by a consideration of the other circumstances said to be relevant.

This chemical is not a pharmaceutical chemical. The opponents disclaimed any intention of putting it forward as such. It is an industrial chemical produced on a fairly large scale—a scale very large for a fine chemical. There is no doubt that most of the witnesses that have given evidence before me regard an industrial chemical used on a substantial scale as something very different from a fine chemical. Even representatives of May and Baker, and Howards, manufacturers of fine chemicals on a very large scale, take the same view.

A special plant is necessary for its production. It is handled in quantities somewhat big for a fine chemical.

On the other hand it is said that the formaldehyde on the market is of great purity and that its manufacture involves continuous scientific control. One has only to re-read the evidence in the earlier cases to see (1) that the degree of purity does not help very much; and (2) that the scientific control there described as necessary to stamp the product as a fine chemical was a control of highly-trained chemists as opposed to the skilled control of persons trained *ad hoc*, with the result that the cost of that control was high relatively to the total cost.

I am not at all satisfied that the skill required to produce formaldehyde is anything more than the skill of men taught and trained for the particular purpose, and Mr. Romanes said in his evidence that if you worked out the cost per ton of the scientific supervision you would find it very small.

I do not think that the description of the fine chemical group, Group 6 of the Association of British Chemical Manufacturers covers this substance.

Formaldehyde to be Removed from List.

The case is one of those border line cases upon which opinions will necessarily differ, but dealing with it as best I can on the evidence given, I find that the complainants have made out their case and that I must award that formaldehyde be excluded from the list.

REFEREE'S DECISION IN ROCHELLE SALT CASE.

The following is the full text of the referee's decision in regard to the complaint that Rochelle salt has been improperly included in the Board of Trade List of dutiable articles under Part I. of the Safeguarding of Industries Act: (the proceedings at the hearing of the complaint were reported in our issue for August 3, p.131.)

In my opinion no case has been made out for taking Rochelle salt out of the List. The Rochelle salt of commerce is a pharmaceutical chemical. It has also a well recognised use as an analytical reagent. It has practically no industrial use. I am inclined to think that the use as an analytical reagent in itself justifies the inclusion of Rochelle salt in the List, but I do not decide the case on that ground. Mr. Kenneth Swan's contentions may possibly require very careful consideration in some future case.

Rochelle Salt to Remain in the List.

I decide this case on the ground that there is no evidence to justify me in saying that the Board of Trade was wrong in including Rochelle salt in the List as a fine chemical. The fact that the chemical is used only in pharmacy and as a reagent raises a strong presumption that the trade would regard it is a fine chemical. Mr. Howard said that it was known in the trade as a fine chemical. Mr. Blenkinsop and others gave similar evidence. There was no trade evidence to the contrary. In my opinion there is no evidence that Rochelle salt is wrongly included in the List, and I award that the complaint fails.

THE MANUFACTURE OF SODIUM HYPOCHLORITE.

PRODUCTION OF CHEAP CONCENTRATED STABLE SOLUTIONS.

THE rapidly-growing demand for cheap sodium hypochlorite as a disinfectant of very general applicability, as distinct from its use as a bleaching agent for textiles has led to many efforts to prepare the material in the form of a highly-concentrated and stable solution suitable for transportation and storage. Up to the present the amount of success that has attended upon the efforts of workers in this field has not been very great, but a process has just been described by H. F. Zoller of the Nizier Laboratories Company, Detroit, U.S.A. (*Industrial and Engineering Chemistry*, August, 1923) which, if all the claims made in connection therewith are substantiated, would appear to have come very near to solving the problem. Mr. Zoller in his introductory remarks states, that: Our conceptions of the constitution and the physical and chemical behaviour of hypochlorite have very materially changed in the last few years. Recently, there have been a few attempts to regulate the stability and bleaching properties of chlorinated alkali solutions by studying their alkalinity in an empirical fashion. Among these investigations are the observations of Higgins that alkalies stabilise sodium hypochlorite solutions and lower the velocity of bleaching, while neutral salts increase the bleaching rate and decrease the stability. Renewed interest in hypochlorites, especially the alkali hypochlorites, for bleaching purposes in the textile industry has been strongly manifested in England during the last decade. In the United States the pendulum seems to have swung in another direction; we have become deeply interested in hypochlorites as sterilising agents and general disinfectants. Many factories engaged in the production of food products would use sodium hypochlorite as a sterilising rinse for their equipment, provided large quantities of a uniformly stable quality could be made readily available, but the present market price is prohibitive to a factory of any size.

Method Based on Hydrogen-Ion Control.

A method is here outlined which will enable the average factory to prepare its own effective disinfecting agent simply and cheaply. The method is based upon the hydrogen-ion control system of manufacture. The solution is heavily buffered in order that the reaction will not rapidly change to yield an unstable solution. A sodium hypochlorite solution containing 5 per cent. available chlorine is here considered to be a concentrated solution. Solutions containing 10 and even 15 per cent. available chlorine are readily prepared using the same principle, but they are unwieldy and impractical for general use.

The first successful attempts to prepare stable, dilute hypochlorite solutions for purposes other than bleaching were those of Dakin, and Cullen and Austin. These attempts matured in the introduction of a serviceable antiseptic solution for medicinal and similar uses, but, owing to difficulties co-existent with the transportation and application of the Carrel-Dakin solution, a series of chloramines was developed which has in a measure superseded the Dakin solution. Cullen and Austin found that between pH 9 and 10, Dakin's solution is very stable. This solution of sodium hypochlorite approximates a 0.44 per cent. solution of available chlorine, or a 0.45 per cent. solution of sodium hypochlorite.

Many attempts by others to prepare more concentrated solutions of sodium hypochlorite at a supposedly similar range of hydrogen-ion concentration (pH 9 to 10) have met with failure, the reason being, in the writer's estimation, a poorly buffered solution at the concentration sought. It is absolutely essential that the solution be heavily buffered between these limits of pH if a high concentration of hypochlorite is desired.

Direct Chlorination of Caustic Soda Most Suitable Method.

The methods in general use for the preparation of sodium hypochlorite are: (*a*) Double decomposition of calcium hypochlorite (chloride of lime) with sodium carbonate or sodium sulphate; (*b*) electrolysis of sodium chloride with the production of sodium hypochlorite and hydrogen; (*c*) direct chlorination of sodium carbonate with chlorine gas.

Wherever large quantities of sodium hypochlorite are demanded, the first process is undesirable because of the variable character of commercial chloride of lime, and

because of the large mass of residual calcium carbonate sludge which must be disposed of. In the electrolytic method it would be necessary to employ buffers along with the sodium chloride if a strong solution of sodium hypochlorite were desired; otherwise, it would be extremely unstable and the tax on the electrodes and equipment enormous. The direct chlorination method is the most practical one for universal practice in producing strong sodium hypochlorite solutions. It is the most easily controlled and can be effected rapidly on a commercial scale.

In adopting the direct chlorination method of manufacture, the first step was to provide a solution with sufficient buffer material to hold the hydrogen-ion concentration in the region of pH 10 to 10.5. On the assumption that the zone of reaction required for the stability of Dakin's solution was applicable to stronger solutions of sodium hypochlorite, several preparations of 2, 3, 3.5, 5, and 10 per cent. available chlorine were made and studied in regard to their stability. The results of the study showed that for maximum stability these strong solutions required that powdered phenolphthalein spread on their surfaces should show a faint but distinctly red colour, and further, that a 1 per cent. alcoholic solution of thymolphthalein should show a flash of blue colour. When such a solution is analysed for titrable alkalinity, available chlorine, and total chlorides, and calculations of the true hydrogen-ion concentration are made therefrom, one finds that the reaction is in the region of pH 10 to 10.6. This is a higher pH than is desired for Dakin's solution.

Sodium Carbonate the Best Buffer Material.

While all the buffer materials were serviceable, sodium carbonate, because of its availability and cheapness, proved superior. As far as could be estimated, there was no appreciable anion influence on the stability of the concentrated solutions among the above buffers. The criterion of the stability seemed to be the intensity of the alkalinity, which is here characterised as the hydrogen-ion concentration.

TABLE I.—Showing Relative Effect of Buffer Material (Anions) on the Stability of Sodium Hypochlorite.

60 per cent. Caustic Ash, Per cent.	Buffer.	Per cent. Buffer on Moisture-Free Basis.	Pink to Powdered Phenol-phthalein.	Blue Flash to 1 per cent. Thymol-phthalein.	Available Chlorine Fresh, Per cent.	Available Chlorine 30 Days Later, Per cent.
7·5	Na_2CO_3	2·5	Yes	Yes	3·25	3·25
7·5	Na_3PO_4	2·5	Yes	Yes	3·19	3·17
7·5	$Na_2B_4O_7$	2·5	Yes	(?)	3·20	3·21
7·5	Na_2SiO_3	2·5	Yes	Yes	3·22	3·22
7·5	$NaHCO_3$	2·5	No	No	3·25	2·80

The influence of daylight on the stability is only minor. The use of amber-coloured bottles is unnecessary. In ordinary clear glass bottles the hypochlorite solutions keep for 5 or 6 months with less than 10 per cent. loss in available chlorine. It is not necessary either to cool the alkali solutions below 40° C. while chlorinating them, or to store the resulting hypochlorite in a cold place. Whereas it is true that the activity of the hypochlorite solutions (chlorinating power) is accelerated by small increases in temperature, their internal decomposition is not noticeably accelerated at the stable region in pH 10 to 10.5.

When chlorine gas is passed into a mixed solution of sodium hydroxide and sodium carbonate, containing about 10 and 2.5 per cent., respectively, and the gas is stopped when the solution registers 5 per cent. of available chlorine, it is found that the yield is 99 to 100 per cent. A temperature change from 15° to 40° C. does not affect this yield. There is no permanent formation of either chlorate or perchlorate under these conditions. In actual experience a pure sodium-hypochlorite solution at pH 8 begins to lose free oxygen to the air. The higher the temperature at this pH the more rapid is the decomposition. Coincident with this loss of oxygen the solution becomes more acid, and because of the increased acidity the decomposition is again hastened. It is an example of catalysis augmented by the hydrogen-ion. Whether or not it is the chlorine or the oxygen, or both, which are the active constituents of sodium hypochlorite, for every pound of chlorine used, one pound (100 per cent.) of available chlorine is obtained in the product.

Details of the Manufacture and Control.

It was found desirable to use sodium hydroxide of good technical grade (60 per cent. caustic ash) for chlorinating, and a good grade of soda ash (anhydrous sodium carbonate) for the buffer material. In order to make a solution of sodium hypochlorite of certain strength, a definite amount of alkali in the presence of the buffer will be required to maintain the stable point in pH. A stronger solution will require more alkali. The writer has made several thousand gallons of 2.5 to 5 per cent. sodium hypochlorite during the last two years, and has found it desirable to maintain the concentration of sodium carbonate at the same point in all the formulas—viz., 2.5 per cent.

TABLE II.—Showing Relative Amounts of Alkali and Alkali Carbonate for Different Concentrations of Product.

NaOH (60 per cent. Free Alkali) Per cent.	Na_2CO_3 (Anhydrous Soda Ash), Per cent.	Average Chlorine for Stable Product, Per cent.	pH (Approx.). Per cent.
2·5 ..	2·5 ..	1·4 ..	10·0
5·0 ..	2·5 ..	2·25 ..	10·8
7·5 ..	2·5 ..	3·25 ..	10·5
10·0 ..	2·5 ..	4·50 ..	10·5
12·5 ..	2·5 ..	6·25 ..	10·6

For 5 to 25-gallon quantities of hypochlorite, the alkali and soda ash are weighed into an iron or copper bucket, and about one-third to one-half of the water is added and the whole stirred until dissolved. It is then filtered through layers of absorbent cotton or muslin into the chlorinating receptacle, which should contain the remainder of the water.

The chlorine is led from a commercial cylinder through a copper tube fitted with a brass or bronze needle valve, and silver soldered thereto. The copper tube may be made to fit snugly into the valve head on the chlorine cylinder and clamped there under pressure. The copper tube from the needle valve terminates into a gas meter, which is chlorine-tight. The meter may be either of the dump type or Venturi effect. Both have been used with success. They must be made entirely of glass and filled with a non-freezing, non-chlorine-attacking solution such as an alkali-chloride brine (NaCl). If rubber connections are used they will have to be frequently replaced. A chlorine distributor for immersion into the alkali solution may be made from a coarse alundum thimble and glass tube. By aid of the needle valve the stream of chlorine gas can be easily regulated. For large-quantity production the chlorine meter may be dispensed with, but it is then necessary to follow the rate of chlorination by titration.

It is only necessary to know the quantity of chlorine passing into the alkali during a given time interval to calculate the strength in terms of available chlorine. However, it is often more convenient to have available a 0.1 *N* sodium thiosulphate solution for the purpose of direct determination of the available chlorine content. The method used by the writer is to measure 10 c.c. of distilled water, 5 c.c of glacial acetic acid, and 5 c.c. of 5 per cent. sodium iodide into an Erlenmeyer flask. Exactly 2 c.c. of the hypochlorite solution are added, and the liberated iodine is titrated directly with the thiosulphate to the disappearnace of the yellow colour. No starch paste is necessary, although a white paper background is convenient. The number of cubic centimetres of 0.1 *N* sodium thiosulphate required for the 2 c.c. of chlorinated solution, multiplied by the factor 0.1772, will give the percentage of available chlorine in the sodium hypochlorite. The percentage of available chlorine multiplied by 1.05 is the percentage of sodium hypochlorite in the solution. It is very essential that the difference between the concentration of available chlorine and concentration of sodium hypochlorite be specifically stated. The two are often intermingled.

Relative Costs of Production.

The overhead expense of this method of manufacture is very low. Soda ash and caustic soda are relatively cheap—the former is around 2 cents per pound, and the latter about 4 cents per pound. Liquid chlorine is quoted at 7 to 10 cents per pound. Thus, if we allow 50 per cent. for labour costs, the expense of producing 2.5 to 5 per cent. "available chlorine" sodium hypochlorite amounts to approximately 6.80 cents and 16.22 cents per gallon, respectively. These values are in a marked contrast with the price of some of the commercial sodium hypochlorite preparations now on the market.

Barytes Production in the U.S.—During the year 1922, the barium products industries in the United States consumed 167,842 short tons of ore, from which were made 46,176 tons of ground barytes, 83,360 tons of lithopone, and 13,900 tons of barium chemicals having a total value of 11,398,000 dollars.

CASEIN IN THE PAINTS INDUSTRY.*

USE AS A BINDER IN DISTEMPERS.

CASEIN, one of the principal constituents of milk, was for long utilised only for alimentary purposes and its employment industrially is one of the greatest conquests of modern technology. It has only been with the growth in our knowledge of proteins and colloids in general and the light thrown thereby on the constitution of casein that this industrial advance has been made possible.

Conditions of Salt Formation with Casein.

Casein belongs to the group of phosphorus-containing proteins and also possesses several of the characteristics displayed by typical colloids. Thus, it is incapable of diffusing through those membranes which are easily permeable by crystalloids. Casein is an amphoteric compound, inasmuch as it will form definite chemical compounds with either acids or alkalies. With the former it gives salts such as nitrates, chlorides, sulphates, phosphates and acetates, and with the latter the caseinates of sodium, potassium, ammonium, calcium, barium, etc. These compounds however are only formed under definite conditions of hydrogen-ion concentration in the protein solution, and there exists a concentration above which no compound can be formed. This concentration is termed the isoelectric point and for casein is pH 4.7. In practice casein can combine with an alkali to form a caseinate when the pH is equal to 4.7, but can only combine with an acid when the pH is lower than 4.7.

When the conditions, as regards hydrogen in concentration, are favourable, the casein reacts stoichiometrically with the acids or alkalies forming salts which dissociate electrolytically. The incapability of casein solutions to diffuse through membranes permeable to the ordinary crystalloids is not due so much to the colloidal nature of the casein as to the enormous volume of the molecules.

Apart from the butter and the lactose, casein is the principal constituent of milk. It occurs therein as calcium caseinate in the form of a very finely-divided emulsion. This calcium caseinate also maintains in permanent suspension the neutral calcium phosphate contained in the milk; probably a double compound of the two salts exists in some cases. When the casein is precipitated the phosphate of lime is precipitated at the same time, whilst the fatty matters in the emulsion coalesce and separate out. It is thus difficult to obtain the casein free from fatty matters and calcium phosphate.

Casein Content of Typical Milks.

The casein content in milk is very variable. Whilst sheep's milk contains about 4.6 per cent., human milk contains but 0.5 per cent. The table below gives the percentage contents of the principal milks.

	Cow	Sheep	Goat	Ass	Mare	Human
Water	87.80	83.5	85.0	89.5	91.2	88.3
Casein .	3.20	4.5	3.7	0.8	1.3	0.5
Butter ...	3.50	5.2	4.7	1.6	1.0	3.0
Albumen .	0.30	1.8	1.3	1.9	0.8	1.7
Lactose ..	4.75	4.8	4.3	5.7	5.6	6.5

Commercially, cow's milk is the principal source of casein, and in such milk the casein content may vary from 2.5 to 4.2 per cent. The material used is the milk skimmed by centrifugal means. The Sharples and Hignette supercentrifuges enable a very complete skimming of the milk to be effected, leaving as an average little more than 0.02 to 0.15 of fatty matters in the milk. The average composition of such a skimmed milk is: water, 90.6 per cent.; casein, 4.26 per cent.; lactose, 4.22 per cent.; fatty matter, 0.13 per cent.; and ash, 0.78 per cent. Soya beans constitute a very valuable source of casein, but one which has up to the present, been but slightly resorted to. The greatest producers of casein are Canada and the Argentine which since the war have imported annually into Europe, thousands of tons of casein chiefly through the ports of Antwerp, London and Hamburg. France is also a producer of casein in small quantities but of the very best quality, and French casein is particularly esteemed for the manufacture of glues, for which purpose the complete absence of fatty matter is a desideratum.

The most interesting properties of casein are undoubtedly those of giving solutions possessing remarkable adhesive and agglutinating powers. The applications that casein has found are extremely varied and include the glueing of wood, the printing of textile fabrics and its use as a binder in paints. In the present article however only the use of casein in the preparation of colours and paints will be considered.

Precipitation and Drying of the Casein.

It was believed at one time that the casein obtained by precipitation from milk with acids was absolutely identical with that obtained by coagulation under pressure, but it has now been found that both physically and chemically there exists considerable difference between the two products, for whilst the substance precipitated by acids is true casein, that produced by pressure-coagulation is para-casein, a substance of less complexity than true casein.

Whichever method be adopted for separating the casein from the milk, however, the precipitate must be well washed with water to free it from any remaining milk and lactose, and then so treated as to reduce its water content. The clots are then broken up into fragments about the size of peas and dried at a temperature of 30-40° C. At a lower temperature, not only does the casein dry more slowly, but it is liable to ferment and to become covered with fungoid growths. If the temperature be much above 40° C., on the other hand, the casein undergoes profound modifications which lead to a darkening in colour and an appreciable diminution in adhesive power and solubility. The drying of the casein should be carried on until the water content is reduced to 10-12 per cent., at which point the material is easily friable and may be crushed to a powder in a wooden mortar. With a higher water content, the casein forms lumps which soon begin to decompose.

Commercial Grades and Common Adulterants.

The usual forms in which casein is met in commerce are as a fine flour and as a granulated meal. The fine powder is obtained by passing the dried casein through a porcelain ball mill or through fluted revolving cylinders. The forms in which the casein occurs as larger granules are made by spraying the product with a little alcohol before packing, with the addition of a little antiseptic to prevent fermentation. Good commercial casein is of slightly yellowish colour and possesses a faint unpleasant odour reminiscent of cheese. It is frequently adulterated with potato starch, barium sulphate, chalk, china clay, silver sand, dextrin, sodium sulphate, etc. A little aniline yellow is occasionally added to colourless caseins.

Soluble Casein.

Casein is insoluble in water, but may be solubilised by means of alkali. The soluble casein of commerce is casein to which has been added from 10 to 12 per cent. of borate or carbonate of sodium, or 20 per cent. of sodium bicarbonate. These mixtures are sometimes made in such a dilatory manner, that the naked eye can pick out easily the particles of the casein and the particles of the inorganic salt. This lack of homogeneity is frequently the cause of irregularity in the solutions. The best method of making a soluble casein is by mixing the casein before drying with a concentrated solution of the salt, and then drying the homogeneous mixture *in vacuo*.

At the present day casein is the binder most frequently used in the preparation of distempers and similar water paints. These water paints are rapidly growing in importance. They are capable of application to wood, stone, masonry, roofs, etc., dry regularly and rapidly, giving matte coatings but little affected by rain. Besides being cheap they offer over oil paints many advantages in cases where the preservation of the covered surface is not the main object in view. Very delicate tints may be obtained, the surface covered needs no special preparation and the layer of paint does not close up the pores of the surface.

The popularity of casein as a binder in these paints is based upon the fact that it is soluble in water in the presence of alkalies, and that when the solution is coated on a surface the casein under the influence of the air soon reverts to its insoluble condition.

In the manufacture of these paints commercial casein in powdered form is mixed with a suitable quantity of hydrated lime. The relative amounts of casein and lime must be worked out very carefully. A colour wash containing insufficient casein has no solidity, is not resistant to rubbing or to the action of water. An excess of binder, on the other hand, is not desirable, for not only does it prevent a uniform coating being obtained, but the casein does not all become insolubilised, and frequently cracks and scales off.

(To be continued.)

* From article by Maurice de Keghel in *La Revue des Produits Chimiques*, July 31, 1923.

INDUSTRIAL PITCHES.

THEIR ORIGINS AND CHARACTERISTICS.

By "Latex."

THE term "pitch" has been in use from the earliest times, and the use of pitches of various kinds has been an art employed by man since the dawn of history. It is probable, however, that the word "pitch," frequently met with in Scripture, and other ancient works, refers to the tarry exudations of bitumens of a petroleum nature still found in Palestine, and other countries of the Near East.

To-day, pitches are still very largely used, and find possibly their largest commercial application as waterproofers. The term is now used, however, in a much less general sense, and is really only applicable to the pyrogenous residues resulting from the destructive distillation of a wide range of organic products. Pitches vary very considerably in chemical and physical characteristics, but all have certain physical resemblances. They are all dark-coloured super-cooled liquids, consisting mainly of hydrocarbons.

The Susceptibility Factor and Penetration-Test Curve.

Not only do pitches vary largely from class to class, but specimens of the same class nearly always vary in composition, and such physical properties as melting point, hardness and ductility. Almost the only property which approaches a physical constant, and a means of distinguishing even members of the same class of pitch is the rate at which the consistency of the pitch varies with changes of temperature. As super-cooled liquids, pitches have no sharp transition from solid to liquid when heated, the change being a gradual one. The rate of change is roughly peculiar to each class of pitch, and can be measured by the alteration in hardness experienced through a rise of temperature of one degree. This can be reduced to an exact figure known as the susceptibility factor, which is a ratio between the hardness of a pitch and its melting point, and the estimation of this gives probably the most useful means of identification and works control. Even this factor varies in various members of the same class of pitch, according to, say, the free-carbon content, and the data must be used in conjunction with other chemical characteristics of the pitch. As an alternative the whole change from the solid to liquid form may be plotted on a graph, and the full curve used instead of the susceptibility factor.

This may readily be done by taking the penetration of the sample as a measure of its hardness or consistency. The penetration is the distance a standard needle will penetrate the mass of the sample under standard weight. The penetration test can be conducted at various temperatures between solid and liquid, and the resulting curve has the advantage that it is independent of the amount of oil present in the pitch. Thus, a pitch of any given class which is soft by reason of its distillation not being carried very far gives a similar curve to that given by a harder specimen of the same class.

Another important physical characteristic general to all pitches is the high di-electric value, which renders the pitches of very marked utility in the electrical trades. As a general rule pitches are very poor conductors of heat as well as of electricity, and owing to their fusibility and miscibility with a wide range of organic materials, they can be compounded into a great number of manufactures of unique utility.

Coal-tar Pitches.

Coal-tar pitches constitute the most important type of pitch in use to-day, and are so well known that little need be said here respecting their peculiarities. Generally speaking they are highly weather-proof and acid-proof. They are, however, largely influenced by temperature changes—*i.e.*, they have a high susceptibility factor. Better-known modifications of coal-tar pitch are water-gas-tar pitch and blast furnace pitch. The former is the product of the tar formed from the water gas producer plant, and is very similar to coal-tar pitch, but has an exceedingly fine lustre or gloss, and in addition is very low in "free carbon" content. These characteristics render it attractive for the manufacture of black varnishes.

Blast furnace pitch is the product of very high temperative carbonisation, and is therefore very high in "free carbon." It usually has rather an unattractive appearance owing to a bluish "bloom" which appears on its surface, probably due to high-boiling-point saturated hydrocarbons. It is cheaper than coal-tar pitch, and finds a ready sale for grouting paving blocks, etc.

Wood Pitches.

From very early times wood tars have been used largely in Scandinavia and Russia as crude waterproofers. The pitches derived from wood tars are, however, now in big demand all over the world. The properties are very peculiar, and in composition they bear unmistakable traces of the phenolic bodies found so prolifically in wood tars. The presence of these phenols renders them often readily attacked by water, the phenols being leached out, and the pitch usually assumes a brownish tint, and perished appearance. Wood tars vary however in relation to their source. Many hard wood tar pitches are practically insoluble in all the well-known solvents, but are totally soluble in phenols, and partially soluble in acetone. Coniferous tar pitches are nearly always entirely insoluble in paraffin solvents, but largely soluble in aromatic hydrocarbons. Wood pitches are largely used as caulking compounds for wooden decks and in certain marine paints.

Fatty Acid Pitches.

These comprise the residues from the distillation of stearic acid, wool-grease, etc., and are exceedingly valuable commercial products. While they vary considerably, most samples which come into the market contain considerable quantities of fatty substances, and as a general rule these pitches represent the best available materials for waterproofing compounds. In addition they have usually a very low susceptibility and are very useful as ingredients for baking japans. On exposure or on the usual baking treatment changes occur which render these pitches very resistant and almost insoluble in the usual solvents.

Carbolic and Gutta-percha Pitches.

The pitches obtained from the refining of petroleums are not usually classed as pitches, and their characteristics are so varied that they can hardly be dealt with in an article of this nature. There are, however, a great number of rarer pitches which find their way into the market from time to time, one of which is carbolic pitch. This is a highly-phenolic pitch and is very often used for the manufacture of wood stains (in which case the phenols are an advantage), disinfectants, and also for the manufacture of varnishes toxic to low forms of animal and vegetable life.

Gutta percha pitches are usually "tacky" and soft, but as may be expected, are very elastic and valuable for use in moulded insulation compounds. These pitches are produced in a variety of forms, colour and consistency, and the technology of their composition and use is very limited and little known.

It is well to remember that all pitches retain pronounced traces of their source, and their behaviour can usually be predicted as being similar to that of the parent compound. Recognition of this fact is probably one of the most useful guides in the successful application of this interesting class of material to industry.

ALPHA AND BETA NAPHTHOLS.

A SIMPLE METHOD OF DIFFERENTIATION.

THE use of metallic sodium as a reagent for the rapid and positive differentiation between alpha- and beta-naphthol is described by H. Kunz-Krause (*Chemiker Zeitung*, July 28, 1923). A very small quantity of the naphthol under examination is dissolved in a few ccs. of absolute alcohol, and to the solution metallic sodium (in the form of a thin ribbon) is added so long as reaction takes place. The solution may be cooled with water during the addition of the sodium. In neither case is a precipitate formed, but if alpha-naphthol be present, the solution assumes a bluish-green slightly fluorescent appearance, which on the addition of excess of sodium reverts to its former colourless appearance. In the case of beta-naphthol on the other hand, the solution first assumes a deep blue colour and is strongly fluorescent. Addition of further sodium in this latter case causes colour changes from blue to olive, to brown and finally to brilliant orange, whilst the fluorescence remains unimpaired. According to the discoverer of the test, it is more delicate and safer than any of the methods that have been suggested hitherto.

MENHADEN OIL PRODUCTION.*

THE GROWTH OF AN IMPORTANT INDUSTRY.

THE source of practically all the oil commonly known as fish oil is the menhaden, or moss-bunker, a small, bony, inedible habitant of the coast waters of the Atlantic Ocean from Texas to Maine. These fish originate in the warm waters of the Gulf of Mexico and the Caribbean Sea, travel northward in great schools as the summer progresses and return to the South in winter. The fishing season, following the movement of the schools, begins in April and continues until cold weather sets in.

Historical.

During the early years of the nineteenth century, settlers along the coast made use of these fish as fertiliser by spreading them over the ground and allowing them to rot, but the value of their oil was soon discovered and a means of extracting it devised. It consisted in placing the fish in open boxes, covering them with water and pressing the mass with weighted boards under which disintegration took place and oil was given off. As the oil floated to the surface it was skimmed off in dippers and loaded into larger containers for transportation and further treatment. This process was soon improved by boiling the fish in kettles before subjecting them to pressure, and resulted in a considerable increase in both the quality and quantity of the oil so produced.

The next step was the introduction of the process of cooking by steam under which disintegration was more rapid and the yield of oil was again increased, so that the business of treating fish for the purpose of extracting oil began to assume importance. Plants were established along the Northern coast adjacent to the fishing areas and in 1866 the first of the so-called "floating factories" was built. This plant consisted of a steamer equipped with apparatus for treating the fish as soon as they were taken aboard, and it made possible not only a further improvement in the quality of the oil, but also greatly extended the area over which the fishermen could operate. New land factories were built and new methods devised to get the fish into the cooking kettles before putrefaction, the fishermen soon realising the necessity of cooking and pressing them while they were relatively firm and solid in order to obtain a maximum yield and a satisfactory quality of oil. This expansion of the industry continued normally, until in 1920 there were approximately sixty factories in operation along the Eastern seaboard served by a fleet of 150 steamers and employing perhaps 7,000 men.

The Fishing Operations.

The fishing steamers are of the tug boat type built with a high bow on which the pilot house is placed in order to provide a vantage point from which the sea may be surveyed. Engines and machinery are placed astern, leaving the central portion as an open hold for the handling and storing of fish. The larger steamers have a capacity of 2,000,000 fish, and in addition to their regular equipment carry with them several small skiffs or striker boats used for following the schools after they have been located, and also a larger type of craft called seine boats which serve to carry nets and other paraphernalia to the point of operation. The nets are ordinary purse seines about 2,000 feet long and fifty to sixty feet deep, made of heavy twine of fairly small mesh and fitted with a ring attachment at top and bottom to hold them in place.

The steamers leave their berths in the early morning, spend the day cruising within ten or fifteen miles of the coast and put back to their home factory or into the nearest harbour at dusk. They are limited in range only by the necessity of discharging their cargo promptly, so that the cooking of the fish may be started before they begin to deteriorate. The transfer of the fish from the steamer's hold is accomplished by means of a bucket elevator into which the fish are fed, and carried to a revolving cylinder arranged to weigh or measure the mass before discharging it into the cooking machines.

Extracting the Crude Oil.

The cooking is done in a long cylinder about two feet in diameter, equipped with a screw conveyer that slowly forces the mass through the cylinder, while heat is being applied by means of steam jets in the bottom. This treatment breaks up the fish so that the oil will flow readily when pressure is applied and the soft, wet mass is then conveyed to the presses, which consist of a tapered screw fixed on a hollow shaft rotating inside a similar and parallel shaft called the curb. The mass moves forward and is pressed by the decreasing size of the screw and curb. It is subjected to steam pressure during its travel and drained both internally and externally.

Oil and water are caught in concrete basins beneath the presses and carried to receiving tanks for further treatment, while the remaining solid matter or scrap is deposited separately, dried, treated with acids and sold as fertiliser. Each press has a capacity of 100,000 fish per hour, and in each hundred pounds of material leaving the presses there are approximately four pounds of oil, forty-six pounds of water and fifty pounds of scrap.

The separation of the oil from the water is accomplished by means of a series of open tanks, each connected to take the overflow or skimmings from the preceding tank in the series, so that when the fluid has reached the last tank it is practically free from water. After separation has been accomplished the oil is heated to the boiling point for about thirty minutes, and then, after being allowed to stand for several days, exposed to the rays of the sun, it is run into storage tanks and held ready for shipment to the refiner.

Both the quality and yield of the oil depend primarily on the quality of the fish, which varies with the locality in which the catch is made, the season and the year. The best oil is obtained from the large, fat fish which are found usually in Northern waters towards the end of the fishing season, and a yield of eight gallons of oil per thousand fish is a fair average, though this figure will be exceeded under favourable conditions during the late summer. The quality of the oil also depends on the skill of the handlers at the factory, and the promptness and thoroughness with which the cooking and pressing is accomplished.

During recent years the fishermen have begun to realise the necessity of producing not only as much oil as possible per unit of fish, but also an oil of good quality as determined by its colour, odour, and clearness. This realisation on the part of the producer has resulted in a raising of the standard of their products, and a general improvement in every process in which fish oil is a component. The output of these seaboard factories is the crude oil of commerce, sold and delivered to the refiners in tank cars or barrels, from which it is dumped by them into storage tanks and drawn off as required for further refining.

Refining Menhaden Oil.

The treatment to which the crude oil is subjected by the refiner is a continuation of the process carried on at the fish factory, and consists primarily in heating it to a fairly high temperature and then slowly chilling it in order to allow the solid matter to congeal and separate from the oil. This is accomplished by drawing the oil from the storage tanks into steam-jacketed kettles, where it is heated for a period of about six hours to a temperature of 170°, during which time it is constantly agitated either by air or by mechanical means. This drives out the moisture and dissolves the crystals or foots which have formed in the oil during its stay in the storage tanks.

The oil is then drawn off into cooling boxes or pans and allowed to stand three or four days subject to a gradual reduction in temperature. The cooling is done by means of pipe coils with which the pans are equipped, and through which a circulation of cold water or brine is maintained. As the temperature of the oil falls the foots separate from it and remain in suspension until the oil is ready for filtering.

Filtration may be accomplished in several ways, but the method longest in use consists of straining the oil through a series of canvas bags hung on wooden racks over a group of sheet metal pans. The chilled oil is run by gravity into the bags, through which it drains into the pans below, the foots remaining inside the bags, while the clear oil passes through. Oil so accumulated is the first run of refined oil, and its quality depends on the temperature at which it is strained.

The foots is then removed from the bags, gathered in portable tanks of three or four barrels' capacity and carried to a press, where it is subjected to a pressure of about 3,000 pounds for a period of eight or ten hours, the work usually being done at night, since no labour is required other than an occasional inspection of the gauges. The oil thus separated from the foots is collected in pans beneath the presses, and is known at the refinery as hydraulic oil because of the type of press used. Its quality again depends on the temperature under which it

* From article by Paul T. Bruyere in the *Oil, Paint, and Drug Reporter*.

is pressed, but regardless of this factor it will usually show a few degrees weaker in cold test than the oil obtained from the first straining through the canvas bags. During recent years attempts have been made to separate the oil and foots by centrifugal force, but the result has not been entirely satisfactory. Some foots can be removed in this way, but not enough to leave the oil clear. An oil having a cold test of about 42° F., is the best that has been obtained by the centrifugal method, and in spite of many experiments in this direction the ordinary straining and pressing process continues to stand alone in producing a uniformly reliable, low, cold test oil free from moisture and foreign matter. The oil so obtained should show a cold test of from 30 to 32° F., with other physical properties as indicated in the following tabulation of properties of ordinary winter-pressed menhaden fish oil: —

Free fatty acid	3.64
Saponification value	196.5
Iodine value	188.5
Colour	0.4
Gravity Baume	20.4
Gravity specific	0.9307
Pounds per gallon	7.75
Flash (deg. F.)	515
Fire (deg. F.)	635
Viscosity at 100° F.	128
Viscosity at 210° F.	50
Cold test (deg. F.)	28
Cloud test	34

These tests were determined from a sample of oil worked during the month of November, and slight variations may be expected in oil worked during either colder or warmer weather.

Bleaching and Blowing the Oil.

The refined oil as obtained from the straining and pressing processes is stored in closed tanks, from which it is drawn for blending or for direct delivery to the consumer in tank cars or barrels as required. Certain consumers require particularly light-coloured oil or perhaps a high viscosity, in which cases the pressed oil may be either bleached or blown, or both, to satisfy the demand. Bleaching is accomplished by filtering the oil with fuller's earth or by cooking it with an alkali.

In the fuller's earth process, oil is mixed with the earth and forced through an ordinary horizontal filter press consisting of a series of canvas sheets hung vertically between perforated metal plates, so that the clear oil runs through the perforations into adjacent pans, while the compressed earth and foreign matter adheres to the canvas sheets. This has the effect of lightening the oil several shades in colour, and also clarifying it to a considerable extent.

In the alkali process the oil is mixed with caustic soda, and subjected to heat in an open kettle which produces practically the same results as filtering with fuller's earth, and also tends to cut down the acidity of the oil and to create soap in proportion to the acidity of the oil used. A low acid oil is therefore usually treated by filtration in order to bleach it, and a high acid oil is treated by the alkali process in order to produce soap. In the latter case the resulting bleached oil is separated from the soap by skimming it off the top, and the quality of the oil so bleached is equal in every way to that obtained from the filtration process, but the quantity obtained is considerably less. Oil bleached by either process is sometimes transferred to shallow pans and allowed to stand for several days exposed to heat and to strong rays of sunlight, which treatment clarifies it still further by removing the last traces of moisture and further lightening its colour.

Blown fish oil is obtained by forcing a strong current of compressed air through the oil while it is hot. A special blow tank is used for this purpose, usually a tall tank of relatively small diameter equipped with a steam jacket and with a ventilator arranged in the top. The tank is filled with oil, gradually heated to about 160° F. and agitated by means of a column of compressed air entering through the bottom, the agitation or blowing being maintained until the oil has absorbed enough oxygen to thicken it to the desired gravity or viscosity as the case may be. This treatment increases the acidity of the oil, darkens its colour, partially deodorises it and shrinks its volume.

Utilisation of the Foots.

In one or another of these forms all the refined oil derived from the crude is accounted for, but there is another usable product remaining after the refining of the oil, and that is the foots. Foots is a chemical ingredient of the crude oil appearing as solid matter when chilled, in quantities varying in direct proportion to the temperature at which straining takes place. Approximately 10 per cent. of the crude oil by weight is foots, and it must not only be removed from the oil in order to make the oil commercially valuable, but may itself be refined and used as a base for making soap.

The foots remaining in the hydraulic presses after the oil has been discharged is in the form of a solid cake, dirty brown in colour and granular in structure. This cake is dumped into a kettle and bleached with soda in a manner similar to that followed in bleaching refined oil by the alkali process. The product as it appears in the kettle after treatment is a clear blackish fluid which is drawn off from the top while still hot and filled into barrels. As its temperature falls it congeals into a hard, silky, white substance known as bleached fish foots, or fish stearine, and is used not only in making soap but also as an ingredient of certain kinds of greases.

Cost of Fish Products.

Demand for refined fish oil products in an average year just about equals supply, but both elements are subject to fluctuation. Demand varies with general business conditions as reflected in the manufacturing industries, and supply varies with the weather and other conditions affecting the catch of menhaden during a given fishing season. Owing to these circumstances the price of fish oil products is not altogether a matter of the actual cost of refining them, but is rather a question of whether the fishing season will produce enough fish to satisfy the demand for oil, and the producer's sales price varies accordingly. Similarly, no fixed relation exists between the demand for refined fish oil and the demand for the by-products, foots and soap. The result is that the refiner sometimes finds himself forced to sacrifice foots and soap, although they have been made from high priced oil.

Uses of Menhaden Oil.

Fish oil is largely used in the paint trade in combination with linseed oil and also as a direct substitute for it. Their general characteristics are somewhat similar, but in addition fish oil has a greater tendency to resist heat so that it may be used to advantage in paints for smokestacks, boiler fronts, and other iron work exposed to relatively high temperatures. It often replaces linseed oil in the manufacture of patent leather, printing inks, japans, linoleums, cork flooring and products in which its quick drying and binding qualities are valuable.

During recent years fish oil and foots have been successfully hydrogenated, and chemists are now applying their ingenuity to the problems of converting it into an edible product. With continued efforts in this direction, there is reason to hope that this result will be accomplished before many years have passed.

METHYL ALCOHOL IN ETHYL ALCOHOL.

SIMPLE METHOD OF DETECTION.

PROFESSOR M. R. MEURICE of the Institut Agronomique of Gembloux (Belgium) suggests a method (*Annales de Chimie Analytique*, July 15, 1923) for the detection of methyl alcohol in ethyl alcohol, which has certainly the merit of simplicity although it possesses the limitation of not being sensitive to lower proportions of methyl alcohol than 3 per cent. in the mixture.

Professor Meurice found that if 10 ccs. of ethyl alcohol of 95° were shaken vigorously in a test tube of about 30 ccs. capacity with 10 ccs. of a 20 per cent. aqueous solution of neutral ammonium sulphate, at a temperature of about 18° C. and the mixture then allowed to rest for a couple of minutes, two layers of liquid formed. The lower and least voluminous layer consisted of an almost saturated solution of ammonium sulphate, whilst the upper layer was the alcohol which had become diluted. After standing some time the lower layer became opalescent and finally deposited a few crystals of the sulphate.

When however the above experiment was repeated with ethyl alcohol containing 10 per cent. of methyl alcohol separation into two layers did not take place, but a voluminous precipitate of ammonium-sulphate crystals was formed. With an ethyl alcohol containing only 3.5 per cent. of the lower homologue, the formation of the two layers was not observed, but an abundant crop of crystals was noted. Further experiments showed that, as mentioned above, the reaction was not reliable for amounts of methyl alcohol lower than 3 per cent.

CORRESPONDENCE.

*** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE BRITISH CHEMICAL PLANT MANUFACTURERS' ASSOCIATION.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—With regard to your editorial remarks on my speech to the B.C.P.M.A. under the title, "Chemical Plant Manufacturers' Grievances," in the issue of the *Chemical Trade Journal and Chemical Engineer* for August 10, I would suggest that the conclusions you have drawn are hardly warranted from a study of a full report of the speech for the following reasons:—

In the first place, I stated that we should have been housed in the Chemical Section of the British Empire Exhibition, which means that the A.B.C.M. had invited us to join them; but our Association, as an Association, had decided not to show, some of the members being committed to other sections, although some individual members are taking advantage of the opportunity extended to them by the parent Association. Far from the relations between the A.B.C.M. and B.C.P.M.A. "not being closely knit," as is suggested in your note, the relations between these two bodies are most cordial.

In the second place, the two associations being composed of business men, they are, of course, unlikely to attempt to coerce one another. The real inference is "propaganda," as you will see at the end of the paragraph (in the speech) "trading with the members." I shall be glad if you will kindly insert this letter in your next issue to remove any misleading impression, which I am sure you would be unwilling to create.—Yours, etc.,

L. M. G. Fraser,
(Chairman.—The British Chemical Plant Manufacturers' Association).

166, Piccadilly, London, W. 1,
August 20, 1923.

[We are obliged to Mr. Fraser for explaining the true state of the relationship between the A.B.C.M. and the B.C.P.M.A., and are pleased to learn that such relationship is on a most cordial basis. The summary of Mr. Fraser's speech, as circulated to the Technical Press, certainly gave the opposite impression.—*Ed., C.T.J. and C.E.*

BRITISH BARYTES PRODUCTION.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I have read with much interest your remarks under the heading of "Bleached Barytes" in the issue of the *Chemical Trade Journal and Chemical Engineer* of August 10. It is true there are many large deposits of excellent barytes in this country, and it is somewhat surprising that the bulk of the large quantity that is used in this country is imported.

The principal reason why more is not done to make the country independent of foreign supplies is that the barytes industry is not able to interest capital for development purposes. Prior to the war the greater portion of the barytes used in this country was imported. During the war the supply was, of course, shut out, with the result that the English production of barytes increased tremendously, somewhere round about 80,000 tons being produced per annum, I believe. Immediately after the war, when the barytes industry was in a very prosperous state, there were several schemes afoot for the building of large modern plants for producing from 250 to 300 tons per week.

With the slump in trade, however, and the English barytes market again flooded with Continental barytes (Continental producers having the advantage of the depreciated rate of exchange), the home producer has been very adversely affected, and the result has been somewhat disastrous for the English barytes industry.

The average barytes plant in this country does not operate on a very large scale, and produces about 40—60 tons per week, the bleaching of the barytes being carried out in a coarse state with acid in lead-lined tanks. The barytes is then washed, spread out on a drying floor, and afterwards ground in ball mills and burr stone finishing mills, and in a few cases Raymond and Griffin mills are installed. With the process used and size of plant, the cost per ton for grinding comes out very high when compared with the large plants as operating abroad, which require practically no labour.

The bleaching of barytes and question of extremely fine grinding, as stated in your *Journal*, are more or less simple, and neither operation presents any serious technical difficulty. Since the Armistice I have been actively associated with several schemes for establishing in this country large modern barytes plant, but due to the present state of trade the projects have not advanced. In my opinion, a barytes plant operating in this country on the same scale and process as used abroad would undoubtedly produce, with a good margin of profit, a product of standard quality, and equal, if not superior, to any imported material.—Yours, etc.,

20, Cooper Street, Manchester. L. A. Mitchell.
August 16, 1923

LEGAL INTELLIGENCE.

ESSENTIAL OIL MERCHANTS' FAILURE.

Gerald Bromage and Co., Ltd.

The creditors interested in the voluntary liquidation of the above company, of 9-10, Foster Lane, London, E.C., dealers in essential oils, etc., met on August 17. An approximate statement of affairs was presented, which showed liabilities of £2,680., of which £2,669. was due to unsecured creditors, almost entirely for goods supplied. The assets were estimated to realise £804., or a deficiency as regarded the creditors of £1,876. The stock consisted principally of synthetics, essential oils, spices, and drugs. It was all marketable, although at the moment the prices of such goods were down. The company was formed in June, 1921, with a nominal capital of £5,000., in £1. shares, and took over the business of G. Bromage, which had formerly been carried on at Lower Thames Street. The directors were G. Bromage and F. L. Gibbins. During the period ended June 30, 1922, the turnover was £22,150., with a gross profit of £1,580., but after allowing for all expenses there was a net loss of £1,126. The principal creditors were the Chemische Fabrick Naarden, who were scheduled for over £1,700., and who had recovered judgment for £1,650. The company had acted as agents for the Naarden Co., and had disposed of quantities of goods for them. The present position had been brought about principally, if not entirely, by the slump. He was afraid that there was no question of a reconstruction or of any offer being made.

After a short discussion a resolution was unanimously passed confirming the voluntary liquidation of the company, with Mr. Middleton, of 195, Strand, London, W.C., as liquidator, while an advisory committee of three of the creditors was appointed.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," August 25, 1888.)

Magnesia Cement.—The need of finding some use for the refuse magnesia salts arising as by-products in the manufacture of potash at Stassfurt has caused the subject of magnesia cement again to attract attention. Dr. Grundmann, of Hirschberg, has recently invented a new method of treating the magnesia, for whereas formerly the material was merely calcined, and made up with water, he now carefully slakes the calcined magnesia, and subsequently exposes the compound or casting to the action of carbonic acid gas, much in the same way that builders have been in the habit of drying and hardening plastered rooms by confining the air, and burning coke in them so as to liberate carbonic acid gas. The natural carbonate of magnesia, known as magnesite, is a mineral of great hardness and density, and the similar substance obtained by the above treatment resembles magnesite in its hardness and in its capacity for taking a good polish. Grundmann also employs the magnesia as a cementing agent for various materials, for instance, by the use of marble dust an artificial dolomite is obtained. The magnesia can also be improved by adding to it soluble silicates of the nature of water glass, and it can be used as a stucco for building purposes.

ITEMS OF INTEREST.

Oil in Tasmania.—The Tasmanian Government geologist, says a Reuter's telegram from Hobart, estimates the Tasmanian oil shale reserves situated in five separate fields at 42 million tons, capable of yielding 40 gallons of crude oil per ton, or enough to supply Australia for twenty years.

Transvaal Platinum Discovery.—It is reported that discoveries of platinum have been made in the Waterberg district of the Transvaal. The reef has been traced for thirty miles and samples have been obtained showing 46 per cent. of platinum and payable gold.

Tariff Notes.—A Greek Decree modifies as from July 15 the import duties on the following articles:—Sodium sulphate, sulphide, hyposulphite and hypochloride, chloride of lime, manganese chloride, naphthalene, paraffin wax, stearine candles, paraffin wax candles, specified toilet soaps, quinine, quinidine and cinchona bark.

South Wales Tinplate Amalgamation. — The Grovesend Steel and Tinplate Company, Limited, announce that they have purchased the Duffryn Steel and Tinplate Works, of Morriston, the Mardy Tinplate Works, of Gorseinon, and the Dynevor Tinplate Works, of Pantyffynon. The purchase price, including stocks, will approximate £600,000.

French Iron and Steel Industry.—According to statistics published by the Comité des Forges, the number of blast-furnaces alight in France on July 1 was 106. In the whole country 7 blast-furnaces were relighted during the month of June, of which three were in the East, two in Alsace-Lorraine, one in the South-west and one in the West. The production of pig-iron during June was 447,013 tons, or an increase of 53,585 tons on the production of the preceding month. The production of steel showed an increase of 39,151 tons compared with May, reaching in June a total of 427,600 tons.

Sewage Purification and River Pollution.—At their last meeting the Mersey and Irwell Joint Committee considered some figures which showed that out of twenty-five samples of effluents from manufactories which the chemical adviser had analysed during the last two months four were reckoned fair, four unsatisfactory, and seventeen bad. Of the sixty-eight samples of effluents from the treatment of sewage, eight were good, twenty fair, five unsatisfactory, and thirty-five bad. The chief inspector to the Joint Board has stated that these figures are not representative of the whole watershed. There is no doubt that the work of sewage purification in the Mersey and Irwell district is much more efficiently done now that it used to be.

Fire.—A serious fire occurred on Sunday night at the works of the Shelton Iron, Coal, and Steel Company's works at Etruria, Stoke-on-Trent. It was observed shortly before eight o'clock in the coking and by-products plant and spread with great rapidity. The Hanley Fire Brigade was quickly on the scene, and, assisted by workmen, got the outbreak under control by ten o'clock. By this time the roof of the premises had been almost completely destroyed and considerable damage done to the plant itself. The coking plant was being extended by the company at an estimated cost of £120,000. When completed it would have been one of the largest of its kind in the Midlands for the carbonising of coal and the production of benzol and other by-products on a large scale. The origin of the fire is unknown.

British Standardised Steel Samples.—Standards issued jointly by the Iron and Steel Institute and the National Physical Laboratory, and at present available are No. 1.—Sulphur (S. = 0.027 per cent.). No. 2.— Sulphur (S. = 0.071 per cent.). No. 3.—Phosphorus (P. = 0.029 per cent.). No. 5.—Carbon (C. = 0.65 per cent.). Acid Open-Hearth Steel. No. 6.—Carbon (C. = 0.10 per cent.). Basic Open-Hearth Steel. These samples are supplied, post free, at 21s. per bottle containing 50 grammes, together with certificate of standardisation. They can be obtained, by sending order with remittance, direct from the National Physical Laboratory (Metallurgy Dept.), Teddington, Middlesex, or by post or application from Dr. C. H. Desch, Department of Applied Science, the University, Sheffield; Dr. C. A. Edwards, the University College, Swansea; Colonel E. L. Johnson, Cleveland Technical Institute, Middlesbrough; D. A. MacCullum, West of Scotland Iron and Steel Institute, 93, Hope Street, Glasgow. Other samples are in preparation and will be issued when ready.

Obituary.—It is with regret that we learn of the death on the 26th ult., as the result of a motor accident, of Richard T. Statham, late partner of John Statham and Sons, manufacturers of acid-resisting stoneware.

Canadian Exports of Chemicals.—Exports of chemical products from Canada during the year ended June 30, 1923, amounted to $15,167,316, as compared with the total for the preceding twelve months of $9,540,024.

Low-temperature Carbonisation.—It is reported that Professor Illingworth, of the South Wales School of Mines, has now completely worked out the details of his new process for the low-temperature carbonisation of small coal. It is claimed that the new fuel has proved to be equal to the best Welsh coal for steam raising.

Trade with Morocco. — The Vice-Consul at Casablanca, Morocco (Mr. C. G. Hope Gill), who is now on a visit to the United Kingdom, will be pleased to interview firms interested in trade in Morocco (Tangier and Casablanca districts) at the Department of Overseas Trade during the mornings of August 25 and 27. British firms who desire to take advantage of this opportunity are requested to communicate with the Comptroller-General, 35, Old Queen Street, London, S.W. 1, quoting Ref. 4,879/TG.

Casein Production in U.S.—The output of casein in the U.S. for the year 1922 was 6,907,000lb. This amount was produced by 74 factories. The production for the first quarter of 1923 as reported by 92 factories was 2,037,000lb., while the production for the same quarter of 1922 from 64 factories was 1,166,000lb. This shows that there was a large increase in the production of casein, and in the amount produced per factory, while the number of factories indicates an increase of nearly 50 per cent.

Research in Wool Textiles.—The British Research Association for the Woollen and Worsted Industries announces that for the year 1923-24 Research Fellowships have been granted to Robert Burgess, to carry out investigations on the damage and deterioration caused by bacteria and fungi on woollen goods and yarns during storage, and H. E. Farrar, to conduct research as to the dyeing of wool with acid and mordant colours. Advanced scholarships have been granted to S. Menzer, tenable at the University of Leeds; T. N. T. Graham, tenable at the Scottish Woollen Technical College, Galashiels; P. M. Redman and W. Lee, tenable at the Bradford Technical College.

Atmospheric Pollution Report.—Classified results of investigation into the amount and nature of impurities deposited from the atmosphere at about thirty experimental stations in different parts of the country are given in the eighth annual report of the Advisory Committee on Atmospheric Pollution. Improvements in the form of the standard gauge used in the estimation of suspended matter are described, with particulars of a new and inexpensive gauge now available. A series of experiments to ascertain the direction from which the maximum amount of impurity emanates is recorded, and a description is given of a new portable instrument for the rapid sampling of atmospheric dust, for subsequent microscopic examination and counting of the particles, together wih photo-micrographs magnified up to two thousand diameters.

Mineral Salts in Canada. — The Mines Branch of the Canadian Department of Mines, Ottawa, report the natural occurrence of soluble mineral salts in the provinces of Manitoba, Saskatchewan, Alberta, and British Columbia, either in the form of bedded deposits or as brines. Some are of considerable extent, and are probably of sufficient size to warrant commercial exploitation, provided economical methods of recovery can be developed, and sufficient markets established. The occurrences of these salts may be broadly classed under two types:—(1) Solid salts and brines in undrained or partially drained basins; (2) brines of flowing streams or springs. The composition of the salts occurring in the basins consists chiefly of mixtures of sodium and magnesium sulphates, with, generally, small quantities of sodium chloride, sodium carbonate, calcium carbonate, and calcium sulphate, etc. The brine streams or springs occur in many places, and may carry sufficient salts in solution to warrant their exploitation for medicinal and other purposes. In some of the occurrences the principal salt present is sodium chloride, the other salts being present only in small quantities. The brine springs of northern Manitoba are good examples of this class of deposit

Business Notice.—The goodwill; plant, and stocks of the United Brassfounders and Engineers, Ltd., have been purchased by Hattersley, Ltd.

British Coal Output.—The coal output from the mines of Great Britain during the week ending August 11 (which included Bank Holiday) was 3,566,400 tons, as compared with 5,253,600 tons in the preceding week. The output for the Bank Holiday week last August was 3,623,200 tons.

Unemployment Figures.—The number of persons on August 13 recorded on the live registers of the Employment Exchanges in Great Britain as wholly unemployed was 1,211,900. This week was 20,074 more than in the preceding week, but 273,978 less than the figure recorded on January 1, 1923.

Cement Companies' Merger.—It is reported that negotiations have been concluded for the acquisition of the Humber Portland Cement Company by the British Portland Cement Manufacturers, Ltd. Although details have not been published, it is understood that the Humber Company's shares are being acquired at 30s. each.

Cement Production in China.—A cement manufacturing company, under the name of Chiang Hwa Company, Ltd., is in course of organisation. Works are to be established in Liaoyang, Fengtien. The material for manufacture is obtained from Penlashantze. A capital of 1,000,000dols., to be divided into 100,000 shares of 10dols., is open for subscription.

Magnesium Production in U.S.—The U.S. Tariff Commission has ordered an investigation of costs of production of magnesium with a view to a possible change in rate of duty, as a result of an application by the American Magnesium Co. of Niagara Falls, N.Y., which has asked for an increase in the tariff duty. The corporation is said to be producing magnesium by a new process and at lower cost.

Cupferron for Determination of Uranium.—Cupferron is a complicated hydroxylamine derivative, which has been used largely in determinations of iron. Holladay and Cunningham, of the Union Carbide and Carbon Research Laboratory, presented to the forty-third meeting of the American Electrochemical Society a study of the application of the reagent to uranium determinations. They find that in solutions containing from 4 to 8 per cent. of sulphuric acid, uranium can be quantitatively precipitated in the presence of aluminium, calcium, magnesium, and phosphates. The precipitate is $U(C_6H_5N_2O_2)_4$, which by ignition is converted into U_3O_8.—*Journ. Franklin Inst.*

Silica Deposits of Eastern Canada.—We are informed by the High Commissioner for Canada that the Department of Mines at Ottawa has just published a report on the silica deposits of Eastern Canada. This report, by L. Heber Cole, discusses the occurrence, exploitation, and uses of the silica, and describes in some detail the various deposits in Eastern Canada, including many which, though now undeveloped, may in the future become of considerable industrial importance. The principal markets for silica in Canada are in the large industrial centres of the Dominion, such as Montreal, Toronto, Hamilton, etc. There are many deposits favourably situated in the Provinces of Ontario and Quebec which, if properly operated, should be able to compete readily with similar material which is at present being imported into Canada from the United States.

Glasgow Corporation Chemical Works. — In his fourth annual report on the Glasgow Gas Committee's Chemical Works Department, Mr. W. A. Walmsley (the Manager) states that the result of the year's work has been very satisfactory. The reorganisation and extension scheme, laid down in 1920, is completed; and all new plant has now come into full operation. The prices obtainable for sulphate of ammonia have been considerably better than those realised during the financial year 1921-22. This, coupled with reductions in wages and in cost of raw materials used in manufacture, has resulted in a considerable increase in the net revenue obtained from the ammonia products. Tar and tar products prices for the first three or four months remained fairly stationary. Towards the end of September, owing to shortage, markets became stronger and firmer, and prices steadily advanced. During the last six weeks of the financial year, prices fell somewhat, but they still maintain a fairly high level. After paying all working expenses, etc., the net revenue is £275,568., an increase of £109,948. as compared with last year.

ITALIAN CUSTOMS DUTIES.

MODIFICATIONS AFFECTING THE EXISTING TARIFF.

ACCORDING to an Italian Decree-Law dated July 11 last, provision was made for certain tariff modifications, and these modifications, in so far as they affect the chemical trade, are tabulated below. This table, therefore, shows the amendments made in the General Tariff as established by the Royal Decree of July 9, 1921. The amendments affect, in certain cases, the tariff nomenclature, and also the rates of duty. For the most part, states the Board of Trade *Journal*, from which this table is extracted, the duty alterations are in the nature of reductions of the previous general rates, such reductions being generally effected by reducing the tariff "coefficients." The "coefficient of increase" indicates the figure by which the tariff duty is to be multiplied to determine the amount to be added in order to arrive at the total duty payable; thus a coefficient of 0.5 indicates that the tariff duty is to be increased by 50 per cent.

Tariff No.	Articles.	Import Duty (Gold Lire).	Coefficient of Increase.
		Lire. c.	
669	Bromine ..... 100 kilogs.	2 00	—
671	Phosphorus, white and red, and sulphides of phosphorus ..... 100 kilogs.	50 00	0·5
672	Acids:		
	Hydrochloric	Free	—
	Sulphuric	Free	—
679	Oxides:		
	Of aluminium:		
	1. Anhydrous ..... 100 kilogs.	10 00	1
	2. Hydrated (including gelatinous alumina) 100 kilogs.	5 00	1
	Of thorium and cerium ..... kilog.	4 00	—
	Of zinc ..... 100 kilogs.	8 00	1
680	Carbonate of soda:		
	2. Crystallised ..... 100 kilogs.	2 00	0·2
686	Chloride of barium ..... 100 kilogs.	5 00	1
694	Lithopone ..... 100 kilogs.	10 00	0·6
700	Hydrosulphites, not specified elsewhere, and their derivatives ..... 100 kilogs.	20 00	0·5
701	Silicates of potash and of soda:		
	Solid or in solution containing less than 50 per cent. of water ..... 100 kilogs.	2 50	1
	Liquid or in solution containing at least 50 per cent. of water .... 100 kilogs.	1 00	1
710	Salts of thorium and of cerium ..... kilog.	2 00	—
712	Oxygenated water. Vol. of oxygen per 100 kilogs.	0 40	0·5
715	Chemical fertilisers, nitrogenous:		
	Calcium cyanamide ..... 100 kilogs.	3 00	—
	* Nitrate of ammonia, impure, for agriculture ..... 100 kilogs.	1 00	—
715	Potassic chemical fertilisers	Free	—
721	Glycerine:		
	Crude ..... 100 kilogs.	5 00	—
	Refined ..... 100 kilogs.	8 00	1
740	Tartrates, not specially mentioned.. 100 kilogs.	10 00	0·6
742	Formaldehyde:		
	In solution up to 40 per cent. .. 100 kilogs.	15 00	0·2
	Other..... 100 kilogs.	30 00	0·2
748	Aniline derivatives, not specially mentioned ..... 100 kilogs.	200 00	0·2
750	Naphthalene derivatives, not specially mentioned ..... 100 kilogs.	200 00	0·2
752	Benzidine ..... 100 kilogs.	200 00	0·2
753	Tolidine, dianisidine, ortho- and para-toluidine ..... 100 kilogs.	200 00	0·2
754	Xylidine ..... 100 kilogs.	200 00	0·2
755	Phenylenediamine, phenetidine, anisidine ..... 100 kilogs.	200 00	0·2
756	Derivatives of benzidine, toluidine, tolidine, dianisidine, xylidine, phenylenediamine, phenetidine, and anisidine, not specially mentioned 100 kilogs.	200 00	0·2
758	Resorcin ..... 100 kilogs.	200 00	0·2
759	Naphthol (alpha and beta) ..... 100 kilogs.	200 00	0·2
760	Derivatives of naphthol and of naphthylamine, not specially mentioned 100 kilogs.	200 00	0·2
761	Derivatives of phenic acid, not specially mentioned ..... 100 kilogs.	200 00	0·2
762	Benzaldehyde and derivatives ..... 100 kilogs.	200 00	0·2
764	Derivatives of benzol, toluol and xylol, not specially mentioned ..... 100 kilogs.	200 00	0·2
766	Quinine and other bases from Peruvian bark and salts thereof:		
	Quinine and other bases from Peruvian bark, and sulphate of of quinine	Free	—
	Other salts of quinine..... kilog.	10 00	—
795	Organic synthetic colours:		
	Sulphur colours:		
	1. Black ..... 100 kilogs.	80 00	0·2
	2. Other ..... 100 kilogs.	100 00	0·4

* *Sulphate and nitrate of ammonia.*—The Decree authorises the Government to impose, within a period of six months from the enforcement of the present Decree, and for a period of six years, a coefficient of 3 on Tariff No. 715*b* 4 and 5 [sulphate of ammonia and nitrate of ammonia, impure, destined for agricultural purposes], and to modify correspondingly the treatment of ammoniacal liquor.

Index to Advertisers.

	PAGE
Adlam, Geo., and Sons, Ltd.	13
Allen, Marcus & Sons, Ltd.	44
Australian Alum Co., Ltd.	27
Bakers (Leeds) Ltd.	7
Baldwin, J., and Co.	6
Balston, W. & R., Ltd.	7
Bandon & Morris	iv
Bayley, F. S., Clanahan & Co.	27, 42
Benker & Millberg	5
Berk, F. W., and Co., Ltd.	24
Blackwell, G. G., Sons & Co., Ltd.	1
Blagden, Victor, and Co., Ltd.	14
Blair, Campbell & McLean, Ltd.	1, 20
Blythe, Wm., and Co., Ltd.	33
Boake, A., Roberts & Co., Ltd.	1, 15
Borax Consolidated, Ltd.	1, 20
Bottomley, J. C., and Emerson, Ltd.	42
Braby, F., and Co., Ltd.	16
British Hydrogen Co.	1
British Oxygen Co., Ltd.	9
Brotherton & Co., Ltd.	18, 36, 37
Brothers Chemical Co. (1922) Ltd.	37
Brown, J. M.	36, 37
Brown, H. G., and Co.	34
Bruce, W. T., and Co.	37
Brunner, Mond & Co., Ltd.	4
Buckley Brick and Tile Co., Ltd.	29
Burton, Baker and Co. Ltd.	33
Burton, Wm., and Sons, Ltd.	31
Bush, Beach & Gent, Ltd.	19
Buyer's Guide	38 39 40 41
Capper, Pass & Son. Ltd.	1, 37
Castner, Kellner Alkali Co., Ltd.	35. 42
Centrifugal Separators, Ltd.	25
Chance & Hunt, Ltd.	12
Christie & Co.	7
Christopherson, C., & Co.	16
Cole, Marchant & Morley, Ltd.	21
Collett, J. M., and Co., Ltd.	36
Comp. Com. Du Nord Ltd.	7
Cortin, J., Ltd.	1
Crone & Taylor, Ltd.	4
Cruickshank, R., Ltd.	17
Daglish, R., and Co., Ltd.	1
Dekker, J.	37
Dore, J., and Co.	9
Douglas, W., and Sons, Ltd.	5
Doulton & Co., Ltd.	27
Drug and Chemical Markets	21
Elcho Chemical Engineering Co., Ltd.	31
Electro Bleach and By-Products, Ltd.	6
Everitt & Co., Ltd.	36
Fletcher, Geo., and Co., Ltd.	7
Follows & Bate, Ltd.	17
Frickers Metal Co., Ltd.	16, 37
Fuller, W. N., junr.	5
Gardner, H., and Co., Ltd.	10
Gardner, Wm., and Sons, Ltd.	17
Garroway, R. & J.	31
Gibbons, Robert	36
Grey & Marten, Ltd.	24
Griffiths Bros. & Co. (London), Ltd.	1
Guthrie & Co.	6
Hadfield, J., and Sons, Ltd.	1
Hallams Ltd.	37
Harrison Blair & Co., Ltd.	30
Harrison, W., and Co., Ltd.	36
Hathern Station Brick and Terra Cotta Co., Ltd.	9
Haughton's Patent Metallic Packing Co., Ltd.	23
Heymann, Harry	iv
Hind & Lund, Ltd.	39
Honeywill Bros., Ltd.	30
Houlder, W., Son & Co.	4
Huncoat Plastic Brick & Terra Cotta Works	17
Hunt, J. T., and Son, Ltd.	36
Huntington, Heberlein & Co., Ltd.	29
Igranic Electric Co., Ltd.	28
International Electrolytic Co., Ltd.	10
Jenkyns, C. P.	iii
Johnson, S. H., & Co., Ltd.	44
Johnson and Sons, M'f'g. Chemists, Ltd.	2
Keeling Oxides (1921), Ltd.	2
Keeling & Walker, Ltd.	36
Kestner Evap. and Eng. Co., Ltd.	8
Lankshear, Wickstead & Co., Ltd.	36
Le Bas, Ed., and Co., Ltd.	6
Leigh, R. & H., and Sons, Ltd.	2
Lennox Foundry Co., Ltd.	3
Lewis, H. K. and Co., Ltd.	31
Locke, Blackett & Co. Ltd.	31
Lowe, Chas., and Co.	27
Major & Co., Ltd.	3
Manchester Oxide Co. Ltd.	17
Manlove, Alliott & Co. Ltd.	28
Mann, Egerton & Co., Ltd.	41
Mason, A., and Sons, Ltd.	5
May & Baker, Ltd.	26
McCarthy Ltd., H. G.	33
McKechnie Bros., Ltd.	42
Merchant Trading Co. Ltd.	i
Metcalf, Wm., Ltd.	42
Miscellaneous Advertisements	ii, iii, iv
National Gas Exhibition.	33
Neill, W., and Son, Ltd.	1
Newcastle Alloy Co. Ltd.	37
Nicholsons (Newcastle-on-Tyne), Ltd.	1
Oxley, J. C.	9
Page, C., and Co., Ltd.	26, 32
Patent Hygienic Strainer Co.	32
Paus & Paus	41
Perry and Hope, Ltd.	37, 42
Petri Bros.	11
Pieterse, H. P.	iv
Potter, E. P., & Co., Ltd.	42
Premier Filter Press Co.	31
Ransome, A., and Co., Ltd.	39
Reeve, H., Angel & Co., Ltd.	7
Riley, W.	36
Riley, J., and Sons, Ltd.	34
Ritchie-Atlas Eng. Co.	31
Rose, J. L.	37
Sachs, C.	10
Salamon & Co., Ltd.	3
Scales, W. T., and Co., Ltd.	26
Sharp, Alph.	32
Sheffield Chemical Co., Ltd.	42
Sherman, J., and Co., Ltd.	11
Simon, R., and Sons, Ltd.	5
Sofnol Ltd.	30
South Metropolitan Gas Co.	4
Spence, P., and Sons, Ltd.	5
Spencer Chapman & Messel Ltd.	35
S.S. Mond Gas Co.	32
Staniar, J., & Co.	36
Statham, J., and Sons	29
Staveley Coal and Iron Co., Ltd.	25
Steel Barrel Co., Ltd.	23
Sturge, J. & E. Ltd.	42
Sturtevant Engineering Co. Ltd.	i
Todd Bros.	7
Townsend, J., Ltd.	11
United Glass Bottle Mfrs. Ltd.	6
Vickers, Ltd.	2
Waller, G., and Son	31
Ward, T. W., Ltd.	15
Warrington Chemical and Drug Co.	37
Washington Chemical Co., Ltd.	24
Watson, H. T.	iv
Waugh, W., and Co.	11
Western Chemical Co. (Paisley) Ltd.	24
White, J. & J., Ltd.	32
White, R., and Sons	42
Widnes Foundry Co., Ltd.	34
Wilkinson, J., and Son	24
Willcocks, H. S., and Co., Ltd.	26
Womersley, A., and Son, Ltd.	36

REPORTS OF COMPANIES.

Minerals Separation, Ltd.

During the year 1922 the expenditure exceeded income by £18,812. The accounts show that, including a refund of £9,785. for income tax, a credit balance of £12,914. was brought in, which, deduced from the above deficit, leaves a debit balance of £5,899. to be carried forward. The directors state that the year's loss is due to the fact that large plants for the use of the coal cleaning and briquetting processes and of the new ore reduction process are not yet in operation, while the situation as regards the metal industries generally has shown very little improvement. The first plant to use the company's new coal briquetting process has been erected at Nantes, France, by the Compagnie Francaise des Mines Powell Duffryn, and was put into operation last month. The results, it is stated, were excellent. The dividend of the Australian company was increased during the year. It is expected that the results of the working of the company's processes at the Modderfontein Deep Levels, Ltd., will be available before the end of the year. Copper fields are being opened up under the company's supervision in Northern Rhodesia. The results of a trial of the new ore reduction process with ore from these fields are expected during next month.

Calico Printers' Association, Ltd.

The net profit for the year ended June 30 amounted to £800,208., and with £237,371. brought forward, the total to the credit of the profit and loss account is £1,037,579. The directors propose a dividend of 10 per cent. for the year on the ordinary shares, with the addition of a bonus of 2½ per cent. A sum of £150,000. is placed to the general reserve, and a similar sum to the fund for equalising dividends, while £100,000. is added to the employees' benefit fund. The balance to be carried forward is £235,432. The previous accounts covered a period of two years to June 30, 1922, and showed a net profit of £503,542. For the former of these years the dividend on the ordinary shares was 5 per cent., while for the latter it was 7½ per cent., and a sum of £50,000. was added to employees' benefit fund.

Virginia Carolina Chemical Company.

Accounts to May 31 show net loss, after providing for depreciation, bond interest, and guaranteed dividend of 7 per cent. on consumers' chemical corporation preferred stock, of 2,894,326 dollars. Surplus brought forward was 6,295,449 dollars; add 15,741,225 dollars arising from reduction of valuation of common capital stock. After deducting loss, a special provision of 2,400,000 dollars for doubtful accounts, 5,059,608 dollars cost of retirement of old bonds, and cost of new issues, and 226,034 dollars miscellaneous adjustments, surplus stands at 11,456,704 dollars.

B. Laporte, Ltd.

The net profit for the year ended June 30 was £20,714. (against £17,586. for the preceding year), while £3,975. was brought forward. It is proposed to write £441. off goodwill account, to transfer £2,000. (against £1,000.) to bad debts reserve, and to pay a dividend on the ordinary shares at the rate of 11 per cent. per annum, less tax (against 10 per cent.), a balance of £10,038. being carried forward. A sum of £5,847. has been recovered in respect of E.P.D. This has been placed to taxes suspense account, which, after charging amounts paid for income-tax and corporation profits tax, shows a balance of £10,547. During the year £17,933. has been expended on additional plant and buildings.

DIVIDENDS.

The Mint, Birmingham.—Directors have resolved to declare an interim dividend at the rate of 6 per cent. per annum, less tax, on the preference shares for the six months ending September 30, 1923.

United Indigo and Chemical Company, Ltd.—Dividend at the rate of 5 per cent. per annum, less tax, for the six months ended June 30 on the ordinary shares, together with a further dividend of 10 per cent., less tax, on the ordinary shares, making 15 per cent. for the year (against 12½ per cent. for the preceding year. A further dividend is also declared of 10 per cent., less tax, on the preference shares, making 15 per cent. for the year (against 12½ per cent. for the preceding year).

J. Mandleberg and Co., Ltd.—The directors have declared an interim dividend of 1s. per share, less tax.

International Paint and Compositions Company, Ltd.—Interim dividend of 3 per cent. on the preference shares, but no interim dividend will be paid on the ordinary.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

British West Indies.

An important firm of commission merchants in Trinidad desire to secure the representation of British manufacturers of cement. (Ref. No. 183.)

Canada.

H.M. Trade Commissioner at Winnipeg reports that a firm in Manitoba, Canada, desire to be placed in touch with British manufacturers of school chalks and crayons. (Ref. D.O.T. 11735/E.D./M.C./A/2.)

Bulgaria.

A firm of agents and importers in Sofia desire to enter into business relations with firms dealing in oil, varnish, lead, zinc and black sheets. (Ref. No. 191.)

Finland.

A firm of commission agents in Helsingfors desire to secure the representation for Finland of British exporters of vegetable oils. (Ref. No. 192.)

Norway.

A commission agent in Christiania desires to secure the representation for Norway of British exporters of cocoanut oil, copra ground nuts, refined ground nut oil and crude and refined glycerine. (Ref. No. 196.)

Algeria.

A merchant and commission agent in Bone, Algeria, desires to obtain representation of a British firm for the importation of copper sulphate, sulphur and fertilisers, and for exportation of all Algerian products. Correspondence in French. (Ref. No. 207.)

NEW COMPANIES.

Burlington Syndicate, Ltd.—Private company. Capital £100. Manufacturing and research chemists, etc. Office: 4, Great St. Thomas Apostle, London, E.C.

Carr and Day and Martin, Ltd.—Private company. Capital £50,000., £1. shares (10,000 7½ per cent. cumulative participating preference and 40,000 ordinary). Manufacturers of boot and other polishes, etc. Office: Brunswick Park Road, New Southgate.

E. Miller and Co. (Peckham), Ltd.—Private company. Capital £2,500. Tanners, dressers, dyers, etc. Office: Clifton Leather Works, King Arthur Street, Peckham, London, S.E. 15.

J. M. Smith and Co. (London), Ltd.—Private company. Capital £10,000. Chemical manufacturers. Office: Hampton Chemical Works, Arthur Street, Old Kent Road, London, S.E.

Osmos Salts, Ltd.—Private company. Capital £6,000. Manufacturers of and dealers in medicinal salts, drugs, chemicals, etc. Office: Thanet House, 231, Strand, London, W.C

Phœnix Glass Company, Ltd.—Private company. Capital £1,000. Office: 24, Christmas Street, Bristol.

W. R. Smith and Sons, Ltd.—Private company. Capital £25,000 Manufacturers of materials and specialities from animal, vegetable, and chemical products. Office: Tattenhall Road Works, near Chester.

Wilson Chemical Company (Leeds), Ltd. — Private company. August 7. Capital £1,000. Chemical manufacturers. Office: The Old Parrott Yard, The Calls, Leeds.

FERTILISER NEWS.

Nitrate of Soda.—The market for the Chilean product continues disappointing; sales by the Producers' Association amounting during the first half of the current month to about 3,000 tons only. This material was taken at the official price of 20s. 7d. per metric quintal, but some activity has been noticeable in the resale market at 20s. 5d. Both in the United States and in Europe an easier tendency is in evidence. In the former market, cotton planters and agriculturists are waiting to see some financial return for their produce before committing themselves to fertiliser orders, while there is a general feeling that nitrate prices will decline later in the autumn. On the Continent, however, the nitrate market is dominated by the political situation. Stocks in European ports are low; consequently shipments are fairly well maintained at 52,000 tons to Europe, 35,000 tons to the United States, and 8,000 tons to other countries, making a total of 95,000 tons for the first half of August. Actual arrivals amounted to about 74,000 tons. Deliveries from ports at 17,500 tons were rather better than for the corresponding period of last year, and left port stocks at about 102,000 tons on the 15th inst., which, with 164,000 tons afloat for this market, makes the visible supply for Europe (including Egypt) about 266,000 tons, compared with 258,000 tons at the same date in 1922. Contrary to anticipation, production during July showed a decrease on the June figure, the cabled corrections stating that the total for last month did not reach more than 157,000 tons, compared with 166,000 tons in the previous month. Stocks in Chile, therefore, based on export and production figures, are being slowly decreased, thus making the position of the fertiliser more stable at the moment. The danger in this ultra-conservative attitude is, however, that consumers will not readily forget the high prices they are having to pay during the present depressed state of agriculture generally, accompanied as it is by the shortage in nitrogenous fertilisers.

Sulphate of Ammonia.—The present inquiry for this fertiliser on home account is not of much volume, farmers being too occupied with harvesting operations to consider the question of orders. The holiday season also adds dulness to the market position, but it is possible that the demand later on will be rather better if the promising estimates of the current harvest are fulfilled. The general outlook so far as sulphate is concerned is rather uncertain, although it is satisfactory to learn that the dock strike has ended at London and work is proceeding at that port. Inquiry for export is still good, and British producers are certainly alive to the position. Prices are being shaded to ensure the absorption of all the sulphate now being made—a policy which results in production being kept up to the maximum, with the natural result that overhead charges are reduced. It seems fairly certain that there is a market for all the sulphate that is being made, though there appears to be an idea current in this country that prices will be lower towards the end of the year. In view of the decreasing activity in the iron and steel industries—16 furnaces went out of blast during July,—it is surmised that the production of sulphate of ammonia will diminish through the coming months. It would therefore seem to be wise for dealers and consumers to order early, in order to take advantage of the Federation's offer of sulphate at £14. 10s. per ton during September for neutral material showing 25¾ per cent. ammonia. With regard to the position on the other side of the Atlantic, some little material has been available for export orders, but, apart from Japan, there has been little further business done. Exports of sulphate from the United States amounted to 15,670 tons in April last, bringing the total for the ten months ended April 30 to 107,290 tons.

Position of British Agriculture.—In view of the serious economic position of the superphosphate industry in this country, it is disappointing to learn that the past twelve months have witnessed a considerable further decrease in the acreage of arable land in England and Wales. A preliminary tabulation of returns collected by the Ministry of Agriculture in June last shows a reduction of 85,000 acres in the total area of crops and grass, as compared with the figure recorded for 1922, the acreage this year being 25,941,000; but when an analysis is made it is found that the arable area has fallen by no less than 129,000 acres, while permanent grass land shows an increase of 44,000 acres. The decrease in the arable area is mainly accounted for by the corn, pulse, and potato crops, and is a significant proof of the critical period through which the agricultural industry has been passing, especially as a further analysis reveals a reduction of 458,000 acres in the total under the three chief cereals, including mixed corn, wheat having declined by 226,000 acres, barley by 35,000 acres, and oats by 190,000 acres. The area of wheat is the lowest since 1913, the barley area is, with one exception (1915), the lowest on record, and the area of oats is practically the same as in 1913. Figures concerning root crops, however, afford some satisfaction. Turnips and swedes are 40,000 acres more than last year, and sugar beet, for the growing of which every encouragement is being given, with 17,000 acres, is more than double the area of 1922.

China's Requirements of Fertilisers.—The use of fertilisers in South China has shown a marked increase in the past few years. During 1922 the imports of these products into Hongkong amounted to 15,410 tons, as compared with 3,612 tons for 1921, and 2,308 tons for 1920. Until 1922 Great Britain and Japan were the principal sources of supply, about 40 and 25 per cent. respectively coming from these markets, while the United States ranked third in importance, furnishing an average of 14 per cent. of the total annual importation. During the past 12 months, however, this situation has gradually changed. American manufacturers have succeeded in obtaining almost 35 per cent. of the business done in 1922, as compared with 28 per cent. secured by British manufacturers and 24 per cent. by Japanese. Of the total of 15,410 tons of fertilisers imported into Hong Kong during 1922, the United States supplied 5,773 tons, United Kingdom 4,097 tons, Japan 3,800 tons, North China 1,359 tons, Canada 255 tons, South America 100 tons, and other countries 26 tons. The fertiliser most in demand is sulphate of ammonia, which at the beginning of June realised an average price of £22. per ton. Hong Kong being a free port, there is no duty on fertilisers, but on imports of these materials into the Republic of China an *ad valorem* duty of 5 per cent. is charged.

New Japanese Fertiliser. — The use of a new fertilising material, known as "promoloid," and consisting chiefly of colloidal magnesium silicate, is claimed by Japanese manufacturers to accelerate the growth of vegetables. It is well known that the Japanese islands are of volcanic origin, and it was observed, state the makers of the new product, that certain districts were noted for the early production and superior qualities of vegetables. An investigation proved that a constituent of the soil common to all these favoured areas was colloidal magnesium silicate, and experiments were made with the material with a view to establishing its responsibility for the increased crop yields. The preparation which has now been brought out under the name of "promoloid" is sold in liquid form, and, after having been subjected to field tests, is said to have proved of distinct value in increasing the yield and quality of crops. Particulars as to cost of production and the economic possibilities are not forthcoming, but further information on these points will be of interest.

Australian Superphosphate Industry.—In view of the country party's agitation for cheaper superphosphates, the Australian Commonwealth Government has introduced a Bill to remove the sulphur duty, approximating 85 per cent., and to substitute a bounty of 45s. a ton on sulphuric acid obtained from pyrites manufactured within the Commonwealth. This bounty, costing £100,000. yearly, will adequately protect the Mount Lyell works and the projected electrolytic zinc works. It is specially provided that if the bounty is removed the duty will be automatically restored.

PUBLICATIONS RECEIVED.

Preliminary Experiments in the Low-temperature Carbonisation of Coal in Vertical Retorts.—Technical Paper No. 7 of the Fuel Research Board. Published by the Department of Scientific and Industrial Research. London: H.M. Stationery Office; price 9d. net (by post 10d.).

Atmospheric Pollution. — Eighth report of the Advisory Committee for the Investigation of Atmospheric Pollution (year ending March 31, 1922). Published by the authority of the Air Ministry (Meteorological Office). London: H.M. Stationery Office; 3s. net.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JULY.

(Concluded from page 198.)

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of July, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended July 31.			Value. Month ended July 31.		
	1921	1922.	1923.	1921.	1922.	1923.
				£	£	£
Gums and Resins:						
Arabic and Tragacanth ..... cwts.	16,316	9,056	9,416	49,842	25,669	64,135
Kauri ..... ,,	514	1,140	2,939	1,701	4,337	14,061
Rosin..... ,,	66,628	120,368	76.770	50 978	79,953	52,659
Shellac, Seedlac, and Sticklac ... ,,	11,302	4,067	11,608	171,853	71,348	152,706
Oils, Fats and Greases:						
Animal (except Marine Animal): Not Refined Tallow:						
From France .,.. tons	—	—	—	—	—	—
,, China ..... ,,	—	—	—	—	—	—
,, U.S.A. .... ,,	75	587	507	1,961	23,327	20,739
,, Uruguay... ,,	397	25	174	12,692	962	7,216
,, Argentine Republic . ,,	1,181	724	894	39,183	26,026	35,261
,, Australia .. ,,	93	1,629	—	2,805	58,234	—
,, New Zealand ,,	1,738	3,129	2,502	55,014	114,141	95,619
,, Other Countries ,,	—	—	576	—	—	21,499
Total ..... ,,	3,484	6,094	4,653	111,658	222,690	180,334
Fish (and Marine Animal)..... ,,	874	2,147	6,785	25,660	73,222	224,257
Mineral, Crude Petroleum..... galls.	13,271 705	27,035 098	30,075 435	267,198	365,112	488,252
Vegetable, other than Essential:						
Castor Oil ..... tons	84	329	267	4,731	15,434	13,458
Coconut Oil, Unrefined ..... ,,	1,320	2,780	3,079	64,780	108,059	134,829
Cotton-seed Oil, Unrefined ..... ,,	280	100	343	11,632	4,299	14,555
Linseed Oil ..... ,,	3	123	44	197	6,118	2,142
Olive Oil, Unrefined ..... ,,	94	116	258	9,156	6,347	15,206
Palm Oil, Unrefined ..... ,,	4,774	9,940	9,334	160,474	320,981	320,615
Palm Kernel Oil, Unrefined ..... ,,	77	—	92	3,696	—	3,419
Rape-seed Oil.... ,,	2	112	32	123	4,970	1,302
Soya Bean Oil ... ,,	712	681	3,164	27,629	25,150	119,747
All other Sorts .. ,,	321	473	346	18,350	27,497	26,769
Soap Stock ..... ,,	85	—	81	2,119	—	2,469
Stearine:						
From Belgium ... ,,	53	27	33	3,422	1,394	1,670
,, Other Countries ,,	447	156	147	21,724	7,929	7,020
Total ..... ,,	500	183	180	25,146	9,323	8,690
Bones for Manure tons	921	619	1,041	9,397	4,243	7,603
Tanning Substances, not elsewhere specified						
Barks for Tanning cwts.	22,279	53,922	105,372	9,823	24,681	43,607
Sumach ..... ,,	7,326	8,991	5,843	5,565	6,046	4,934
Gambier ..... ,,	2,620	7,260	2,060	3.632	12,818	4,262
Myrobolans ..... ,,	26,303	54,622	26,127	7,929	18,447	10,191
Valonia ..... ,,	1,660	6,076	7,342	1,129	3,766	4,151
Other Sorts ..... ,,	183	1,810	687	277	1,403	410
Boron Minerals (including Borate of Lime, Borate of Magnesium, and Boracite) ... tons	13	3,997	375	244	80,456	5,659
Fertilisers:						
Guano, Raw .... ,,	1,490	567	—	10,763	4,875	—
Phosphate of Lime and Rock Phosphate ..... ,,	8,561	32,944	18,696	32,060	70,942	29,350
Sulphur, Crude . ,,	—	2,719	715	—	11,534	4,600
Fertilisers, not elsewhere specified:						
Basic Slag..... tons	5,099	10,117	4,366	25,749	32,213	12,114
Gelatine, Glue, and Size..... cwts.	7,017	10,180	10,211	43,966	58,280	40,110

Articles.	Quantities. Month ended July 31.			Value. Month ended July 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Starch, Dextrine, Farina, and Potato Flour:						
Rice Starch ..... cwts.	6,341	9,873	5,367	14,076	14,999	8,310
Other kinds of Starch ..... ,,	131,028	170,854	95,704	96,839	107,674	68,715
Dextrine, and Farina or Potato Flour . cwts.	45,584	47,189	79,838	45,209	58,036	57,388
Total ..... ,,	182,953	227 916	180,909	156,124	180,709	134,413
Copper Ore (including Regulus, Matte, Precipitate, Cement, Copper, and Scale):						
From Portugal .. tons	—	10	12	—	440	480
,, Spain ..... ,,	601	186	58	23,102	7,562	2,652
,, Mexico .... ,,	—	—	—	—	—	—
,, Peru ..... ,,	—	—	—	—	—	—
,, Chile ..... ,,	15	90	386	685	3,300	11,680
,, Cape of Good Hope .... ,,	—	—	—	—	—	—
,, Australia .. ,,	—	—	—	—	—	—
,, Other Countries ,,	73	1,251	995	4,955	57,000	38,802
Total ..... ,,	689	1,537	1,451	28,742	68,302	53,614
Iron Pyrites (including Cupreous Pyrites) tons	2,933	35,961	41,153	9,662	77,350	87,277
Manganese Ore . ,,	4,789	27,415	37,296	29,135	116,934	129,535
Silver Ore, including the value of the Silver contained in Argentiferous Ores and Metals ..... val.	—	—	—	32,830	33,340	23,845
Tin Ore and Concentrates:						
From S. America tons	462	1,076	3,873	36,692	80,659	378,182
,, Brit. South Africa ... ,,	—	64	—	—	5,808	—
,, Other Countries ,,	540	804	908	51,193	74,977	91,480
Total ..... ,,	1,002	1,944	4,781	87,885	161,444	469,662
Lead, Pig and Sheet:						
From Spain ..... tons	8,011	5,616	3,737	190,604	133,060	96,158
,, U.S.A. .... ,,	800	175	1,153	17,894	4,125	29,636
,, Mexico .... ,,	—	411	1,109	—	11,010	26,062
,, Australia .. ,,	405	6,119	3,127	10,525	152,061	79,192
,, Other Countries ,,	3,502	2,738	2,886	71,866	67,210	71,538
Total ..... ,,	12,718	15,059	12,012	290,889	367,466	302,586
Mercury ..... lbs.	343,176	93,740	114,092	49,850	13,190	14,961
Tin: Blocks, Ingots, Bars and Slabs:						
From Straits Settlements and Federated Malay States ... tons	1,080	2,250	555	184,281	347,122	105,617
From Australia .. ,,	70	—	—	11,435	—	—
,, Other Countries ,,	1,038	967	491	170,324	149,072	87,770
Total ..... ,,	2,188	3,217	1,046	366,040	496,194	193,387
Zinc, Crude (*i.e.*, Cakes, Slabs, Blocks, etc.) tons	2,713	6,983	6,365	75,411	188,221	195,019
Manufactures, not elsewhere specified (including Rolled Sheets, Plates, and Discs) tons	97	847	1,051	31,478	29,026	40,074

Platinum Production in the U.S.—Of the 968 ounces of crude platinum produced in the United States in 1922, the U.S. Geological Survey finds that Alaska yielded 39 ounces, California 876 ounces, and Oregon 53 ounces. the product sold for 195,000dols. The year's total purchases of crude platinum by refiners amounted to 67,570 ounces, of which 53,385 ounces came from Colombia, 10,085 ounces from Russia, and 12 ounces from Canada.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN JULY.

(Concluded from page 199.)

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during July, 1923, compared with 1921 and 1922. As from April 1, 1923, export trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended July 31.			Value. Month ended July 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Oils, Fats and Greases:						
Animal (except Marine Animal), not refined ..... tons	855	1,463	1,061	26,966	41,374	29,508
Vegetable, other than essential:						
Castor Oil ..... ,,	415	362	235	21,302	20,245	14,509
Coconut Oil, unrefined ..... ,,	14	—	6	509	—	271
Cotton-seed Oil, Unrefined ..... ,,	17	2	1,784	402	67	76,881
Linseed Oil ..... ,,	5,270	3,308	2,540	203,644	149,761	122,027
Olive Oil, unrefined ,,	—	—	—	78	44	111
Palm Oil, unrefined ,,	15	45	44	520	1,717	1,668
Palm Kernel Oil,, ,,	363	86	1,195	18,154	3,220	48,170
Rape Seed Oil... ,,	148	273	362	10,088	12,331	15,818
Soya Bean Oil ... ,,	392	1,207	453	19,771	58,951	20,306
Other Seed Oils . ,,	250	51	126	9,857	2,034	4,669
Other Vegetable Oils, not elsewhere specified . ,,	100	141	125	3,722	4,537	3,575
Tar, Coal Tar .... tons	402	1,729	358	4,000	8,820	2,788
Pitch, Coal Tar Pitch ,,	7,443	10,527	4,542	43,882	35,035	31,687
Cement, Calcareous, for Building and Engineering purposes:						
To Netherlands ... tons	1	2,768	2,201	17	5,318	3,635
,, France..... ,,	—	—	2	—	1	4
,, Brazil ..... ,,	634	3,980	1,158	3,189	9,894	2,552
,, Argentine Rep. ,,	116	83	751	673	225	1,843
,, British S. Africa ,,	177	1,617	1,843	911	4,498	4,629
,, British E. Indies ,,	6,316	8,824	15,324	37,743	30,540	39,940
,, Australia..... ,,	504	2,730	2,571	2,604	9,070	6,990
,, New Zealand.. ,,	32	183	66	255	669	240
,, Other C'tries... ,,	8,188	9,783	31,008	41,173	34,377	84,863
Total ..... ,,	15,968	29,968	54,924	86,565	94,592	144,696
Fertilisers not elsewhere specified:						
Basic Slag..... tons	—	29	353	—	75	924
Superphosphates ,,	208	318	1,495	2,283	1,499	6,498
Guano, Manufactured, and Compound Manures (including Bone Meal, and other Manufactured Fertilisers) ..... tons	692	2,478	3,604	9,187	26,546	26,804
Gelatine ..... cwts.	571	644	329	8,739	7,891	4,828
Glue and Size ... ,,	3,970	13,919	10,133	13,264	28,977	21,331
Lead:						
To Russia ..... tons	—	—	—	—	12	—
,, Sweden ..... ,,	2	81	80	61	2,409	2,220
,, Germany..... ,,	—	177	4	—	4,020	116
,, France..... ,,	200	144	2	4,700	3,732	90
,, China (including Hong Kong) ,,	37	6	11	1,043	195	429
,, Japan ..... ,,	—	—	—	—	2	—
,, U.S.A. ..... ,,	—	2	—	—	290	43
,, British S. Africa ,,	10	34	14	429	1,428	731
,, British E. Indies ,,	190	136	79	7,655	5,424	2,874
,, Canada ..... ,,	319	6	42	4,994	337	1,438
,, Other C'tries . ,,	194	486	487	6,945	14,965	16,923
Total Pig ..... ,,	600	637	349	11,456	15,141	9,905
Total Sheet ..... ,,	215	299	242	8,004	10,983	8,724
Total Pipes ..... ,,	92	63	79	4,036	2,455	3,001
Total Foil ..... ,,	2	—	2	144	76	199
Total Manufactures not elsewhere specified ,,	43	73	47	2,187	4,159	3,035
Total ..... ,,	952	1,072	719	25,827	32,814	24,864
Tin: Blocks, Ingots, Bars and Slabs:						
To Russia ..... tons	—	11	225	—	1,628	47,500
,, Sweden ..... ,,	14	24	67	2,887	3,752	13,304
,, Germany..... ,,	10	80	99	1,650	12,130	19,462
,, France..... ,,	139	167	135	22,718	25,500	25,207
,, Turkey ..... ,,	—	13	38	—	1,308	7,678
,, U.S.A. ..... ,,	25	195	1,208	4,150	28,287	223,409
,, Canada ..... ,,	4	90	100	665	13,415	18,707
,, Other C'tries.. ,,	204	523	641	34,532	80,469	121,859
Total ..... ,,	396	1,103	2,513	66,602	166,489	477,126
Zinc, Crude and Manufactures thereof.. tons	432	370	423	12,717	11,130	14,855

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The brisk demand for coke remains the best feature of an otherwise gloomy situation. The iron and steel trades are depressed, and the coal trade also is now slack. Rock bottom, however, appears at last to have been touched. There is certainly little apprehension felt as to any further decrease in the demand for the class of iron in the smelting of which the local coke is employed. It is quite true that the Continent is no longer an important consumer, but there is a heavy tonnage of iron going to the Midlands, and the expectations are that the district will continue to absorb considerable supplies for some months to come. In that case, of course, the seven furnaces in blast at Workington will remain in operation, and it is not beyond the bounds of possibility that in the autumn another furnace may be lighted in West Cumberland. Coke is in sharp request, and, indeed, there is not enough to go round now that the Continent is in the market. The West Cumberland and Furness district furnaces have all been short at times. Local smelters are paying from 29s. to 33s. per ton, according to carbon content. The Continent is paying from 34s. to 38s. per ton, f.o.b. Residuals are in fair demand. The entire make of tar is being absorbed by the chemical works on the coast. Crude benzol is rather on the easy side. Sulphate of ammonia is being exported to the Canary Isles, and there is very little being stocked, except when deliveries are difficult to arrange. Chemical products are rather slow. Road tar is dull, and solvent naphthas are not brisk. Sulphuric acid is a fairly good trade. East Coast coke supplies this week are 8,200 tons.

It is stated that a settlement is in sight at the Whitehaven collieries. An offer has been made which may be accepted by the representatives of both sides. It will remain, of course, for the miners to ballot on any propsals submitted to them.

SOUTH WALES NOTES.

[Specially Contributed.]

Business in the tinplate trade remains rather dull, new orders not being booked for any large quantities. The Far Eastern markets are now the chief consumers. There was a falling off in the exports last month of 1,000 tons as compared with July, 1922; but on the basis of seven months' trading an increase of 60,000 tons is shown on comparison with last year. During the week an important deal took place when the proprietors of the Grovesend Steel and Tinplate Company, Ltd., acquired the controlling powers of the Duffryn Steel and Tinplate Works, Morriston; the Mardy Tinplate Factory, Gorseinon; and the Dynevor Tinplate Company's undertakings. The acquisition of these important industrial concerns make the Grovesend Company the largest producers of tin and block sheets in the United Kingdom. Business in the galvanised sheet trade is improving, several new orders having been placed. There is also a better inquiry for patent fuel, but as quotations are not so firm, orders for large quantities are lacking. Owing to the abundance of small coals, manufacturers are accepting lower prices, and business for immediate delivery is much better. The chief export markets at present are Spain and France. Cokes have been somewhat neglected, though the outputs of the ovens have not diminished. Seeing that the by-produtcs, on the whole, are selling fairly well, the probability is that coke prices will be still further reduced. There is no improvement in the copper industry, and at present not more than 25 per cent. of the workers are fully employed. The nickel factories, on the other hand, are steadily working. The chemical trade is rather weak in tone.

Included in the week's imports were 97cwt. white lead from Bremen, 42 tons calcium carbide from Sarpsborg, to Cardiff; 1,870cwt. nickel oxide from Montreal, 600cwt. calcium carbide from Amsterdam, 2,800 tons bauxite from Bombay, 1,000kilo. calcium carbide from Hamburg, 2 tons tin oxide from Rotterdam, 800cwt. magnesite from Hamburg, to Swansea; 635 tons of iron pyrites from Huelva to Llanelly. Exports included 5 tons chloride of lime from Newport to Hennebont.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Bede Metal and Chemical Company, Ltd., Hebburn-on-Tyne.—Registered July 31. £60,000. debs. (inclusive of £50,000. already registered) (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £10,000.

Brown (E) and Son (Blacking and Boot Polish Manufacturers), Ltd., London, E.—Registered August 2, £10,600. mort., to E. P. Wilson, 61, Wool Exchange, London, E.C., and others.

Hewett and Reynolds, Ltd., London, N.W., dyers.—Registered August 2, £1,000. mort., to E. J. Hewett, 104, Valkyrie Road, Westcliffe-on-Sea.

Produce and Chemical Company, Ltd., London, E.C.—Registered August 7, £600. deb. and £400. deb., to Mrs. E. E. Anderson, 46, Brunswick Square, Hove.

Randall (F.) (Luton), Ltd., bleachers, etc.—Registered July 31, £1,000. deb., to Mrs. E. M. Randall, 83, Hazelbury Crescent, Luton.

Richardson (R. J.) and Co. (London), Ltd., London, E.C., ebonite manufacturers, etc.—Registered August 2, £250. debs.

Synthetic Products Company, Ltd., London, E.C.—Registered July 31, £1,000. charge, to Research Syndicate, Ltd., 50, City Road, London, E.C.

SATISFACTIONS.

Taylors' Drug Company, Ltd., Leeds.—Satisfaction registered August 3, £700., registered June 11, 1911.

BANKRUPTCY INFORMATION.

Curtis, Wm. Hy., Atlas Chemical Works-cot and trading at Atlas Chemical Works, Newmills, as W. H. Curtis and Co., manufacturing chemist. R.O., August 10. Adjourned August 10.

Heyl, Geo. E., King's-ho., Kingsway, London, W.C. July 4. Order of discharge, May 4, 1923, varied and in lieu thereof, bankrupt discharged subject to consent to judgment for £200. Note.—£100, a first instalment to be paid prior to signing of order, since paid.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Central Chili Copper Company, Ltd.—Resolved August 3: That the company be wound up voluntarily. F. T. Whinney, of Whinney, Smith and Whinney, liquidator.

Land Fertilisers, Ltd., Tadcaster.—Resolved July 4, confirmed July 30: That the company be wound up voluntarily. W. Carr, 27, Regent Street, Barnsley, liquidator.

Barron (Thomas), Ltd., Mexborough, bottle manufacturers.—W. H. Copley, of Hart Moss and Co., Rotherham, appointed liquidator August 3.

DISSOLUTION OF PARTNERSHIP.

(*Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.*)

Stanford, Wylie and Fraser (Jno. Fraser and Alex. Wylie, jun.), Argyle Oil Mills and Chemical Works, Possilpark, Glasgow, oil refiners and merchants. June 15, by death of J. Fraser. Debts by A. Wylie, jun., who continues.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Blunt, W. H., and Son, 70, Snow Hill, Birmingham; manufacturing chemists; £18. 12s., June 22; £13. 17s. 2d., July 2.

Rathbone and Orlans, Ltd., 52A, Drury Buildings, Drury Lane, Liverpool; chemists; £14. 0s. 5d., June 28.

Beresford, Thos. G., Grant Street, Leeds Road, Bradford [illegible] Soap Company); soap manufacturer;

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

August 7 to 11 (inclusive).

Hydrogenation of Hydrocarbon Oils and Residues. Beilby, Sir G. T. 20,185.
Mercury Derivatives of Hydroxybenzene Sulphonic Acids. Chemosan Akt.-Ges. 20,425.
Products for Dyeing or Printing Textile Fibres. Durand and Huguenin Akt.-Ges. 20,401 and 20,488.
Sulphuric Acid. Gaillard, E. A. 20,385.
Piston Pumps for Acids. Gaillard, E. A. 20,386.
Waterproofing Brick Walls. Hendrich, M. W. 20,406.
Recovering Chromic Salts from Residues. Jucker and Co., Chemische Fabrik. 20,132.
Dyeing Textiles. Ness, H. E. Van. 20,285.
Blasting Explosives. Nobel's Explosives Co., Ltd.; Picton, N.; and Thomas, E. G. 20,411.
Propellant Explosives. Nobel's Explosives Co., Ltd.; Nolan, T. J.; and Picton, N. 20,412 and 20,413.
Discharging Loose Material from Rotary Drums. Pease, E. L. 20,124.
Treatment of Mineral Oils. Plausons' (Parent Co.), Ltd. 20,352.
Decolorising Carbon. Potts, H. E. (*Naamlooze Vennootschap Algemeene Norit Maatschappij*). 20,256.
Conversion of Gaseous Aliphatic Ethylene Carbides into Liquid Carbides. Ricard, Allenet, et Cie. 20,298.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1922.

Compositions Containing Casein Suitable for Use as Glue. New Zealand Co-operative Dairy Co., Ltd. 11,899. **187,200**
Dyes of the Anthraquinone Series. British Dyestuffs Corporation, Ltd., Baddiley, J., and Tatum, W. W. 11,983. **201,610**
Extraction of Oils or Fats from Vegetable Matters. Cellulose et Papiers Soc. de Recherches et d'Applications. 12,045. **179,191**
Condensation Products from Carbazole and *p*-nitrosophenol and its Derivatives. Galbraith, W. L.; Lewcock, W.; and Tallantyre, S. B. 12,311. **201,624** and **201,625**
Measuring and Feeding Plastic Substances. Baker, Sons and Perkins, Ltd., J.; and Prescott, W. E. 12,485. **201,640**
Azo-dyestuffs. Bloxam, A. G. (*Chemische Fabrik Griesheim Elektron*). 17,272. **201,712**
Production of Ice. United Alkali Co., Ltd.; and Shores, J. H. 22,096. **201,772**
Vat Colouring-matters. Sokal, S. (*Kalle and Co., Akt.-Ges.*). 23,033. **201,786**
Explosives. Segay, A. 23,542. **201,791**
Furnaces for Ore-roasting. Leggo, A. V. 24,059. **190,448**
Separating the Vapours of Volatile Liquids from Gases. Brégeat, J. H. 25,711. **201,119**
Coating Rotating Filtering Frames. Vallez, H. A. 29,168. **201,822**
Gelatinous Nitro-glycerine Explosives Proof Against Firedamp. Dynamit-Akt.-Ges. vorm. A. Nobel and Co.; and Naoum, Dr. P. 32,409. **189,780**

1923.

Removing Hydrogen Sulphide from Gases. Petit, T. P. L. 6,768. **195,061**
Separation of the Constituents of Gaseous Mixtures. L'Air Liquide, Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. 7,433. **197,302**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Vulcanisation of Rubber. Pirelli and Co. 13,770. **201,885**
Halogenating Latex. Naugatuck Chemical Co. 18,439. **201,898**
Condensation Products. Pollak, F. 18,929. **201,906**
Articles Requiring a High Resistibility against Corrosion by Ammonium Chloride Solutions. Krupp Akt.-Ges., F. 19,574. **201,914**
Articles which Require a High Resistibility against the Attack of Sulphurous Acid Taking Place at a High Temperature and High Pressure. Krupp Akt.-Ges., F. 19,575. **201,915**
Improving Resins. Consortium für Elektrochemische Industrie Ges. 19,591. **201,916**
Phosphorescent Zinc Sulphide. "Allchemin" Allgemeine Chemische Industrie Ges.; and Johoda, Dr. R. 19,735. **201,922**
Anhydrous Tin Chloride. Buss Akt.-Ges. 19,834. **201,927**
Silicates of the Basic Dyestuffs. Eberlein, W. 20,045.
Recovering Chromic Salts from Residues Containing Chrome. Jucker and Co. Chemische Fabrik. 20,132. **201,942**
201,940 and **201,941**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Explosives. T. Hawkins, Slatington, Pennsylvania, U.S.A. British Patent. **199,489**, of 1922.

An explosive is prepared by treating mercury with a mixture of nitric and sulphuric acids then with denatured alcohol or ether ethyl alcohol, the precipitate being washed

and dried free of acid. To the above, may be added another material prepared as follows: Picric acid dissolved in water is treated with litharge or another oxide of lead, preferably while the solution is kept boiling; to the solution, after filtration, is added a solution of potassium chlorate, or potassium nitrate. A paste results and is separated by filtration, pressure, or suction and dried. The dry product may be treated with fuming nitric acid and again treated with litharge, etc., as above. Other explosive compounds may be added with the dried product to the mercury compound referred to above.

Purifying Salt. J. T. Westermann, Bussum, Holland. British Patent, **199,607**, of 1922.

Brine is purified by adding a reagent consisting of two molecular proportions of disodium phosphate to one of sodium carbonate so as to remove calcium and magnesium as phosphate and then barium chloride to remove the sodium sulphate. The reagents are preferably added while the solution is boiling with agitation. The mixed precipitate of phosphates and barium sulphate may be used as a white pigment, or the phosphates may be used to make di-sodium phosphate and the barium sulphate be used as a pigment. The purified brine may be evaporated to complete dryness. When the salt is to be used for certain purposes, such as the production of sodium sulphate, silicate, or phosphate, the treatment with barium chloride may be omitted.

Compositions for Removing Paint. H. Hamaguchi, Osaka, Japan. British Patent, **199,504**, of 1922.

A pasty composition for removing dried paint comprises an alkaline aluminate, caustic alkali, and rice bran. In an example, 3 parts by weight of a 10 per cent. solution of ammonia are added to 2 parts by weight of a 35 per cent. solution of aluminium sulphate and the precipitated hydroxide dissolved by the addition of caustic soda or potash; 90 per cent. by weight of this solution is added to 10 per cent. of a mixture obtained by mixing a 10 per cent. solution of caustic potash with half its own weight of rice bran. If the aluminium hydroxide has been dissolved in excess of alkali, the rice bran may be added directly to the solution. The composition is applied to the paint by brush or blowing nozzle, and after an interval, the whole is washed off with water.

Fixation of Nitrogen. V. Gerber, Zürich, Switzerland. British Patent, **199,667**, of 1922.

A mixture of aluminiferous material such as clay, bauxite or alunite and an alkaline earth compound such as barium or calcium oxide, hydroxide, carbonate or sulphate in considerable quantity together with iron or an iron ore and with or without fluxes such as alkaline earth chlorides, fluorides or carbides or sodium chloride, is fused in an electric furnace and the product after cooling and grinding is heated in nitrogen, with or without pressure, the reaction being exothermic. The fusion process produces a mixture of carbides and alkaline earth aluminate which readily separates from the ferrosilicon produced from the iron and the reduced silica. The nitrogenised product is treated with water or with a solution of for instance alkali hydrate carbonate or sulphate with or without pressure to obtain ammonia and aluminate and regenerate the alkaline earth compound employed. The aluminous material and the alkaline earth compound employed may be calcined prior to the fusion so as to remove volatile matter such as carbon dioxide, sulphur dioxide, and alkalies.

Sulphur Dioxide Refrigerators. F. W. Golby, London. (Utility Compressor Co., Detroit, Michigan, U.S.A.) British Patent, **198,770**, of 1922.

In compression machines employing sulphur dioxide, the circulating-system is washed out with carbon dioxide previously to charging it with the sulphur dioxide, to minimise corrosion. The system may be dried and charged with carbon dioxide at about fifty pounds pressure and exhausted, this step being repeated as desired, the sulphur dioxide being charged after the last exhaustion; or the system may be filled with carbon dioxide at about atmospheric pressure before charging it with the sulphur dioxide.

Refractory Substances. C. S. Garnett, W. A. Reid, F. E. S. Greenwood, and F. S. Cowlishaw, all in Derby. British Patent, **197,791**, of 1922.

Dolomite or magnesian limestone is partly calcined so that the product contains 8-12 per cent. of carbon dioxide; to the calcined material, mineral substances, such as silicates or oxides, which prevent hydration, are added, and the mixture is made plastic with water, moulded into bricks, etc., either before or after slaking is completed, and fired at about 1,500° C. Suitable substances for preventing hydration are olivine, talc, serpentine, kaolin, chlorites, bauxite, felspar such as labradorite and orthoclase, oxides of iron and titanium such as ilmentite, and pyroxenes, such as diallage and other augites.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Aluminates. J. Koritschoner, Vienna; and F. Hansgirg, Steeg, near Goisern, Austria. British Patent, **199,017**. Convention date, June 9, 1922.

Aluminiferous materials such as bauxite are mixed with alkaline earth compounds such as lime and with carbon in certain proportions and fused in an electric or other furnace. The product is cooled and powdered, and is leached with a solution of an alkali such as sodium carbonate to obtain alkali aluminate. The leaching may be effected at 100° C. The proportion of alumina to lime may be 47.5 to 52.5 and the quantities given in an example are 64.9 parts bauxite, 36.9 parts lime, and 10 parts charcoal. It is stated that metallurgical processes, especially the production of iron in blast or electric furnaces, may be carried on so that the slag contains lime and alumina in the above proportions so that the alumina may be extracted from the slag as above described.

Catalytic Materials. C. Urfer, Geneva. British Patent, **199,025**. Convention date, June 12, 1922.

Catalytic materials for use more particularly in the synthesis of ammonia are produced by heating an alkaline earth metal or lithium in the compact state in the presence of a gas, such as ammonia or hydrogen, with which it will combine to form a dissociable compound, mixing the compound with an inert oxide such as lime or magnesia, heating the mixture *in vacuo*, and finally allowing it to cool in an atmosphere of nitrogen. The product contains the nitride of the metal in a finely divided state. By omitting the step of cooling in nitrogen, the metal is obtained as a fine powder mixed with inert oxide. The addition of the inert oxide prevents the powdered metals from fusing and agglomerating during the heating process. According to the example, commercial lithium is heated in pure, dry ammonia, the resulting amide mixed with powdered lime or magnesia, heated *in vacuo*, and then cooled in a current of nitrogen. If the alkaline earth metal or lithium be heated in hydrogen, the corresponding hydride is formed and may be treated in the same way as the lithium amide. It is stated that the synthesis of ammonia can be effected at atmospheric pressure or low pressures by using the products as the catalytic materials.

Tanning Agents. M. Melamid, Freiburg, Baden, Germany. British Patent, **194,723**. Convention date, March 11, 1922.

An artificial tanning material is obtained by esterifying waste sulphite liquor by any method, but preferably with sulpho-chlorides. The products may be used alone or in admixture with other natural or artificial tanning substances. According to the example, a mixture of waste sulphite liquor and caustic soda is heated with toluene sulphochloride.

Rubber Vulcanisation Accelerators. Naugatuck Chemical Company, Naugatuck, Connecticut, U.S.A. (Assignees of H. S. Adams and L. Meuser, Naugatuck, Connecticut, U.S.A.) British Patent, **199,354**. Convention date, June 19, 1922.

Disubstituted guanidines are obtained by treating a symmetrically disubstituted thiourea with ammonia and a metallic compound, such as zinc oxide, lead oxide or lead carbonate, capable of eliminating the sulphur from the thiourea. According to the example, *sym*-diphenylurea is heated with zinc oxide and strong aqueous ammonia, each in excess, to a temperature not exceeding 80° C. The resulting mixture of diphenylguanidine, zinc sulphide and zinc oxide,

may, after filtration and drying, be used directly as a vulcanisation accelerator; or the diphenylguanidine may be separated by boiling the mixture with hydrochloric or other acid, neutralising the excess of acid with sodium acetate or similar salt, introducing hydrogen sulphide to precipitate the zinc, filtering, and finally liberating the diphenylguanidine from its salt by means of alkali. If lead oxide be used instead of zinc oxide, the reaction product is digested with sulphuric acid and the diphenylguanidine sulphate solution filtered off.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—There has, perhaps, been a little more inquiry on the market of late, but business is still far from good, and continues to be limited to small quantities. The dock strike, which seems to have ended at last, has made things exceedingly difficult both as regards imports and exports. With a settlement of the political situation on the Continent, we may look for something in the way of an all-round improvement and steadier conditions generally. **Acetic Acid,** 80% technical, about £47.; 80% pure, about £51.; 98% glacial, £73. in glass demijohns and £60. in casks; spot stocks are still very restricted, and at the prices quoted the market appears to be very firm. **Acetone,** British Government specification, £125. to £127. per ton, in drums; the spot position remains exceedingly strong, with little or no supplies available to meet the good inquiry; higher prices are expected in the near future. **Alum,** lump, in casks, £10. to £10. 10s. per ton; dealers are offering at these rates, but business remains rather poor. **Arsenic,** Cornish white powdered, on spot, £73. to £74. per ton; these high rates are maintained for spot goods, but cheaper prices are mentioned for forward delivery. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; the market keeps steady at this level, but there has not been much doing of late. **Barium Chloride,** 98—100%, about £15. to £15. 5s. per ton; dealers are offering on spot at about these figures, with only small business doing. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; the demand for this product so far as dealers are concerned remains quiet. **Borax,** commercial, granulated £26. 10s., crystals £27., powdered £28., extra fine £29.; B.P., crystals £31., powdered £32., extra fine £33. per ton, for home trade only, in 2cwt. free bags, carriage paid to destination. British makers' prices continue at these unchanged rates; quotations for export vary as to destination; dealers are offering for home consumption under similar conditions to makers at: granulated £25. 10s., and powdered £27. per ton. **Borax Glass,** lump, £74.; powdered, £75. per ton, in tin-lined cases; British makers' prices, for home trade only, are unaltered at these rates, packages free, carriage paid to destination. **Boric Acid,** commercial, crystals £50., powdered £52.; B.P., crystals £56. powdered £60., extra fine £62. per ton, in free bags, carriage paid to destination; British makers quoting at these unaltered rates for home trade only; dealers are offering some grades at competitive prices. **Cream of Tartar,** 99—100%, 90s. to 92s. 6d. per cwt., less 2½%; this article seems to be firmer, and tends to move to slightly higher rates. **Citric Acid,** B.P., crystals, about 1s. 6d. per lb., less 5%; this market seems to have moved to still lower prices for spot goods, and remains weak; large parcels could no doubt be obtained for less. **Epsom Salts,** commercial quality, about £5. per ton, in bags; dealers are finding little demand for the spot material floating about. **Formaldehyde,** 40% volume, spot, about £95. per ton, and forward about £75. per ton; the Referee's decision removing the import duty of 33⅓% has had the immediate effect of lowering the price of this article for forward delivery; business is likely to be good after the prolonged hold-up. **Glauber's Salt,** commercial quality, £3. 15s. to £4. per ton, in bags; there is still but small inquiry on spot for this article. **Lead Acetate,** brown, about £41. to £42.; white, about £42. to £43. per ton; supplies on spot are scarce, and Continental offerings are dear and limited. **Litharge,** about £35. 10s. to £36. per ton; dealers are offering Continental material at about these figures, and some moderate business has been booked. **Lithopone,** 30% Continental red seal, £22. to £22. 10s. per ton; the demand on spot has dropped off a little, but prices keep very steady both on spot and on the Continent. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; this market keeps fairly steady, and there has been a moderate business passing. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at about these rates. **Oxalic Acid,** about 6d. per lb.; there is no change in the quoted price of this article; business remains very slow. **Carbonate of Potash,** 90—92%, about £27. 10s. to £28.; 96—98%, about £31. to £32. per ton; offerings on spot appear to vary somewhat, and in some quarters the market has a slight tendency to weaken. **Chlorate of Potash,** crystals and granulated, about 3d. per lb.; little interest is shown in offers at this rate. **Caustic Potash,** 88—92%, on spot, about £32. to £33. per ton, in drums; some little business continues here, with prices now fairly steady. **Permanganate of Potash,** commercial quality, 9½d. to 10d. per lb.; this market has improved, and prices are firm at the higher rates mentioned. **Prussiate of Potash,** yellow, about 1s. 2d. to 1s. 2½d. per lb.; the little business coming on the market is keenly competed for; no further fall in prices recorded. **Sulphate of Potash,** 96%, £11. 10s. per ton, ex ship; the position is as reported last week. **Mercury,** about £9. 15s. to £10. per bottle of 75-76lb.; with a continuance of the poor demand, this market has slumped badly, but may recover. **Red Lead,** imported, about £35. 10s. to £36. per ton, c.i.f. London; at these unchanged rates importers find a fair volume of business. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49.; medium, £43. to £44.; fine white crystals, £25. to £26. per ton; somewhat easier conditions obtain in this market; the demand continues slow and limited. **Saltcake,** ground and unground, home trade, about £4. 5s. and £5. 5s. for export, delivered and f.o.b. respectively; British makers' prices are steady at these rates. **Acetate of Soda,** about £25. 10s. per ton, for a few spot parcels offering. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid to destination; British makers quote at about this figure for home trade only; their prices for export vary as to destination. **Soda Crystals,** £5. 5s. per ton, in bags, carriage paid to destination; British makers quoting at this price, for home trade only; dealers are offering at competitive rates, ex wharf or stores. **Caustic Soda,** 70—72%, £18. 10s.; 76—77%, £20. 10s. per ton, in drums, ex wharf shipping port; dealers continue to quote at about these rates, with business still on the small side. British makers' price, for home trade only, are at about £19. to £21. 10s. per ton, in drums, carriage paid; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination; British makers quoting at this price for home trade only; dealers are offering at about level figures. **Bichromate of Soda,** home trade, about 4¼d. per lb.; export, slightly more; British makers' prices show no change; business slow. **Cyanide of Soda,** 98—100%, export, about 8¼d. to 9d. per lb.; home trade, about 10½d. per lb.; British makers offering at these prices. **Nitrate of Soda,** 96%, about £13. 7s. 6d. per ton, f.o.r. United Kingdom port; this market keeps very steady. **Nitrite of Soda,** 100%, about £26. 10s. to £27. per ton; this market is unchanged on the week. **Prussiate of Soda,** about 6½d. per lb.; the demand for this article remains slow, and prices quoted on spot are unchanged. **Hyposulphite of Soda,** pea crystals, about £14. 10s. to £15. per ton, in 1cwt. kegs, ex stores; commercial quality, about £9. per ton. **Sodium Sulphide,** 60—62%, solid, £14. to £14. 10s.; ditto, broken, £15. to £15. 5s. per ton, in drums; dealers are offering Continental material at about these figures, with the demand slow. **Sulphate of Copper,** about £26. per ton; Continental material is still offering at cheap rates, with the demand still small. **Tin Crystals,** 1s. 4d. per lb.; this market shows no change on the week. **Tartaric Acid,** B.P., crystals, about 1s. 2½d. per

lb., less 5%; the spot position seems rather doubtful, with the demand still slow and limited; the tendency for the future seems to be towards easier rates. **White Lead,** imported, about £43. to £44. per ton; dealers are quoting at about these figures, with business very limited. **Zinc Oxide,** B.P., about £51.; white seal, about £43.; 99.5%, about £37. 10s. per ton, f.o.r. makers' works; British makers report that prices are inclined to harden.

Pharmaceutical Chemicals.—There has certainly been more inquiry on the market of late, but the majority of the business is still for small lots. Prices are holding up very well, and some advances are recorded. Bromides seem to be a poor feature on spot. **Acetanilid,** crystals and powder, about 1s. 6d. per lb.; some offers on spot might be at lower rates, but the market seems a little firmer. **Acetyl-Salicylic Acid,** B.P., about 3s. 1d. per lb.; prices quoted for spot supplies are firming up to this higher rate, and fair business has been done. **Benzoic Acid,** B.P., about 2s. 6d. per lb.; no interest is shown here; price quoted is nominal. **Diethylbarbituric Acid,** B.P. (barbitone), 18s. per lb.; a sharp drop in the dealers' price is recorded here, with the market dull. **Salicylic Acid,** B.P., 2s. 3d. to 2s. 4d. per lb.; prices have moved to higher levels, and the tone of the market is good; business is fair. **Tannic Acid,** leviss, about 3s. 4d. to 3s. 6d. per lb.; the spot position keeps very steady at these rates. **Amidopyrin,** about 14s. 3d. to 14s. 6d. per lb.; the position of this product on spot keeps very steady at unchanged values. **Ammonium Bromide,** about 7d. per lb.; this is one of the weak features, with spot supplies seemingly ample to meet the rather poor demand. **Benzonaphthol,** about 5s. per lb.; nominal; no movement on the market. **Benzaldehyde 03,** about 3s. per lb.; only small business is recorded, and quoted prices are steady. **Betanaphthol,** resublimed, about 1s. 11d. to 2s. per lb.; dealers quote at about these figures, with little doing at present. **Calcium Lactate,** about 1s. 9d. per lb.; this price governs a much steadier market, with business limited. **Chloral Hydrate,** duty paid, about 4s. per lb.; the demand for this product remains light, with quoted rates well maintained. **Creosote,** B.P., about 2s. 5d. to 2s. 6d. per lb.; a sharp advance in spot offers is recorded in most quarters. **Creosote Carbonate,** about 8s. 6d. per lb.; inquiry remains small here, and dealers are offering at unchanged rates. **Guaiacol Carbonate,** about 8s. 3d. per lb.; this market shows but little sign of life. **Hexamine,** about 3s. 9d. per lb.; a further fall in spot values is recorded, with the market still rather unsteady as quoted. **Hydroquinone,** about 3s. 6d. per lb.; this price seems difficult to obtain on spot. **Methyl Salicylate,** about 2s. 6d. per lb.; the tone has improved here, and slightly higher prices are being asked in some quarters. **Methyl Sulphonal,** about 15s. per lb.; the demand remains very small; dealers' quoted rates are unaltered. **Paraformaldehyde,** 3s. 6d. per lb.; after the recent advances in the price of this article, the market has moved sharply in buyers' favour. **Paraldehyde,** about 1s. 5½d. to 1s. 6d. per lb.; these prices are being quoted, but most sales for fair quantities would possibly be slightly cheaper. **Phenacetin,** about 6s. per lb.; at this level the spot position keeps fairly steady, although business is not brisk. **Phenazone,** about 7s. 6d. per lb.; the quoted rate is fully maintained here, and shows no sign of breaking. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; the position shows no change, with spot prices firm. **Piperazine,** about 3s. per oz., in kilo. lots; spot offers are made at this price, with little doing. **Potassium Bromide,** crystals and granulated, 6½d. per lb.; the spot position shows no improvement; stocks seem too plentiful, with the demand poor. **Potassium Permanganate,** B.P., 10d. to 10½d. per lb.; at these prices the market seems to be firming up a little. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; there has been very little inquiry on the market. **Salol,** about 2s. 8d. per lb.; the market seems to have steadied up at this cheaper rate. **Sodium Benzoate,** about 2s. 6d. per lb., nominal; still no life in this market. **Sodium Bromide,** B.P., crystals and granular, about 7d. to 7½d. per lb.; offers on spot seem to vary a great deal, and buyers should be able to obtain at low prices for quantities. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; a further slight reduction in price is recorded, with the market still dull. **Sodium Salicylate,** powder, about 2s. 5d.; crystals, about 2s. 8d.; flake, about 2s. 11d. per lb.; spot supplies seem rather limited, and prices as quoted appear very steady. **Sulphonal,** about 14s. 6d. per lb., nominal; the market remains idle. **Terpin Hydrate,** about 1s 9d. per lb.; this market keeps very steady, although business is small. **Thymol,** about 15s. per lb.; spot offers are being made at about this figure, with little interest shown.

Coal-tar Products, Intermediates, Etc.—Pitch is now quoted nominal at a slightly advanced figure. In other directions this market has shown a little more life, and prices are being fairly well maintained. Toluol has advanced. **Aniline Oil,** about 9d. to 9¼d. per lb., in drums; quoted rates are unaltered on a quiet market. **Aniline Salt,** about 9¼d. to 10d. per lb., in casks; the market remains dull at unchanged values. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; business remains slow, with values unchanged. **Benzol,** 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; this article is now steady, and likely to remain on its present level for some time. **Toluol,** about 2s. per gallon, f.o.r. makers' works, in buyers' packages; a firmer tone is recorded here, with prices moving up sharply. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; dealers are quoting at these unchanged rates on a quiet market. **Naphtha,** about 1s. 4d. per gallon; this product has weakened to still lower rates during the week. **Solvent Naphtha,** 90/160, 1s. 5d. per gallon, drums extra; the quoted rate shows no change, but the market is dull and rather unsteady. **Heavy Solvent Naphtha,** 90/190, 1s. 4d. per gallon, drums extra; prices show no change, with the market quiet and weak. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; the market shows no change on the week, and business quiet. **Burning Oil,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; quoted rates are the same as last week, with the market steady. **Creosote Oil,** 10d. per gallon, f.o.b.; the dull tone previously reported continues, with the market price fully maintained. **Carbolic Acid,** crystals, about 1s. 2d. per lb., f.o.b.; this price governs a steady but quiet market. **Naphthalene,** £20. per ton; dealers continue to quote at this level; crude, £7. to £13.; crystals, £20.; powder, £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; dealers are quoting at this unaltered rate. **Pyridine,** 20s. per gallon; at this further advanced price the spot position is very firm. **Hexamethylene,** about 3s. 9d. per gallon; spot values have fallen away sharply, but the market seems fairly steady at this lower level. **Pure Methyl Alcohol,** £100. per ton, ex wharf London; importers are showing no signs of making any reduction in their price. **Pitch,** about 140s. per ton, in London; nominal. **Sulphate of Ammonia,** quiet home inquiry at the fixed price of £14. 10s. per ton, delivery over September. This rate is for consumption in the United Kingdom only. Export values are slightly higher, with good inquiry.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £64. 17s. 6d. to £65., cash; £65. 8s. 9d. to £65. 10s., three months; electrolytic, £70. 10s. to £70. 15s. **Tin**: Standard, £190. 7s. 6d. to £190. 10s., cash; £191. 7s. 6d. to £191. 12s. 6d., three months; Straits, £193. 17s. 6d.; English, £191. **Lead,** soft foreign, £24. 7s. 6d., prompt; English, £25. 15s.; chemical sheet, 34s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 12s. 6d.; hard, £27. 15s. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. 6d. to 12s. 9d. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust,** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand for heavy chemicals continues on the dull side, both on export and home account, and prices generally remain in buyers' favour. For **Caustic Soda,** prices have been reduced for home trade as follows: 76%, £19. 7s. 6d.; 70%, £17. 17s. 6d.; powdered, 77—78%, £22. per ton. **Ammonia Alkali, Bicarbonate of Soda,** and **Soda Crystals** are unchanged. **Bleaching Powder,** softwoods, quiet at £11. 7s. 6d., f.o.r. **Glauber's Salt,** easy at £4., carriage paid. **Chlorates** and **Bichromates** are without alteration. There

is little inquiry for **Copper Sulphate**, and price nominal at £26., f.o.b. American **Sulphur**, firm at £5. 5s. on rails. **Phosphate** and **Commercial Hyposulphite of Soda** are moving off slowly; **Nitrite of Soda**, steady at £26. 10s., ex store. White powdered **Arsenic** is lower at £68., on rails Cornish works. **Yellow Prussiates** have a downward tendency; **Potash** at 1s. 2d., and **Soda** 6d. to 6¼d. per lb. **Carbonate** and **Caustic Potash** are unaltered. Quotations for **Acetic Acid** and **Acetate of Soda** are maintained, and there is fairly good inquiry. Grey and brown **Acetate of Lime** are in short supply, and prices are firm. **Miscible Wood Naphtha**, 6s. 6d. per gallon. **Acetone**, higher at £128. **Lead Salts** are dull, but values without change. **Acetate**, white £41., brown £43.; and **Nitrate**, £42., delivered. Foreign **Litharge**, lower at £35. **Barium Chloride**, quiet at £15. per ton. **Copperas** continues in steady request, and prices show some improvement. **Oxalic Acid**, weak at 6d. per lb. **Permanganate of Potash**, 9¾d. per lb.

SWANSEA MARKET REPORT.

Wednesday.

A little business was done in **Tinplates** for immediate delivery on the basis of £1. 3s. 1½d. per box. **Galvanised Sheets** met with better inquiry, and prices were fairly firm at £18. 7s. 6d. per ton, f.o.b. **Copper** quiet and steady, with prompt at £64. 12s. 6d. per ton, and three months £64. 7s. 6d. **Tin** firmer; prompt £185. 12s. 6d., three months £186. 17s. 6d. **Lead**, steady at £24. per ton, forward; English, £25. 10s. **Spelter** more active, with increased sales at £33. 2s. 6d. per ton prompt, and forward £32. 17s. 6d. **Zinc Sheets**, £36. 17s. 6d. per ton. **Linseed Oil** firm, with raw at £2. 3s. 3d., and boiled £2. 5s. 3d. per cwt. **Cotton-seed oil**, common edible £2. 1s. 3d., and deodorised £2. 4s. 3d. per cwt., net. **Coconut Oil**, dull and nominal. **Olive Oil** quiet at £66. 17s. 6d. per ton, ex ship. **Rape Oil** easier, with best refined at £2. 3s. 3d. per cwt. **Cod Oil**, scarce and nominal. **Palm Oil**, very firm; Lagos, prompt, £33. 12s. 6d.; softs, £33. 12s. 6d. prompt, and £33. 15s. forward; mediums, £33. 15s. 6d.; hards, £34. 2s. 6d. **Copperas**, slow at £2. per ton, delivered. **Arsenic** meets with small trade at £71. 12s. 6d. per ton for white powdered. **Pitch** was rather easier at about £6. 12s. 6d. per ton for best qualities. **Oxalic Acid**, dull at 6¼d. per lb., f.o.r. **Benzol**, in good call at 1s. 4d. per gallon, at ovens. **Sulphate of Ammonia**, quiet but steady, with home-trade prices at £13. 7s. to £14. 10s. **Sulphate of Copper**, dull at £26. 2s. 6d. per ton, less 5%. **Nitrate of Soda** in limited sale, with prompt at £13. 12s. 6d. per ton. **Bone Meal** slow, with Indian, prompt, £9. 2s. 6d. per ton. **Turpentine** steady, with American, prompt, at £3. 14s. 3d. per cwt. **Sulphuric Acid**, in steady demand at £3. 15s. per ton upwards, on rails makers' works. There was a more optimistic feeling on the **Coal** exchange, in the belief that France and Belgium would be wanting larger supplies: Best Admiralty smokeless steam coal £1. 9s. 6d., seconds £1. 8s.; ordinaries, £1. 7s. per ton, all f.o.b. **Anthracite**, best large £2. 9s. 6d., seconds £1. 19s. 6d.; Paris nuts, £3.; all f.o.b., per ton. **Patent Fuel**, rather quiet at £1. 10s. to £1. 14s. per ton, f.o.b. **Cokes** less active; export, £2. 7s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, on rails at ovens.

LIVERPOOL CHEMICAL MARKET.

Wednesday.

Business in chemicals of the heavier class for use in the United Kingdom has taken place on a moderate scale, and has continued fairly steady throughout the week. In the export branch a fair trade is being done, and a rather free movement of stocks on foreign account continues. **Bleaching Powder** has had a steady sale, and is £10. to £11. per ton for use in the United Kingdom, and £11. per ton for export. **Calcium Chloride** continues to meet with a very fair inquiry, and is £5. 12s. 6d. per ton. **Caustic Soda** has had a moderate sale for home-trade uses, and has moved somewhat freely on export account; prices are: for use in the U.K., £19. 10s. to £21. 10s. per ton, carriage paid; and for export, £19. 10s. per ton. **Bicarbonate of Soda** has been rather more in request for home-trade uses, and has had a fair shipment on foreign account; it is £10. 10s. per ton, carriage paid, for use in the United Kingdom. **Soda Crystals** have been in quietly steady demand, and are £5. 5s. per ton for home-trade uses. **Nitrate of Soda** has had a moderate sale, and is £13. 5s. to £13. 10s per ton. **Borax** has had a very fair sale, and is £26. 10s. to £27. 10s. for commercial crystals, and £28. for powdered; for higher grades, £31. for crystals and £32. per ton for powdered, carriage paid in the United Kingdom, is quoted. **Saltcake** has been rather more in request, and is £4. 10s. to £5 per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has been quiet, and is 4¾d. per lb., c.i.f. to usual ports. **Ammonia Alkali** has had a fair inquiry for use in the United Kingdom, and has been shipped freely on foreign account; it is £7. 12s. 6d. per ton for home-trade uses, and £8. per ton for export. **Hyposulphite of Soda** has again been in rather good demand, and is £10. 10s. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £16. per ton in 1cwt. kegs for photographic. **Sulphide of Soda** has been but little in demand; solid is £15. 10s. per ton, and crystals £9. to £10. per ton. **Chlorate of Soda** has been very quiet, and is 3d. to 3½d. per lb. **Phosphate of Soda** has had a very limited inquiry, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been in moderate demand, and is 6¾d. to 7d. per lb. **Yellow Prussiate of Potash** has sold more readily, and is 1s. 2¼d. to 1s. 3d. per lb. **Red Prussiate** has been quiet, and is 3s. 6d. per lb. **Carbonate of Potash** has moved but slowly, and is £25. to £32. per ton, according to quality. **Nitrate of Potash** has had a steady and fair sale, and is £33. to £35. per ton for refined. **Chlorate of Potash** has had a moderate inquiry, and is 3½d. to 4d. per lb. **Caustic Potash** has had a very limited sale, and is £32. to £33. per ton. **Permanganate of Potash** has been in quietly steady demand, and is 9¾d. to 10d. per lb. **Bichromate of Potash** has been quiet, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in moderate demand; first quality is £63. per ton, second quality £60., and third £57. **Sulphate of Ammonia** has had a small sale for use in the United Kingdom, but has had a rather large shipment for foreign ports; neutral of 25¾% is £14. 10s. per ton, and ordinary of 25¼% £13. 7s. per ton, for home-trade use. **Carbonate of Ammonia** has had a steady but moderate inquiry, and is 4d. per lb. **Muriate of Ammonia** has been but little called for, and is £32. to £33. per ton. **Magnesia** has had a very fair inquiry; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. per ton. **Alum** has been rather more in request; it is £12. per ton for home-trade uses, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been but little called for; it is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been more in request; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s. per ton, and American £5. to £5. 10s. per ton. **Tartaric Acid** has been in very fair request, and is 1s. 2¼d. to 1s. 3d. per lb. **Cream of Tartar** has sold rather freely, and is £4. 10s. to £4. 15s. per cwt. **Boric Acid** has been steadily called for; commercial crystals are £52. per ton, and powdered is £58., £2. per ton extra being charged if in casks. **Citric Acid** has been quieter, and is 1s. 8d. to 1s. 8½d. per lb. **Oxalic Acid** has been very quiet, and is 6d. to 6¼d. per lb. **White Acetate of Lead** has had a limited inquiry, and is £42. to £43. per ton. **Sulphate of Copper** has moved but slowly for home-trade uses or for export; it is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** continues quiet; white powdered is £72. per ton.

WEST OF SCOTLAND CHEMICALS.

Wednesday.

A little more activity has again been noticeable in the Glasgow market during the week, and business, though still of small dimensions, is considered as having a more hopeful tone. The usual day-to-day demand for chemicals on home account is maintained, but inquiries for export are still of a limited character. Prices generally are easier. Quotations, at Glasgow, are as follows:—**Alum**, quiet, and in small demand; prices steady at £12. 5s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; the quotation is further reduced to £75. per ton, net, on spot. **Barium Chloride** remains very quiet, despite the recent reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation stands at £11. 7s. 6d. **Boric Acid and Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax**, granulated, is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride**, 70—75%, solid, £5. 12s. 6d. per ton. **Citric Acid** is a quieter market, with the price maintained at 1s. 7¼d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure of £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar** quieter, with smaller

inquiry at the reduced price of £4. 7s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in fair request; brown steady at £41. per ton, net; and white better at £41. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid** is 6¼d. per lb. **Paraffin Wax** experiences a quietly steady trade at 2½d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the lower figure of 1s. 3¼d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 10s. per cwt., but business is nominal at this reduced figure. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb.; **Chlorate** is quieter at 3½d.; while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic,** 43—44%, rather easier, and inclined to be dull at 1s. 1d. **Tartaric Acid** still shows a quiet tendency at 1s. 2¾d. per lb., less 5%, Glasgow.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).
Bls.	Bales.	Css. or Cs.	Cases.				
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.		
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.

qr. Quarters.
lb. Pounds.

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending August 18.

ACETIC ACID—
Rotterdam, 10 cks.

ARSENIC—
Nantes and Bordeaux, 3 cks.

ALUMINIUM SULPHATE—
Cette, 200 bgs.

BARIUM SULPHATE (BLANC FIXE)—
Bremen, 24 cks.

BARYTES—
Barcelona, 20 brls.
Bremen, 589 bgs.

BITUMEN—
New York, 289 brls.

BORAX—
Los Angeles, 4,938 bgs.

BORON MINERAL—
Wellington, 7,180 bgs.

CALCIUM ACID PHOSPHATE—
Rotterdam, 23 kgs.

CALCIUM CARBIDE—
Christiansand, Christiania, Drammen, and Sandefjord, 100 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 20 brls.
New York, 1 bx.

COAL TAR PRODUCTS—
Naphthalene
Bremen, 30 cks.

CREAM OF TARTAR—
Barcelona, 11 cks.
Wellington, 5 cks.

DEXTRINE—
Bremen, 100 bgs.

DYESTUFFS (NATURAL) —
Cutch
Rangoon, 225 bxs.
Logwood
New York, 25 brls.

GELATINE—
Bremen, 7 cs.

GLUE—
Antwerp, 207 pkgs.

IRON OXIDE—
Malaga, 47 cks., 200 bgs.

IRON PYRITES—
Huelva, 2,400 t.

LACTIC ACID—
Bremen, 7 cks.

I THOPONE—
Bremen, 11 cks.
Rotterdam, 40 cks.

MAGNESIUM CHLORIDE—
Bremen, 254 drms.
Hamburg, 15 drms.

OCHRE—
Norfolk, 126 brls.

OXALIC ACID—
Hamburg, 2 cks.

PHOSPHATE OF LIME—
New York, 50 bls.

ROSIN—
Stenkjaer, 113 brls.

SALT—
Bremen, 500 bgs.
Hamburg, 1,100 bgs.

SOAP—
New York, 153 bls.

STEARINE—
Montreal, 250 bxs.
New York, 35 brls.

SULPHUR—
Catania, 6 brls., 20 bgs.
Hamburg, 40 cs.

TALLOW—
Christiania, Christiansand, Drammen, and Sandefjord, 120 brls.
New York, 180 bls.
Wanganui, 34 cks.
Wellington, 75 cks.

TANNING MATERIALS—
Unspecified
New York, 17 brls.

ZINC OXIDE—
Antwerp, 3 brls.
Rotterdam, 25 cks.

GOOLE.

Week ending August 18.

ARSENIC—
Antwerp, 42 cks.

FORMIC ACID—
Antwerp, 220 crbys., 1 crt.

MAGNESITE—
Amsterdam, 50 bgs.

SODIUM SILICO FLUORIDE—
Rotterdam, 100 bgs.

GRIMSBY.

Week ending August 18.

AMMONIA—
Hamburg, 30 cylds.

CALCIUM CARBIDE—
Christiania, 400 drms.

NITRIC ACID—
Christiania, 312 drms.

POTASSIUM NITRATE—
Hamburg, 70 t.

HULL.

From Return for week ending July 13, *Deduct*—

CHEMICALS (*otherwise undescribed*)
Ghent, 2 t.

From Return for week ending July 27, *Deduct*—

MAGNESIUM SULPHATE—
Rotterdam, 10 t.

Week ending August 18.

ALUM—
Amsterdam, 6 c.

ALUMINIUM SULPHATE—
Valencia, 10 t.

BEESWAX—
Marseilles, 7 c.

CALCIUM CARBIDE—
Antwerp, 2 c.
Christiania, 52 t. 5 c.

CARBON (DECOLOURISING)—
Amsterdam, 10 t. 10 c.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 2 t. 10 c.; Bari, 2 t.; Barcelona, 8 t. 3 c.; Bremen, 5 t.; Copenhagen, 132 galls.; Genoa, 7 t.; Malaga, 42 t.; Rotterdam, 4 t.

COAL TAR PRODUCTS—
Naphthalene
Antwerp, 12 t. 6 c.

DEXTRINE—
Amsterdam, 2 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 2,840 lb.

FERRO CHROME—
Bremen, 1 t 19 c.

FERRO SILICON—
Christiania, 267 t.
Gravosa, 147 t.

FERTILISERS (*otherwise undes.*)—
Copenhagen, 4 t. 5 c.

GLUE—
Antwerp, 2 t.

LEAD COMPOUNDS (*otherwise undescribed*)—
Rotterdam, 7 t. 4 c.

PHOSPHATE (*otherwise undescribed*)
Tunis, 1,750 t.

PHOSPHATE OF LIME—
Ghent, 10 t.

ROSIN—
Pensacola, 18 t. 4 c.; Rotterdam, 44 t. 9 c.; Valencia, 18 t. 7 c.

SOAP—
Amsterdam, 2 t. 10 c.; Bremen, 2 c.; Copenhagen, 1 t. 1 c.; Marseilles, 2 c.

STEARINE—
Antwerp, 6 t.

TALLOW—
Christiania, 32 t. 7 c.

TANNING MATERIALS—
Sumac
Valencia, 9 t. 17 c.
Valonia
Kyrenia, 83 t.
Wattle Bark
Durban, 1,200 t.
Natal, 102 t. 10 c.

TAR (WOOD)—
Copenhagen, 10 c.

TURPENTINE—
Savannah, 16 t.

LEITH.

OFFICIAL AMENDMENTS.

To Return for week ending Aug. 18, *Add*—

SODIUM BICHROMATE—
Dunkirk, 13 cks.

IODINE—
Dunkirk, 3 cks.

Week ending August 18.

ACETIC ACID—
Bremen, 2 cks.
Rotterdam, 27 cks.

BARYTES—
Bremen, 150 bgs., 25 cks.
Hamburg, 34 cks.

CHEMICALS (*otherwise undescribed*)
Bremen, 20 crbys.

CRYOLITE—
Copenhagen, 500 bgs.

LACTIC ACID—
Hamburg, 2 cks

LITHARGE—
Rotterdam, 7 cks

POTASSIUM CARBONATE—
Hamburg, 20 cks

POTASSIUM FERROCYANIDE—
Rotterdam, 4 cks

RED LEAD—
Rotterdam, 39 cks

SALT—
Hamburg, 200 bgs

SOAP—
Copenhagen, 10 cs

SODIUM NITRATE—
Tocopilla, 11,074 bgs

STEARINE—
New York, 70 brls

WHITE LEAD—
Antwerp, 20 cks

ZINC OXIDE—
New York, 700 brls

LIVERPOOL.

OFFICIAL AMENDMENTS.

To Return for week ending July 21, *Add*—

PARAFFIN WAX—
Baltimore, 200 brls.

* Entered under the Safeguarding of Industries Act.

From Return for week ending July 21, Deduct—

LITHARGE—
Bremen, 10 cks.

From Return for week ending June 2, Deduct—

CASEIN—
Wellington, 42 sks.

Week ending August 18.

ACETONE—
Hamburg, 75 drms.

AMMONIA—
Philadelphia, 200 cylds.

AMMONIUM NITRATE—
Hamburg, 1,658 cks.

ANTIMONY OXIDE—
Hankow, 500 cs.

ANTIMONY REGULUS—
Hankow, 2,000 cs.

ARGOLS—
Barcelona, 221 bgs.

BARYTES—
Hamburg, 22 cks.

BEESWAX—
Valparaiso, 223 cs.

BONE FERTILISER—
Bordeaux, 280 bgs.

BORATE OF LIME—
Mejillones, 18,492 bgs.

CALCIUM CARBIDE—
Cristobal, 1 drm.

CARBON BLACK—
New Orleans, 350 cs.
St. Nazaire, 255 bgs.

CASEIN—
Havre, 50 bgs.

CAUSTIC SODA—
New York, 2 cs. (pt.).

CHEMICALS (*otherwise undescribed*)
New York, 8 pkgs.

COAL TAR PRODUCTS—
Carbolic Acid
Antwerp, 24 drms.
Tar
Marseilles, 12 cks.

CREAM OF TARTAR—
Barcelona, 128 brls.; Bordeaux, 15 cks., 50 kgs.; Marseilles, 196 bgs., 19 cs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Havre, 7 cks.

DYESTUFFS (NATURAL)—
Logwood
New York, 206 cks., 175 pkgs.

FERTILISER (DRIED BLOOD)—
Zarate, 870 bgs.

GLUE—
Antwerp, 20 cs.
St. Nazaire, 1 ck.

LACTIC ACID—
Hamburg, 59 cks.

LITHOPONE—
Rotterdam, 120 cs.

MAGNESITE—
Amsterdam, 102 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 72 drms.

MANGANESE ORE—
Calcutta, 2,500 t.
Rotterdam, 30 bgs.

METHYL ALCOHOL—
Gothenburg, 16 brls.
Kotka, 17 brls.

OCHRE—
Marseilles, 17 cks.

PARAFFIN WAX—
Baltimore, 438 bgs.
New Orleans, 198 brls.
Philadelphia, 125 brls.

PLUMBAGO—
Marseilles, 3 cs.

POTASSIUM CARBONATE—
Hamburg, 86 cks.

POTASSIUM CHLORATE—
Gothenburg, 200 cs., 156 bgs.

RED LEAD—
Venice, 95 brls.

ROSIN—
Bordeaux, 100 cks.
New Orleans, 500 brls.

SALT—
Hamburg, 50 bgs.

SCALE WAX—
Baltimore, 150 brls.
Philadelphia, 200 brls.

SOAP—
Boston, 10 cs.; Genoa, 100 cs.; Havre, 27 cs.; Marseilles, 267 cs.; New York, 28 cs., 1 brl.; Philadelphia, 600 bxs.

SODIUM NITRATE—
Iquique, 11,580 bgs.
Tocopilla, 11,005 bgs.

STEARINE—
Monte Video, 117 trcs.

SULPHUR—
Puerto Empedocle, 3,500 t.

TALLOW—
Baltimore, 334 brls.; Boston, 341 brls.; Buenos Ayres, 763 cks., 878 trcs., 246 pps.; Fredrikstad, 63 drms., 3,865 brls.; Monte Video, 552 trcs., 256 cks., 14 pps.; New York, 80 drms.; Philadelphia, 52 brls.; Zarate, 354 cks.

TANNING MATERIALS—
Chestnut
Leghorn, 270 brls.
Myrabolans
Calcutta, 13,177 pks.
Quebracho
Buenos Ayres, 203 bgs.
Unspecified
Bordeaux, 100 cks.
Norfolk, 227 brls., 364 bgs.

TARTARIC ACID—
Barcelona, 32 brls.

WAX (*otherwise undescribed*)—
Amsterdam, 26 cs.; New Orelans, 563 brls.; New York, 170 brls.; Philadelphia, 102 bgs.

WHITE LEAD—
Amsterdam, 111 cks.

ZINC OXIDE—
Antwerp, 80 brls.
Rotterdam, 10 cks.

LONDON.

OFFICIAL AMENDMENTS.

From Return for week ending Aug. 3, Deduct—

BORIC ACID—
China, 100 pkgs. J. Batt

From Return for week ending June 8, Deduct—

AMMONIA—
Gibraltar, 9 c. Conbro & Scrutton

Week ending August 18.

ACETONE—
Jugo-Slavia, 24 t. 19 c. H. Smart

ALUM—
Italy, 83 pkgs. C. H. Haigh

ALUMINIUM SULPHATE—
France, 1,100 pkgs. J. Bailey
,, 500 Greeff

AMMONIUM CHLORIDE—
Belgium, 10 t. Van Oppen

ANTIMONY—
Japan, £176.

ARGOLS—
France, 1,205 pkgs.
Italy, 115

BARIUM PEROXIDE—
France, £1,594. G. T. Symons

BARYTES—
Belgium, 450 bgs. Felton & Crepin
Germany, 200 G. Elliott

BEESWAX—
France, 10 cs.
French Somaliland, 33 blks. Leach

BORAX—
Belgium, 2 t. Burton Baker

BORIC ACID—
Belgium, 10 pkgs. Burton, Baker

CALCIUM CARBIDE—
Jugo-Slavia, 94 t.

CARNAUBA WAX—
Brazil, 72 pkgs. Leach

CASEIN—
Esthonia, £350. Venesta
France, £400. E. S. Boize
,, £1,215. Sampson & White

CAUSTIC POTASH—
Germany, 9 pkgs. J. M. Steel
Holland, 112 Scheuer

CHEMICALS (*otherwise undescribed*)
Germany, £51. Petri
,, £12 Allen Craig
Holland, £10. Stancourt & Muir

CHEMICALS (*otherwise undes.*)—
£101.

CITRATE OF LIME—
Italy, 85 pkgs.

COAL TAR PRODUCTS—
Carbolic Acid
France, 5 cks.
Naphthalene
Belgium, £121.
Pitch
Belgium, 2 cks.
France, 11 G. T. Symons

DEXTRINE—
Holland, 1 t. Rubeck, Thew
,, 10 19 c.
,, 31 8 K. J. Kulder
,, 3 7 M. V. Thacker
,, 19 14 C. A. Coutts
Poland, 10 P. Winn

DYESTUFFS (ARTIFICIAL)—
Unspecified
Germany, £360.

DYESTUFFS (NATURAL)—
Cutch
Burmah, 400 pkgs. Leach
Logwood
U.S.A., 12 pkgs. Pronk, Davis & Rushby
Turmeric
Brit. India, 187 pkgs. J. W. Cook
Unspecified
Brit. India, £70. W. France & Fenwick
Switzerland, 1 pkg.

FERTILISERS (*otherwise undes.*)—
Holland, 5 t. Lactine

FUSEL OIL—
Czecho-Slovakia, 9 drms. Honeywill
Holland, 1,300 cks.

GELATINE—
Belgium, £38. Union Glue & Gel.
,, £2,322. B. J. Howlett
,, £350. Cazaly, Mills
Germany, £203. Crowe
,, £20. C. W. Hartrodt
Holland, £903. W. H. Muller

GLUE—
Belgium, £255. Van Oppen
,, £50. Martindale & Jones
France, £18. Rubeck, Thew
,, £6. Stockwell
,, £166. G. T. Symons
Germany, £210. H. Smart
Holland, £73. Union Glue & Gel.
,, £7.
Hungary, £605. P. Ingenlath
U.S.A., £1,120. C. Shaw Lovell

HYDROCHLORIC ACID—
Germany, 69 pkgs. W. A. Connell

ISINGLASS—
Brit. India, 36 cs.

LITHOPONE—
Holland, 8 cks.
,, 8 F. T. H. Nye

MAGNESITE—
Holland, £24. W. H. Muller
,, £7.
,, £350. Cazaly, Mills
,, £138. Scheuer

MAGNESIUM (METAL)—
France, £98. Davies Turner & Cocquyt
Germany, £20. C. Zimmermann

MANGANESE ORE—
Denmark, 1 t.

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Solvakia, 2 cks.
,, 103 Henderson, Craig
Germany, 50 bgs. McNamara
Italy, 4 brls.
Spain, 14 cks. Ramon Aguye
,, 16 brls. Hemingway
,, 3 cks. Griffiths

OCHRE—
Spain, 172 bgs. O'Hara & Hoare

PLUMBAGO—
Germany, 25 bgs. Hall & Hall
Japan, 750 cks.
Madagascar, 6,095 bgs. Morgan Crucible

POTASSIUM CARBONATE—
Germany, 28 pkgs. J. M. Steel
,, 20 Stephens

POTASSIUM CHLORATE—
Sweden, 80 pkgs. J. J. Masters

POTASSIUM CHLORIDE—
Belgium, 500 pkgs.

POTASSIUM NITRATE—
Brit. India, 634 pkgs. G. & H. Green

RED LEAD—
Italy, 90 cks. T. Dens

ROSIN—
France, 50 cks. Lowden, Connell
Germany, 7 drms. A. Boake Roberts
Portugal, 74 Co-op W'sale
U.S.A., 250 brls.
,, 450 W. R. Green
,, 600 Co-op. W'sale
,, 2,100 Rosin & Turp.

SALAMMONIAC—
Germany, 5 t. Petri

SALT—
Germany, 20 t. Morris
,, 40 A. G. Robinson & Roberts

SALTPETRE—
Belgium, £1,100. G. & H. Green

SHELLAC—
Brit. India, 32 t. Litchfield & Saundy
,, 7 10 c. J. W. Cook
,, 69 4 Dunlop
France, 8 c. Rubeck, Thew

SOAP—
Belgium, £85.
,, £57. H. H. Poole
,, £20. S. Kolisky
Canada, £143. Gerhard & Hey
Denmark, £123. Beck & Pollitzer
France, £646. P. Le Brun
,, £42. E. A. Kimpton
,, £20. G. T. Symons
,, £383. E. A. Kimpton
Germany, £9. S. Kalisky
Holland, £131.
U.S.A., £12. Butler & Crispe
Victoria, £1,800. L. F. Smith

STEARINE—
Belgium, 1 bg. A. C. E. Garnham

SULPHUR—
Belgium, £315. Comp. Comm. du Nord
,, £80.
Italy, £40. J. J. Masters

TALLOW—
Belgium, 6 brls. A. C. E. Garnham
N.S.W., 25 t. 8 c.
N.Z., 27 1

TANNING MATERIALS—
Gambier
U.S.A., 300 pkgs. Leach
Myrabolans
Brit. India, 373 pkgs. J. W. Cook
Unspecified
Natal, 50 t. Leach
,, 275
,, 20 Fisher, King
Switzerland, 4 pkgs.

TARTARIC ACID—
Italy, 60 pkgs.

TURPENTINE—
Holland, 9 brls. Darby, Williams
U.S.A., 1,532
,, 300 Rosin & Turp.

WHITE LEAD—
Germany, 18 brls. Dexters
Holland, 2 Chance & Hunt
Italy, 36 T. C. Sayer

ZINC OXIDE—
Czecho-Slovakia, 125 cks. Greeff
Holland, 90 M. Ashby
,, 50
,, 65 F. T. H. Nye

MANCHESTER.

Week ending August 18.

ACETIC ACID—
Bremen, 46 cks.
Rotterdam, 54 cks.

BARYTES—
Bremen, 32 cks., 500 bgs.

CARBON BLACK—
New Orleans, 405 cs.

CASEIN—
Rouen, 67 bgs.

CHEMICALS (*otherwise undescribed*)
Bremen, 21 cks.; Hamburg, 28 cks.; Rotterdam, 14 cs.

CHROME ORE—
Antwerp, 80 bgs.

COAL TAR PRODUCTS—
Anthracene
Hamburg, 153 cks.
Naphthalene
Hamburg, 30 cks.

DEXTRINE—
Bremen, 24 bgs., 2 cs., 13 cks.
Hamburg, 200 bgs.

DYESTUFFS (NATURAL)—
Logwood
Philadelphia, 10 brls.

FORMALDEHYDE—
Bremen, 254 crbys.

FORMIC ACID—
Rotterdam, 39 crbys.

GLUE—
Antwerp, 97 bls.
Rotterdam, 23 pkgs.
Rouen, 9 cks.

LITHOPONE—
Bremen, 20 cks.
Rotterdam, 200 cks.

MAGNESIUM SULPHATE—
Hamburg, 499 bgs.
Rotterdam, 960 bgs.

OXALIC ACID—
Rotterdam, 6 cks.

ROSIN—
New Orleans, 50 brls.

SALTPETRE—
Antwerp, 50 bgs.

SOAP—
Rouen, 5 cs.

SODIUM CHLORATE—
Rouen, 100 cs.

SODIUM NITRITE—
Rotterdam, 50 cks.

SODIUM PHOSPHATE—
Antwerp, 15 cks.
Bremen, 12 cks.

SODIUM PRUSSIATE—
Rotterdam, 17 cks.

STEARINE—
Antwerp, 216 bgs.

TALLOW—
Boston, 598 brls.
Gisborne, 400 cs.

TARTARIC ACID—
Bari, 80 brls.

ULTRAMARINE—
Hamburg, 6 cs.

WHITE LEAD—
Antwerp, 8 cks.

ZINC DUST—
Antwerp, 100 cks.

ZINC OXIDE—
Antwerp, 130 cks.

ZINC SULPHATE—
Hamburg, 29 cks.

NEWCASTLE-ON-TYNE

Week ending August 18.

BARYTES—
Bremen, 460 cks. and bgs.

CALCIUM CARBIDE—
Christiania, 910 drms.

CHEMICALS (*otherwise undescribed*)
Christiania, 51 bgs.

CREAM OF TARTAR—
Barcelona, 50 brls.

GLUCOSE—
New York, 906 brls.

MAGNESIUM CHLORIDE—
Hamburg, 35 drms.

SALT—
Hamburg, 500 bgs.

STEARINE—
Rotterdam, 7 bgs.

WAX (*otherwise undescribed*)—
New York, 125 brls.

N. & S. SHIELDS.

Week ending August 18.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 18.

AMMONIUM CARBONATE—
Alexandria, 1 t. 3 c.; Algoa Bay, 1 c.; Cape Town, 6 c.

AMMONIUM CHLORIDE—
Genoa, 5 t. 3 c.
Rouen, 5 t. 7 c.

CHEMICALS (*otherwise undescribed*)
Algoa Bay, 20 pkgs.; Aden, 20 pkgs.; Alexandria, 116 pkgs.; Antwerp, 3 pkgs.; Bahia, 1 pkg.; Bangkok, 30 pkgs.; Cape Town, 39 pkgs.; Calcutta, 20 pkgs.; Christmas Island, 12 pkgs.; Demerara, 28 pkgs.; East Londers, 1,000 pkgs.; Hamburg, 110 pkgs.; Madras, 25 pkgs.; Montreal, 20 pkgs.; Mossel Bay, 100 pkgs.; New York, 1,059 pkgs.; Perth (W.A.), 50 cs.; Rangoon, 38 pkgs.; Rio de Janeiro, 230 pkgs.; Rouen, 440 pkgs.; Santos, 50 pkgs.; Singapore, 32 pkgs.; Sydney, 107 pkgs.; Vancouver, 50 pkgs.; Trinidad, 18 pkgs.

COAL TAR PRODUCTS—
Pitch
Bombay, 41 t. 10 c.
Tar
Alexandria, 6 t. 10 c.; Barbados, 5 c.; Colombo, 29 t. 10 c.; Cyprus, 1 t. 16 c.; Demerara, 4 t. 4 c.; Helsingfors, 112 t.; Kilindini, 3 t. 8 c.; Kingston (Ja, 2 t. 18 c.; Pt. Said, 62 t. 2 c.; Rangoon, 45 t. 14 c.; Singapore, 7 t. 14 c.; Tampico, 1 t. 18 c.; Zanzibar, 1 t.
Unspecified
Helsingfors, 25 t.
Madras, 11 t. 3 c.
Malta, 7 t.

DISINFECTANTS (*otherwise undes.*)
Colombo, 1 t. 17 c.

FERRO SILICON—
Portland (Ore.), 40 t.

GELATINE—
New York, 1 t. 10 c.

GLUE—
Demerara, £10.
Rangoon, 5 t. 12 c.

MAGNESIA—
Rangoon, 3 c.

MAGNESIUM CARBONATE—
Montreal, 1 c.

PARAFFIN WAX—
Alicante, 2 t.; Sydney, 1 t.

PHOSPHATE OF LIME—
Alicante, 30 t.; Cartagena, 20 t. Corunna, 100 t.; Santander, 50 t.

PITCH (STEARINE)—
Hamburg, 1 t. 14 c.

PITCH (STOCKHOLM)—
Calcutta, 3 t.

POTASSIUM BICHROMATE—
Alexandria, 4 t.; Algoa Bay, 2 c.; Bordeaux, 15 c.; Calcutta, 2 t. 9 c.; Hankow, 1 t.; Madras, 5 t.; Rio de Janeiro, 6 t. 10 c.

SHEEP DIP—
Buenos Ayres, 28 t.; Descado, 11 t. 14 c.; Gallegos, 5 t. 17 c.; Madryn, 5 t. 17 c.; San Julian, 11 t. 14 c.

SOAP—
Cape Town, 18 c.; Christmas Island, 5 c.; Demerara, 1 c.; Kingston (Ja.), 3 c.; Montreal 9 c.; Pt. Said, 12 c.; Trinidad, 3 t. 7 c.; Rangoon, 2 c.; Zanzibar 3 c.

SODA CRYSTALS—
Bombay, 7 c.; Calcutta, 11 c.; Christmas Island, 2 c.

SODIUM BICHROMATE—
Barcelona, 4 t. 19 c.; Bordeaux, 1 t. 12 c.; Hamburg, 13 c.; Calcutta, 1 t.; Cape Town, 1 t.

SODIUM SULPHATE—
Helsingfors, 301 t.

SPERMACETTI WAX—
Rouen, 13 c.

TAR (WOOD)—
Alexandria, 1 t. 5 c.

TURPENTINE
Buenos Ayres, 100 galls.

WAX (*otherwise undescribed*)—
Aden, 1 t. 10 c.; East London, 1 t.; Montreal, 2 t.

GRANGEMOUTH.

Week ending August 18.

BLEACHING POWDER—
Rotterdam, 5 t.

CAUSTIC SODA—
Bergen, 5 c.

PARAFFIN WAX—
Antwerp, 80 bgs.
Rouen, 32 bgs.

POTASSIUM BICHROMATE—
Rouen, 20 cks.

ROSIN OIL—
Rotterdam, 2 t. 2 c.

SODIUM BICHROMATE—
Rouen, 104 cks.

WAX (*otherwise undescribed*)—
Christiania, 335 bgs.

HULL.

Week ending August 14.

CHEMICALS (*otherwise undescribed*)
Antwerp, 2 cks., 1 kg.; Amsterdam, 6 cks., 2 pkgs., 18 drms.; Gothenburg, 16 cks., 7 brls.; Hango, 4 drms.; Kalmar, 60 cks., 20 cs.; Rotterdam, 2 cks.; Stockholm, 76 cks.

COAL TAR PRODUCTS—
Benzol
Hango, 4 drms.
Creosote
Hamburg, 10 brls.
New York, 1,066,258 brls.
Pitch
Bergen, 24 brls.
Gothenburg, 10 bgs.
Unspecified
Rotterdam, 6 drms., 1,499 bgs.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 3 brls.; Gothenburg, 50 drms.; Helsingfors, 6 drms.; Malmo, 2 cs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bergen, 1 cs.; Gothenburg, 1 cs.

FERRO MANGANESE—
Hango, 43 cks.

GLUE—
Helsingfors, 1 bl., 22 bgs.
Malmo, 10 bgs.

SOAP—
Antwerp, 3 brls.; Bergen, 1 ck.; Gothenburg, 1 cs.; Malmo, 20 cs., 60 cks.; Stockholm, 1 ck.

STEARINE—
Gothenburg, 30 brls.; Hamburg, 30 brls.; Rotterdam, 180 brls.

WOOD PRESERVATIVE
Gothenburg, 10 drms.

Week ending August 18.

AMMONIA—
Cartagena, 2 cs.

ANTIMONY—
Hamburg, 1 kg.
New York, 34 cks.

BLEACHING POWDER—
Gothenburg, 30 cks.

CAUSTIC SODA—
Bergen, 16 drms.
Copenhagen, 15 drms.
Christiania, 262 drms.

CHEMICALS (*otherwise undescribed*)
Cartagena, 1 cs.
Christiania, 1 cs.

COAL TAR PRODUCTS—
Creosote Oil
Christiania, 51 drms.
Tar
Bergen, 1,228 bgs.

HYDROCHLORIC ACID—
Cartagena, 1 cs.

LITHARGE—
Christiania, 36 pkgs.
Gothenburg, 13 cks.
Hamburg, 3 cks.

OXIDE (*otherwise undescribed*)—
Hamburg, 1 kg.

PHOSPHORUS SULPHIDE—
Gothenburg, 200 cs.

RED LEAD—
Bergen, 2 cks.; Christiania, 35 kgs., 14 cks.; Gothenburg, 4 cks.; Hamburg, 48 cks.

SALT—
Gothenburg, 70 cs.

SOAP—
Christiania, 2 cs.
Gothenburg, 876 cs.

SODIUM SALTS (*otherwise undes.*)
Hamburg, 347 drms.

SODIUM SULPHATE—
Skoghill, 446 t.

SODIUM SULPHITE—
Gothenburg, 20 bgs.

SULPHURIC ACID—
Cartagena, 3 cs.

WHITE LEAD—
Gothenburg, 10 cks.
Hamburg, 170 kgs., 126 cks.

ZINC OXIDE—
Bergen, 20 cks.
Gothenburg, 11 cks.

* Entered under the Safeguarding of Industries Act.

LEITH.

Week ending August 18.

AMMONIUM SULPHATE—
Valencia, 1,651 t.

ETHYL CHLORIDE—
Rotterdam, 30 drms.

GLUE—
Rotterdam, 2 brls.

PARAFFIN WAX—
Gothenburg, 160 bgs.

RED LEAD—
Amsterdam, 50 cks.

TALLOW—
Copenhagen, 50 tres.
Rotterdam, 25 tres., 80 cks.

WOOD PRESERVATIVE—
Copenhagen, 25 drms.

LIVERPOOL.

Week ending August 16.

ACETIC ACID—
Valparaiso, 3 t. 11 c., £201.

ALUM—
Sydney, 2 t., £21.

ALUMINOFERRIC—
Alexandria, 50 t., £440.
Calcutta, 5 t., £36.
Rosario, 50 t., £358.

ALUMINIUM SULPHATE—
Bangkok, 11 t., £175.; Bombay, 26 t. 13 c., £267.; Calcutta, 129 t., £1,141.; Copenhagen, 2 t., £20.; Christiania, 10 t., £80.; Riga, 15 t., £144.

AMMONIUM CARBONATE—
Antwerp, 2 t., £74.; Amsterdam, 2 t., £67.; Buenos Ayres, 7 t. 17 c., £268.; Cape Town, 6 c., £11.; Constantinople, 15 c., £22.; Galatz, 6 t. 13 c., £196.; Kobe, 2 t. 2 c., £69.; Madras, 15 c., £31.; New York, 6 t. 7 c., £227.; Piraeus, 19 c., £46.; Santander, 10 c., £19.; Singapore, 1 t., £46.; Tuticorin, 1 t., £43.

AMMONIUM CHLORIDE—
Bilbao, 7 t. 6 c., £244.; Bombay, 3 t., £118.; Calcutta, 5 t., £203.; Karachi, 12 t. 10 c., £508.; Shanghai, 30 t., £1,218.

AMMONIUM PHOSPHATE—
Durban, 5 t. 1 c., £303.

AMMONIUM SALTS (*otherwise undescribed*)—
Christiania, 10 c., £18.
La Corunna, 1 t., £39.

AMMONIUM SULPHATE—
Hong Kong, 365 t. 3 c., £6,279.; Kobe, 1,629 t. 16 c., £27,092.; Las Palmas, 343 t., £5,296.; Lisbon, 29 t. 14 c., £460.; Nyasaland, 4 t., £63.; Oratava, 50 t., £775.; St. Kitts, 15 t., £225.; Teneriffe, 55 t., £888.; Yokohama, 99 t. 16 c., £1,650.

ANTIFOULING PAINT—
Barcelona, 2 t. 19 c., £342.; Bathurst, 4 c., £11.; Calcutta, 1 t., £72.; Hong Kong, 5 t. 16 c., £643.; Kobe, 7 t., £690.; Sherbro, 8 c., £28.; Yokohama, 2 t., £209.

ANTIMONY REGULUS—
Buenos Ayres, 3 t. 19 c., £128.

ARSENIC—
Singapore, 10 c., £38.

BARIUM CARBONATE—
Montreal, 10 t., £117.

BARIUM CHLORIDE—
Rouen, 7 t., £108.

BLEACHING POWDER—
Aarhus, 15 t. 2 c., £133.; Adelaide, 10 c., £12.; Callao, 2 t., £27.; Lyttleton, 1 t., £12.; Montreal, 9 t. 6 c., £195.; Philadelphia, 2 t. 13 c., £70.; Piraeus, 3 t., £36.; Rio de Janeiro, 5 t. 1 c., £53.; Shanghai, 20 t. 1 c., £288.; Volo, 1 t. 10 c., £19.

BOILER COMPOSITION—
Calcutta, 15 t., £221.
Durban, 1 t. 2 c., £45.

BONE SUPERPHOSPHATE—
Las Palmas, 4 t., £22.
Oratava, 20 t., £132.

BORAX—
Cartagena, 4 c., £21.; Malta, 1 qr., £1.; St. Johns (N.F.), 1 t. 10 c., £142.

BORIC ACID—
Kingston, 1 c., £4.

CALCIUM CHLORIDE—
Bolivia, 2 t. 19 c., £17.; Bombay, 5 t. 2 c., £24.; Fremantle, 5 t. 4 c., £31.; Shanghai, 9 t. 19 c., £52.; Sydney, 85 t. 12 c., £493.

CHEMICALS (*otherwise undescribed*)
Adelaide, 7 t., £192.; Antwerp, 2 c., £17.; Barcelona, 1 t., £54.; Brisbane, 8 t. 11 c., £245.; Cape Town, 1 t., £28.; Cartagena (Col.), 2 t. 19 c., £359.; Durban, 41 t. 6 c., £303.; Havana, 1 t. 6 c., £36.; Hamburg, 9 t. 17 c., £273.; Kobe, 10 t., £291.; Monte Video, 50 t. 9 c., £357.; Lagos, 1 t. 10 c., £17.; Madras, 8 t. 3 c., £221.; Melbourne, 27 t. 19 c., £2,335.; Pointe a Pitre, 1 t. 7 c., £81.; Rotterdam, 2 t., £56.; Rio de Janeiro, 24 t. 7 c., £175.; Ronneby, 19 t. 4 c., £528.; Santos, 35 t., £951.; Saqurto, 2 qrs., £13.; Shanghai, 4 t. 3 c., £130.; Sydney, 11 t. 10 c., £391.

CHLOROFORM—
Melbourne, 3 c., £33.

CITRIC ACID—
Cartagena (Col.), 2 c., £22.
Montreal, 2 t. 10 c., £432.
Melbourne, 10 c., £95.
Singapore, 11 c., £95.

COAL TAR PRODUCTS—
Aniline Oil
Danzig, 20 t., £1,872.
Carbolic Acid
Antwerp, 2 t. 10 c., £345.; Calcutta, 9 c., £87.; Danzig, 10 t., £1,331.; Demerara, 2 c., £23.; Genoa, 1 t. 10 c., £182.; Hamburg, 36 t., £4,409.; Monte Video, 11 t. 11 c., £805.; Petrograd, 10 t. 1 c., £269.; Shanghai, 2 t., £294.; Sydney, 2 t. 7 c., £121.
Creosote
Antwerp, 9 c., £95.
Yokohama, 3 t., £133.
Dinitrochlor Benzol
Riga, 20 t. 5 c., £1,621.
Naphthalene
Aden, 6 t. 18 c., £68.
Pitch
Malta, 10 t. 6 c., £60.
Tar
Alexandria, 1 t. 5 c., £13.
Bilbao, 6 c., £22.
Unspecified
Beira, 13 t. 10 c., £385.
Rotterdam, 3 t. 16 c., £294.
Shanghai, 18 c., £199.

COBALT OXIDE—
Kobe, 8 c., £320.

COPPER SULPHATE—
Callao, 1 t. 10 c., £41.; Montreal, 2 t., £49.; Santos, 2 t. 7 c., £59.; Tientsin, 3 t., £75.; Vancouver, 30 t., £765.

CREAM OF TARTAR—
Adelaide, 10 c., £46.; Brisbane, 10 c., £5[illegible].; Fremantle, 7 t., £632.; Sydney, 1 t., £92.

DISINFECTANTS (*otherwise undes.*)
Bombay, 1 t. 9 c., £57.; Bluff Harbour, 5 c., £37.; Calcutta, 4 t. 12 c., £80.; Durban, 3 c., £17.; East London, 5 c., £10.; Hamburg, 1 t., £235.; Iquique, 5 c., £28.; Lome, 3 c. 2 qr., £17.; Mombasa, 2 t. 2 c., £79.; New York, 90 t. 6 c., £3,783.; Pt. Harcourt, 3 c. 1 qr., £10.; Para, 7 c., £27.; Puerto Barrios, 1 t., £61.; Puerto Cabello, 8 c., £42.; Rangoon, 3 t. 8 c., £144.; St. Johns (N.F.), 10 c. 2 qr., £90.; Singapore, 2 c., £11.; Sydney, 4 t. 10 c., £541.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Batavia, 1 t. 10 c., £495.; Madras, 6 t. 15 c., £756.; Samarang, 8 t. 5 c., £1,386.; Sourabaya, 12 c., £198.; Sydney, 2 c., £75.
Indigo
Shanghai, 2 t. 19 c., £405.
Tientsin, 23 t. 11 c., £2,986.
Tsingtao, 23 t. 16 c., £3,000.

DYESTUFFS (ARTIFICIAL)—*Contd.*
Unspecified
Boston, 1 t. 6 c., £304.; Barcelona, 10 c., £260.; Bombay, 1 c., £22.; Durban, 1 c., £20.; Halifax (N.S.), 4 c., £172.; Iddo, 3 c., £138.; Larnaca, 2 c., £60.; Montreal, 4 t. 6 c., £882.; Melbourne, 11 c., £136.; Penang, 30 lb., £11.; Rio de Janeiro, 2 c., £33.; Sydney, 11 c., £200.; Valparaiso, 1 t. 9 c., £322.

DYESTUFFS (NATURAL)—
Indigo
Dairen, 8 t. 19 c., £1,252.
Sydney, 1 t., £158.
Orchil
New York, 16 c., £40.

ESSENTIAL OILS (SYNTHETIC)—
Dunkirk, 1 t. 15 c., £631.
Kobe, 1 t., £334.

FERTILISER (DRIED BLOOD)—
Las Palmas, 1 t. 9 c., £23.
Colombo, 99 t., £1,645.

FERTILISERS (*otherwise undes.*)—
Baltimore, 100 t., £600.
Canaries, 17 t., £261.

GLYCERINE—
Antwerp, 9 c., £40.; Bombay, 6 t., £544.; Calcutta, 5 t., £360.; Kobe, 5 t. 1 c., £383.; Patras, 5 c., £25.; Yokohama, 48 t. 10 c., £4,019.

HYDROCHLORIC ACID—
Saqurto, 7 c., £29.

LEAD ACETATE—
Bombay, 3 t. 2 c., £137.

MAGNESIUM CARBONATE—
Buenos Ayres, 5 c., £13.
Bombay, 2 t., £76.
Rio Grande do Sul, 4 c., £16.

MAGNESIUM CHLORIDE—
Salonica, 1 t. 10 c., £20.
Sydney, 13 c., £108.

MAGNESIUM SULPHATE—
Accra, 10 qr., £5.; Cape Coast, 15 c., £19.; Las Palmas, 2 c., £3.; Limassol, 3 qr., £1.; Madeira, 2 c., £3.; Sherbro, 2 c., £3.; Saltpond, 5 c., £7.; Sierra Leone, 6 c., £8.; Warri, 5 qr., £2.; Winnebah, 2 c., £3.; Montreal, 5 t. 10 c., £85.

MANGANESE CHLORIDE—
Hong Kong, 5 c., £10.

MANGANESE HYDRATE—
Buenos Ayres, 1 t. 9 c., £78.

NICKEL OXIDE—
Santos, 5 c., £37.

NITRIC ACID—
Beira, 9 c., £35.

PHOSPHORUS (AMORPHOUS)—
Bombay, 9 c., £106.
Calcutta, 4 c. 2 qr., £53.
Rio de Janeiro, 2 t. 8 c., £585.

PHOSPHORUS SESQUISULPHIDE
Corunna, 10 c., £101.

POTASSIUM BICHROMATE—
Danzig, 7 c., £18.
Hamburg, 10 c., £25.
Neufahrwasser, 5 t. 2 c., £253.

POTASSIUM CHLORATE—
Pimental, 10 c., £20.

POTASSIUM IODIDE—
Degama, 37 lb., £36.
Demerara, 1 qr., £24.
Sierra Leone, 2 qr., £15.

POTASSIUM SULPHATE—
Las Palmas, 6 t., £72.

SALAMMONIAC—
Varna, 10 c., £28.

SALICYLIC ACID—
Melbourne, 5 c., £60.; Rangoon, 1 c., £13.; Sydney, 5 c., £60.

SALTCAKE—
Gothenburg, 600 t. 2 c., £2,886.

SALTPETRE—
Para, 10 c., £20.

SHEEP DIP—
Fremantle, 2 t. 9 c., £133.; La Guaira, 14 c., £42.; Lyttleton, 2 t. 6 c., £166.; Mombasa, 12 c., £40.; Melbourne, 11 t. 1 c., £670.; Wellington, 14 t. 3 c., £878.

SULPHATE OF LIME—
Callao, 4 t. 3 c., £86.

SULPHUR—
Monte Video, 7 t. 18 c., £56.

SULPHURIC ACID—
Buenos Ayres, 2 t. 2 c., £68.
Iquique, 8 c., £26.
Maranhao, 15 c., £25.

TANNING MATERIALS—
Unspecified
Antwerp, 8 t. 17 c., £247.; Cape Town, 1 t. 3 c., £20.; Calcutta, 11 c., £80.; Gothenburg, 1 t. 2 c., £25.; Iddo, 1 t. 2 c., £30.; Mossel Bay, 5 t. 15 c., £156.; Melbourne, 3 t. 7 c., £47.; Pt. Elizabeth, 9 t. 7 c., £176.; Sydney, 2 t. 7 c., £41.

TAR (VEGETABLE)—
Canaries, 2 t. 8 c., £47.
Talcahuano, 1 t. 5 c., £32.

TARTARIC ACID—
Brisbane, 18 c., £122.; Cartagena (Col.), 2 c., £18.; Montreal, 6 t. 10 c., £853.; Melbourne, 3 t. 15 c., £497.; Sydney, 2 t. 10 c., £328.

VANILLIN—
Amsterdam, 5 c., £490.
Melbourne, 2 c., £229.
Sydney, 2 qr., £59.

VERDIGRIS—
Melbourne, 6 c., £30.

WOOD PRESERVATIVE—
Pt. Louis, 16 c., £28.

ZINC CHLORIDE—
Bombay, 4 t. 11 c., £109.; Madras, 1 t. 10 c., £133.; Rangoon, 1 t. 5 c., £31.; Sydney, 1 t., £27.

Week ending August 17.

ALUMINOFERRIC—
Shanghai, 2 t.

BASIC SLAG—
Fremantle, 250 t.

CARBON (RETORT)—
Leghorn, 66 t.

CARBON BLACK—
Havre, 1 pkg.

CAUSTIC SODA—
Aarhus, 14 drms.; Adelaide, 10 drms.; Batavia, 10 drms.; Beira, 10 cs.; Bombay, 425 drms.; Bourgas, 290 drms.; Cape Town, 14 drms.; Cheribon, 50 pkgs.; Ceara, 50 pkgs.; Colombo, 2 cs.; Christiania, 100 drms.; Constantinople, 60 pkgs.; Dalny, 101 pkgs.; Demerara, 50 drms.; Fremantle, 47 pkgs.; Gothenburg, 54 pkgs.; Hankow, 168 drms.; Hong Kong, 9 pkgs.; Kobe, 867 drms.; Lagos, 6 cs.; Monte Video, 100 drms.; Melbourne, 22 drms.; Naples, 30 drms.; Oporto, 34 drms.; Padang, 50 drms.; Pt. Elizabeth, 105 cs.; Rangoon, 41 drms.; Rockhampton, 15 drms.; Rosario, 102 drms.; Rotterdam, 49 drms.; Samarang, 50 drms.; San Antonio, 83 drms.; Sierra Leone, 11 cs.; Sydney, 130 drms., 32 cs.; Tjilatjap, 10 drms.; Varna, 750 drms.; Yokohama, 248 drms.

COAL TAR PRODUCTS—
Mirbane Oil
Brisbane, 5 brls.
Sydney, 24 drms.

FERRO CHROME—
Bilbao, 1 t.

FERRO MANGANESE—
Antwerp, 50 t.
Hamburg, 140 t.

FERRO VANADIUM—
Dunkirk, 1 dble. drm.

GLUE, SIZE, AND GELATINE—
Bombay, 40 bgs., 10 pkgs.; Brisbane, 10 cks.; Calcutta, 20 bgs.; Caracas, 11 pkgs.; Colombo, 40 pkgs.; East London, 10 pkgs.; Halifax (N.S.), 10 pkgs.; Havana, 200 pkgs.; Hong Kong, 20 pkgs.; Las Palmas, 8 pkgs.; Manila, 40 bgs.; Montreal, 95 brls.; Panama, 3 bgs.; Pernambuco, 1 bg.; Rangoon, 40 bgs.

MANGANESE BORATE—
Rouen, 3 cks.

MANGANESE ORE—
Hamburg, 10 t.

SALT—
Auckland, 60 t.; Barbados, 50 t.; Bermuda, 5 t.; Brisbane, 37 t.; Buenos Ayres, 5 t.; Burutu, 251 t.; Cape Town, 7 t.; Dunedin, 15 t.; Guernsey, 5 t.; Iddo, 10 t.; Lyttleton, 5 t.; Madras, 3 t.; Montreal, 18 t.; Newcastle, 1,050 t.; Quebec, 100 t.; Sydney, 120 t.; Valparaiso, 1 t.; Wellington, 189 t.

SALTCAKE—
Hamburg, 100 pkgs.

SOAP
Accra, 20 pkgs.; Addah, 20 pkgs.; Adelaide, 1 bx.; Alexandria, 1 pkg.; Amboina, 520 bxs.; Antofagasta, 50 pkgs.; Antwerp, 2 pkgs.; Assinie, 10 pkgs.; Bahrein, 5 cs.; Banda Neira, 305 pkgs.; Bandjermassin, 550 bxs.; Banjoewangie, 50 bxs.; Barbados, 938 pkgs.; Beira, 6 pkgs.; Belawan, 550 bxs.; Bombay, 1,991 pkgs.; Calcutta, 450 pkgs.; Callao, 200 bxs.; Cape Coast, 200 pkgs.; Cape Town, 94 pkgs.; Casablanca, 5 pkgs.; Ceuta, 250 pkgs.; Cheribon, 231 pkgs.; Christiania, 50 pkgs.; Colon, 400 pkgs.; Colombo, 342 bxs.; Constantinople, 11 pkgs.; Curacao, 4 pkgs.; Demerara, 452 bxs.; Dominica, 260 bxs.; Dongala, 250 pkgs.; Durban, 326 bxs.; Genoa, 6 bxs.; Gibraltar, 117 pkgs.; Gorontalo, 25 pkgs.; Hong Kong, 107 pkgs.; Ichang, 5 pkgs.; Iddo, 1 pkg.; Karachi, 867 bxs.; Kingston, 609 pkgs.; Kobe, 10 bxs.; La Guaira, 1 bx.; La Libertad, 32 bxs.; Langsa, 50 pkgs.; Larache, 46 pkgs.; Lho. Beumawe, 25 pkgs.; Libreville, 1 pkg.; Limon, 50 bxs.; Lisbon, 20 bxs.; Macassar, 100 bxs.; Madras, 450 pkgs.; Malta, 6 cs.; Mangalore, 40 pkgs.; Maracaibo, 9 pkgs.; Mauritius, 3,728 pkgs.; Melilla, 150 bxs.; Menado, 435 bxs.; Montserrat, 3 cs.; Nantes, 12 pkgs.; Naples, 100 cs.; Olehleh, 150 boxes; Palembang, 35 boxes; Paramaribo, 51 boxes; Penang, 14 cases, 350 bxs.; Pointe a Pitre, 100 bxs.; Pontianak, 257 bxs.; Puerto Barrios, 11 bxs.; Pt. Said, 129 cs., 325 bxs.; Pt. Victoria, 52 pkgs.; Posso, 50 bxs.; Punta Arenas, 35 cs.; Quittah, 50 cs.; Rangoon, 143 pkgs.; Saltpond, 100 bxs.; Samarang, 25 bxs.; Sandakan, 1 cs.; Santos, 8 cs.; Saparoca, 50 bxs.; Sassandra, 25 bxs.; Sekondi, 26 pkgs.; Shanghai, 2,972 pkgs.; Sherbro, 46 bxs.; Sibolga, 6 bxs.; Sierra Leone, 16 bxs.; Singapore, 1,784 pkgs.; Sinoe, 100 bxs.; Sourabaya, 100 bxs.; St. Johns (N.F.), 650 cs.; St. Kitts, 310 cs.; St. Lucia, 1 cs.; Suez, 15 drms.; Sydney, 16 cs.; Tandjong Balei, 515 pkgs.; Tazacorte, 25 cs.; Tetuan, 125 bxs.; Tjilatjap, 105 bxs.; Trinidad, 521 cs.; Tumaco, 200 cs.; Tuticorin, 1 cs.; Valparaiso, 60 cs.; Winnebah, 210 bxs.; Yokohama, 14 cs.

SODA ASH—
Batavia, 120 bags; Brisbane, 303 pkgs.; Christiania, 50 pkgs.; Colombo, 200 pkgs.; Copenhagen, 100 pkgs.; Geelong, 29 pkgs.; Gothenburg, 600 pkgs.; Hong Kong, 561 pkgs.; Karachi, 200 pkgs.; Kobe, 7,358 pkgs.; Lisbon, 100 pkgs.; Melbourne, 1,681 pkgs.; Moji, 704 bgs.; Newcastle, 177 pkgs.; Puerto Alegre, 130 pkgs.; Rangoon, 200 pkgs.; Rio de Janeiro, 985 bgs.; Rockhampton, 33 cks.; Rosario, 37 pkgs., 99 bgs.; Rotterdam, 1,100 pkgs.; Salaverry, 42 pkgs.; Samarang, 100 bgs.; Sydney, 30 cks.; San Antonio, 58 cks.; Santos, 96 cks.; Tsingtao, 4,480 bgs.; Yokohama, 4,653 bgs.; Varna, 20 bgs.

SODA CRYSTALS—
Cape Town, 30 pkgs.; Demerara, 70 pkgs.; Gibraltar, 40 pkgs.; Iquique, 90 pkgs.; Malta, 20 pkgs.; Patras, 10 pkgs.; Pt. Said, 9 pkgs.; Pt. Antonio, 5 pkgs.; Rosario, 99 pkgs.; Sierra Leone, 3 kgs.

SODIUM BICARBONATE—
Adelaide, 737 pkgs.; Auckland, 7 pkgs.; Brisbane, 91 pkgs.; Colombo, 120 pkgs.; Copenhagen, 71 pkgs.; Devonport, 20 pkgs.; Genoa, 40 pkgs.; Gothenburg, 95 pkgs.; Hamburg, 310 pkgs.; Ichang, 2 pkgs.; Melbourne, 989 pkgs.; Moji, 1,077 pkgs.; Newcastle, 229 pkgs.; Pelotas, 200 kgs.; Piraeus, 20 kgs.; Rangoon, 250 pkgs.; Rockhampton, 20 kgs.; Rotterdam, 610 pkgs.; Santos, 383 pkgs.; Wasa, 100 kgs.; Yokohama, 2,231 bgs.

SODIUM BISULPHITE—
Pt. Swettenham, 200 drms.

SODIUM SILICATE—
Buenos Ayres, 401 pkgs.; Durban, 124 pkgs.; Fremantle, 54 pkgs.; Kobe, 63 pkgs.; Leghorn, 32 pkgs.; Monte Video, 100 cks.; Pt. Elizabeth, 2 pkgs.; Pt. Said, 73 pkgs.; Sourabaya, 40 drms.

SODIUM SULPHIDE—
Lisbon, 5 pkgs.

STEARINE—
Delagoa Bay, 673 bgs.
Durban, 305 bgs.
Shanghai, 608 bgs.

WOOD PRESERVATIVE—
Fremantle, 160 pkgs.

LONDON.

Week ending August 15.

ACETIC ACID—
Irish Free State (F.) 1 pkg., £14.; Irish Free State, 4 cks., £28.

AMMONIA—
Calcutta, 10 cs., £18.
Constantinople, 6 cs., £5.
Rangoon, 3 cs., £5.

AMMONIUM CARBONATE—
Piraeus, 2 c., £6.

ANTIMONY SULPHIDE—
Valencia, 4 cks., £28.

BISULPHITE OF LIME—
Wellington, 5 cks., £8.

BITUMEN—
Rouen, 275 brls., £550.

BONE FERTILISER—
Antwerp (transit) (F.), 25 t., £290.; Channel Islands, 5 t., £15.

BORAX—
Antwerp (F.), 10 t., £253.
Bangalore, 3 c., £5.

CARBON (RETORT)
Bremen, 35 t., £84.

CHEMICALS (*otherwise undescribed*)
Switzerland (*via* Antwerp), 17 pkgs., £786.; Bombay, 7 cs. (pt.), £35.; Durban, 2 cs. (pt.), £5.; East London, 20 drms., £30.; Gothenburg, 2 pkgs., £9.; Gothenburg (F.), 5 pkgs., £25.; Madras, 4 kgs., £32.; Ostend, 4 pkgs., £29.; Rangoon (F.), 10 pkgs., £27.; Rangoon, 4 pkgs., £7.; Stavanger, 35 pkgs., £95.; Sydney, 20 cs. (pt.), £589.; Wellington, 1 cs. (pt.), £6.

CITRIC ACID—
Bombay, 2 c., £29.; Penang, 1 c., £28.; Rangoon, 2 c., £23.; Rotterdam, 2 c., £19.; Wellington, 1 c., £9.

COAL TAR PRODUCTS—
Creosote
New York, 1,042 bgs., £1,297.
Naphthalene
Rangoon, 10 cs., £13.
Pitch
Smyrna, 21 cks., £175.

COBALT OXIDE—
Paris, 13 cs., £881.

COPPER SULPHATE—
Bombay, 3 t. 6 c., £92.

CREAM OF TARTAR—
Bombay (F.), 1 c., £9.

DISINFECTANTS (*otherwise undes.*)
Auckland, 4 c., £5.; Durban, 5 c., £8.; Paris, 4 c., £10.; Rangoon, 2 t. 6 c., £75.; Wellington, 8 c., £16.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bombay, 1 cs. (pt.), £12.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 3 t. 8 c., £58.

FORMALDEHYDE—
Rangoon, 2 cs., £6.

GALLIC ACID—
Sydney, 9 pkgs. (pt.), £48.

GLYCERINE—
Bombay, 1 c., £8.
Madras, 4 t. 18 c., £339.

IRON PERCHLORIDE—
Sydney, 11 pkgs., £17.

LEAD ARSENATE—
Las Palmas, 1 drm., £7.
Melbourne, 54 drms., £197.

LEAD SULPHATE—
Rouen, 1 ck., £7.

MAGNESIA—
Barcelona, 20 cs., £298.; Perth, 2 cs., £5.; Sydney, 25 cs., £60.

MAGNESIUM CITRATE—
Barcelona, 4 cs., £38.
Switzerland, 1 cs., £6.

MAGNESIUM SULPHATE—
Bombay, 12 c., £19.; Casablanca, 4 c., £5.; Delagoa Bay, 15 c., £18.; Sekondi, 4 c., £7.

MERCURY OXIDE—
Amsterdam, 4 cs., £195.

PHOSPHORUS SESQUISULPHIDE
Buenos Ayres, 200 cs., £2,155.

POTASSIUM PRUSSIATE—
Paris, 19 kgs., £250.

POTASSIUM SILICATE—
Bilbao, 20 drms., £36.

POTASSIUM SULPHATE—
Channel Islands (F.), 2 t., £23.

SALICYLATES (*otherwise undes.*)—
Sydney, 5 cs. (pt.), £84.

SALTPETRE—
Amsterdam, 3 c., £5.
Parahyba, 2 t. 9 c., £110.

SODIUM BICARBONATE—
Bombay, 2 c., £6.
East London, 7 c., £14.

SODIUM BISULPHITE—
Antwerp, 12 c., £12.
Bordeaux, 2 t. 6 c., £46.
Paris, 2 t. 4 c., £51.

SODIUM HYDROSULPHITE—
Rouen, 2 cs., £9.

SODIUM SALICYLATE—
Durban, 1 cs., £7.

SULPHUR (FLOWERS)—
Rangoon, 10 c., £7.

SULPHURIC ACID—
Rangoon, 1 c., £7.

TANNIC ACID—
Vera Cruz, 1 cs. (pt.), £6.

TARTARIC ACID—
Bahrein, 1 c., £7.; Bombay, 2 c., £16.; Gibraltar, 2 c., £14.; Rangoon, 4 c., £43.; Vera Cruz, 4 c., £33.

TURPENTINE—
Wellington, 1 drm., £5.

ZINC OXIDE—
Paris, 1 cs., £6.
Pt. Sudan, 6 cs., £19.

Week ending August 18.

ANTIMONY REGULUS—
Santos, 1 t.

DYESTUFFS (NATURAL)—
Cochineal
Wellington, 1 c.

GLUE, SIZE, AND GELATINE—
Amsterdam, 2 t. 1 c.; Antwerp, 1 t. 13 c.; Bombay, 3 c.; Dunedin, 10 c.; Durban, 2 t.; Haifa, 6 c.; Jamaica, 1 c.; Larache, 4 c.; Melbourne, 1 t.; New York, 20 t.; Paris, 10 t. 13 c.; Perth, 10 c.; Piraeus, 1 c.; Pt. Elizabeth, 9 c.; Rotterdam, 1 t.; Sydney, 8 c.

PLUMBAGO—
Antwerp, 6 c.
Bilbao, 4 t. 16 c.

QUININE—
Haifa, 96 oz.; Pt. Sudan, 40 oz.

ROSIN—
Rotterdam, 1 t. 2 c.

SALT—
Malmo, 1 t. 9 c.; Malta, 10 c.; Pt. Said, 4 c.; Rangoon, 9 c.; Tangier, 5 c.

SHELLAC—
Italy, 1 t.

SOAP—
Adelaide, 1 c.; Amsterdam, 1 c.; Basra, 1 c.; Bombay, 1 t. 5 c.; Bremer, 1 c.; Cologne, 1 t. 4 c.; Constantinople, 1 c.; Durban, 1 c.; Ghent, 6 c.; Gibraltar, 1 c.; Harlingen, 4 c.; Kilindini, 5 c. Malta, 18 c.; Melbourne, 1 c.; Pt. Sudan, 11 c.; Rotterdam, 13 c.; Sydney, 3 c.; Wellington, 6 c.

TALLOW—
Channel Islands, 7 c.; East London, 2 c.; Genoa, 16 t. 12 c.; Nantes, 10 t. 9 c.; Riga, 200 t.

TURPENTINE—
Irish Free State, 1,200 gals.

WHITE LEAD—
Channel Islands, £5.
Melbourne, £345.
Rangoon, £199.

MANCHESTER.

Week ending August 18.

ALUM—
Canada, 35 brls.
Boston, 150 cks.

AMMONIUM CARBONATE—
Novisad, 12 cks., 10 kgs.

CHEMICALS (*otherwise undescribed*)
Bombay, 22 cks.; France, 14 cks.; Malta, 4 cs.; Toronto, 1 ck.

COAL TAR PRODUCTS—
Tar
Pt. Said, 2 drms.
Unspecified
Hamburg, 28 cks.
Switzerland, 95 cks.

DEXTRINE—
Bombay, 25 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Alexandria, 1 cs.; Bombay, 50 cks., 9 drms., 5 pkgs., 180 kgs.; France, 2 cks.; Gothenburg, 15 cks.; Melbourne, 1 kg.; Rouen, 23 kgs., 2 cs.; Switzerland, 6 kgs.

GLUE—
Cairo, 20 bgs.; Canada, 40 bgs.

LEAD SULPHATE—
Holland, 40 cks.

PITCH (STEARINE)—
U.S.A., 12 brls.

RED LEAD AND WHITE LEAD—
Pt. Said, 16 drms.

SALT—
Gothenburg, 1,967 sks., 500 bgs., 5 cks.; Montreal, 2,000 sks., 2,400 bgs.; Quebec, 1,600 pkgs., 1,650 sks., 20 brls.

SIZE—
Belgium, 3 cks.; France, 51 brls.

SOAP—
Bombay, 22 drms., 13 cs.

SODA ASH—
Bombay, 25 bgs.

TALLOW—
Pt. Said, 1 bx.

WHITE LEAD—
Belgium, 14 cks.

ZINC CHLORIDE—
Bombay, 4 drms.

PRICES CURRENT.

WEDNESDAY, AUG. 22, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23	6	& 47/-
Acetic, (Glacial, B.P.) in carboys	*ton	66	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	50	0	0
Citric	lb.	0	1	8¼
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	9
Tarteric (crystals)	lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	7	2	6
Pyridin	gallon	1	0	0
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	128	0	0
Alum, loose lump (delivered)	*ton	12	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	10	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	68	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	15	0	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	7	6
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	26	0	0
Formaldehyde, 40%	ton	78	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	0	0
Lead Acetate (brown)	ton	43	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey) 80%	*ton	20	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	35	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, comml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	46	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	9¾
Potassium Prussiate (yellow)	lb.	0	1	2
Potassium Prussiate (red)	lb.	0	3	9
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/-	&	57/-
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d.	to	9d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	7	15	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	13	0	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	7	6
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11½
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	6¼
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	14	10	0
Sodium Sulphide Crystals (casks)	†ton	8	10	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	64	5	0
Lead (Chemical Sheet), delivered	cwt.	1	14	0
Lead (Foreign Pig)	ton	24	2	6
Nickel	ton	30	0	0
Silver	oz.	0	2	7
Tin, English Ingots	ton	188	15	0
Zinc (Spelter)	ton	33	7	6
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	41	0	0
Linseed, Raw	*ton	42	10	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	38	0	0
Turpentine	cwt.	3	11	9

* *Packages extra or returnable*; otherwise prices usually include packages.

† Makers' prices for home consumption only

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
The World's Radium Supplies	243
The Control of our Dyestuffs Industry	244
The Pyrites Agreement	244
Gypsum and Gypsum-products	245
The Liquefaction of Coal	248
Agitation in Chemical Engineering Practice	249
Sumac Production and Trade	251
Casein in the Paints Industry	252
Egyptian Industry and Trade	253
The Oxidation of Carbon	253
Items of Interest	254
Chemical Trade of the Netherlands	255
Correspondence	256
Trade Inquiries	256
Gazette News	256
Reports of Companies	258
Cumberland Coking and By-product Industries	258
Publications Received	258
Fertiliser News	259
South Wales Notes	259
The Patent List:—	
Applications for British Letters Patent	260
Complete Specifications Accepted	260
Complete Specifications Open to Public Inspection before Acceptance	260
Abstracts of Latest Complete Specifications	260
New Companies	261
Thirty-five Years Ago	261
Market Reports:	
London "Open Market" Report	262
London Metal Market	263
Manchester Chemical Market	263
Swansea Market Report	263
Liverpool Chemical Market	264
West of Scotland Chemicals	264
Imports of Chemical Products	265
Exports of Chemical Products	267
Prices Current	270

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CURRENT TOPICS.

THE WORLD'S RADIUM SUPPLIES.

IT is not generally realised how completely the world's radium position has changed since the discovery in 1913 of new sources of uranium ore in the Belgian Congo, and particularly since the discovery of the Kasolo deposit by the British prospector, Sharp, in 1915. Up to within a year or two ago—for the outbreak of war did not permit extensive work on the Congo deposits till 1919,—by far the greater proportion of the world's radium had been derived from the deposits of Colorado and Utah, which yield about 5 milligrammes of radium per ton, and in all some 160 grammes of radium bromide had been produced. The new Belgian deposits, however, have proved so rich in radio-active constituents (about 150 milligrammes per ton), and comparatively so easy to work, that the American producers have found the competition too severe and have decided to close down their mines for some years to come. The Belgian mineral is worked up at Oolen, near Antwerp, where the largest and most up-to-date plant in the world has been erected and put into full operation within the short space of eighteen months. The method of extraction employed at Oolen does not differ materially from that worked out by Curie and Debierne. Uranium, iron, copper, lead, calcium, and phosphoric acid are eliminated by a series of operations which leave, as the final product, barium chloride containing about one part in 125,000 of radium chloride. The two chlorides are separated by an exceedingly lengthy series of fractional crystallisations, the first sixty of which are effected in enamelled cast-iron pans of continuously decreasing dimensions, and the subsequent fractionations are carried out in the laboratory until some 2 to 3 grammes of highly radio-active product is obtained. The material is then freed from any trace of lead by hydrogen sulphide, the chlorides converted into bromides, and the operation of crystallisation continued until a product containing 95 to 96 per cent. of radium bromide is reached. Six months ago the current price of radium in the world's markets was £20. to £25. per milligramme. At present the Belgian company, the Société Générale Métallurgique, is offering radium in unlimited quantities at £14. per milligramme, and the price can certainly still further be reduced. The Oolen works are now producing 3 grammes of radium per month, and this production can be increased if necessary to 6 grammes, which means a yearly output of 36 to 72

grammes. Cheap and plentiful supplies of radium, which leave a considerable surplus after medical and purely scientific needs have been met, must lead inevitably to new and valuable industrial applications being found for the material, and is is far from impossible that in the domain of organic chemistry at least, radium may be found an effective catalyst for carrying out certain reactions which at present require high pressures and temperatures, under more comfortable conditions.

THE CONTROL OF OUR DYESTUFFS INDUSTRY.

The resignation of Professor Arthur G. Green from his post of Director of Research to the British Dyestuffs Corporation has created considerable consternation, not only amongst those more or less directly connected with the colour-making and colour-using industries, but among the general public as a whole, and has once again focussed attention upon the internal affairs of our largest dyestuff-making establishment. At the present time Professor Green is our greatest tinctorial chemist. Under any circumstances, therefore, his resignation from active participation in the affairs of the Dyestuffs Corporation at a time so critical as the present would have been greatly regretted. When, however, he gives as his considered reasons for resigning his post that he is dissatisfied at the absolute lack of technical knowledge upon the board of directors, and that he is convinced that under present conditions the permanent establishment of a dyestuffs industry in this country is impossible, his resignation presents a still graver aspect. Professor Green, desirous as he is of doing nothing to hinder the future development of the industry, is naturally reluctant at the moment to go into further details of his motives, but it seems logical to assume that his action is dictated not only by the abstract belief that technical men should be included in the directorate, but by concrete knowledge of loss in efficiency that has occurred through the unsympathetic attitude of a purely commercial board of directors to those working on research problems. The present directors, on the other hand, have every confidence in themselves, and state that they rely implicitly upon, and are guided entirely by, the advice of their experts in all technical matters. Theoretically, such a system of control might appear quite satisfactory, but practically it always has, and probably always will prove rather unsatisfactory. Sir William Alexander, at the annual meeting of the British Dyestuffs Corporation in Manchester last month, explained in detail the present policy of the board in regard to research. This policy is to cut down expenses in the direction of the investigation of new products, and to concentrate the activities of the research staff upon reducing the cost of production and perfecting the quality of the large range of colours made at present. The unsatisfactory financial position of the company, and the pressing demand of the colour users for lower-priced products, were given as the reasons for this change of policy. To the average business man such a policy would appear not only justified, but the only logical one. To the technical man possessing an intimate knowledge of the growth of the German dye industry, however, the policy seems fraught with danger and liable to lead to stagnation. The incessant investigation of new products is, in his view, the lifeblood of the dyestuffs industry. Yet it must not be overlooked that comparison between the German pre-war industry and the world-wide dyestuffs industry of to-day is not absolutely straightforward. It is quite possible that had the German dyestuff industry been confronted with financial and economic difficulties of the magnitude that now face the British industry, similar measures would have been adopted. We are of the definite opinion, however, that irrespective of the merits or demerits of the present policy of the directors, the inclusion on the board of men possessing expert technical knowledge of the industry is the only way to secure internal harmony, and thus promote maximum efficiency in our dyestuffs industry.

THE PYRITES AGREEMENT.

Further particulars are now available regarding the agreement between the principal producers of pyrites. This agreement, as we announced at the time, was, after considerable difficulties had been surmounted, actually signed in the middle of July, and has thus been in operation for some six weeks. All the larger producers, such as the Rio Tinto, the Tharsis Company, Mason and Barry, and the Orkla and Huelva mines, are to retain their main customers, within the limits of the sales quota assigned to them. A certain quota is also allowed the smaller producers, such as the Pena Copper Company and the Esperanza Company, and an indemnity of about 3s. per ton is to be accorded those of the smaller producers whose sales have not reached the maximum allowed by their quota. The Saint Gobain and Montecatini establishments, although not actual signatories to the main agreement, have entered into a separate and subsidiary undertaking, whereby they are accorded the sole selling rights in the French and Italian markets. The agreement is to remain in force for five years, after which the question of further extension will be considered and an executive committee is to supervise matters from London. The functions of this committee will be to regularise production, to control sales, and to fix selling prices at a level dictated by the world demand for the pyrites. According to estimates made by the committee, sales should reach two and a half million tons this year, and this figure has been taken as the basis upon which the quotas have been worked out. It will be remembered that a slight rise occurred in the price of pyrites when rumours of an agreement amongst producers were first heard, but no material change in market conditions has since taken place. It is difficult to prophesy the direction of prices during the next month or so, but after all it is only a question of the intensity of the demand. The agreement should lead to greater economy of production amongst the pyrites suppliers, and the interests of consumers will be safeguarded sufficiently by the competition of sulphur.

GYPSUM AND GYPSUM-PRODUCTS.

A SYNOPSIS OF WELL-KNOWN AND LITTLE-KNOWN USES.

By C. Elliott, B.Sc., A.M.I.C.E.

THE mineral gypsum, $CaSO_4.2H_2O$ both in the crude and calcined condition, has many important uses. These are being continually increased and it is the purpose of this article to discuss the most important of them in some detail, to enumerate the minor applications of gypsum and to touch on the possibilities of extending its industrial employment, especially in this country. Unfortunately the comparatively high cost of the mineral and its disadvantages, such as solubility in water and uncertain strength, have prevented a full realisation of the possibilities that lie in its employment in some directions; but there is no doubt that in many ways gypsum products can show advantages over other materials.

In order to give some idea of the size of the industry in various countries, the following figures may be of interest. In the year 1920 the United Kingdom produced from its mines 291,598 metric tons, India 34,091 metric tons, Canada is credited with 389,319 tons, while the American output reached a total of 3,129,142 short tons. South Australia in the same year produced 40,192 long tons, but the only figures available for France are those for 1913 when the production was 1,726,379 metric tons.

Uses of Gypsum in the Cement Industry.

By far the most important use of raw gypsum is as a retarder in Portland cement. Pure cement sets very quickly, actually in a matter of a few minutes, and as this is obviously not desirable except under very special circumstances, it is necessary to add some substance which will retard the set and for this purpose raw or calcined gypsum may be employed. As the retarding effect is due to the sulphur trioxide, calcined gypsum, $CaSO_4\frac{1}{2}H_2O$ which contains about 55.2 per cent. would be preferable to raw gypsum which contains only 46.5 per cent., if it were not for the fact that the price of the former is roughly double that of the crude mineral. If gypsum is employed then, it is added in coarse lumps to the cement clinker as it leaves the kiln and before it is ground; but if plaster is used, it is added to the cement after grinding. Obviously the first method has the advantage that the cement and gypsum are uniformly mixed. The actual amount added varies from 1 to 3 per cent. depending on the setting time desired, and is limited by the specifications adopted as standard by various countries.

Since sulphur trioxide is the active retarding agent, it has been suggested that natural anhydrite, which is always found associated with gypsum, and which is practically valueless, would be suitable since it contains 58.7 per cent. SO_3, but this is very doubtful as the anhydrite is practically insoluble in water. In 1920 no less than 541,901 short tons of gypsum were thus employed in the American Portland cement industry. In connection with the cement industry many patents have been taken out with the idea of using gypsum as a substitute for limestone by removing the sulphur trioxide in various ways, leaving calcium oxide. The SO_3 could then be recovered as a by-product which would be conveyed to lead chambers and converted into sulphuric acid in the usual way. These efforts do not seem to have passed the experimental stage.

Uses in Agriculture.

In the United States the earliest and for many years the principal use of gypsum was as land plaster, but the amount now used annually (107,443 short tons in 1920) is very small relatively to the other purposes for which it is employed. Although its use in this country is not so common as this, yet a fair amount is added to the soil in the hopfields of Kent and Surrey. It must be understood that gypsum does not act as a direct fertiliser. It is not itself a food for plants and, in fact, its application to some soils would be valueless if not actually injurious. Its beneficial effect is realised only if there are certain elements in the soil with which it can react. For example, it accelerates the decomposition of zeolites and acts on the double silicates of magnesia and potash, thus liberating these valuable plant foods. Also should there be any black alkali (Na_2CO_3) or any magnesium carbonate in the soil, the gypsum converts these into sulphates and is itself converted into calcium carbonate which has no injurious effect. Its employment as land plaster is especially favourable in promoting the growth of cloves and other leguminous plants. It is claimed that the perviousness of sandy soil to water can be reduced and non-porous clay soils rendered more porous by the addition of the mineral. Another valuable property is its affinity for water, which is so great that it is of considerable service when starting grass or grain crops since it retains the water just where the roots of the young weak plants require it most.

Crops Saved by Gypsum.

In a hot season gypsum will often save a crop because it absorbs the moisture from the air. In Australia in 1921, the Government carried out experiments with gypsum on light soils in order to endeavour to raise wheat. A dressing of the soil at the rate of one and a half tons of gypsum and 100lb. of superphosphate per acre produced a yield of 27.4 bushels as compared with a yield of 6.5 bushels without the dressing. These experiments were repeated in 1922 and the yields were 9 bushels with no dressing, 15.1 bushels with 100lb. of superphosphate and 25.6 bushels when gypsum was also added.

In a similar connection there may be mentioned the ability of gypsum to absorb the ammonia from manure heaps and stable floors which would otherwise lose this valuable constituent. A small quantity—3 to 4lb. per animal per day—scattered on the floor of a stable or a cowshed will combine with the nitrogen in the manure to form ammonium sulphate according to the equation:

$$(NH_4)_2CO_3 + CaSO_4 = CaCO_3 + (NH_4)_2SO_4.$$

In this form the nitrogen is easily available as a plant food and has the advantage that it is stable in the air, is not washed from the heap by rain, but is retained until the manure is applied to the land. It is claimed that the gypsum also causes the potash and phosphates to be retained in manure, while if the mineral be added to a heap in alternate layers, only a few per cent. of the ammonia will be lost even after five or six months storage. In connection with these remarks it is interesting to notice that in the Badische synthetic-ammonia plant the ammonia made by the fixation of nitrogen extracted from the air is converted into ammonium sulphate according to the equation:

$$2NH_3 + CO_2 + H_2O + CaSO_4 = (NH_4)_2SO_4 + CaCO_3.$$

In chemical fertilisers, gypsum is mixed with superphosphates to bring the percentage of the latter to about 80 per cent., and sometimes partly-calcined material is added to act as a drier and to prevent the development of any mould.

Gypsum in the Paint Trade.

In the paint trade a considerable amount of calcium sulphate is employed in various ways. It is often found in combination with white lead and in some white paints, but owing to its solubility in water (1 part dissolves in 400/500 parts of water) it is used to only a limited extent in paints for exterior work. It finds considerable use in railway paints and in dipping or implement paints to prevent rust. Gypsum is also used as a substratum on which to strike certain organic lakes, notably para reds, while in Venetian reds it is often found to the extent of 50-80 per cent. Thus high class Venetian red may contain 50 per cent. ferric oxide and 50 per cent. calcium sulphate, although in this case the form of sulphate used is that which has been strongly heated and is therefore quite anhydrous and insoluble. Chrome yellow paints of a common class often have the mineral as a tinting agent and Brunswick blues also contain gypsum. The colour of a pure commercial gypsum is a good white, though with more blue in it than barytes but less than in white lead, and it is lighter than either of these pigments, but heavier than china clay or zinc white. As a pigment itself, gypsum is only suitable for use with water as a vehicle, for with oil it loses its opacity and becomes more or less transparent. It is however quite permanent when exposed to light and air and, being neutral in its properties, can be mixed with any other pigment. Gypsum possesses good covering power and in this respect is better than white lead, barytes, zinc white or lead sulphate. Artificial gypsum —*i.e.*, precipitated calcium sulphate is better than the natural variety because it is more amorphous—*i.e.*, less crystalline in structure and has a better body and covering power.

Value in Water for Breweries.

The quality of the water available in the neighbourhood of a brewery often influences the particular type of beer made. Thus the Burton water, which has its origin in the Keuper beds in the district, is very suitable for the manufacture of the pale ales for which the place is famous, this being due to the large amount of calcium sulphate dissolved

in the water which increases the solubility of the albuminous matter in malt. The amount of calcium sulphate present in a typical water from Burton-on-Trent is 78 grains per gallon, the other constituents such as magnesium and calcium carbonate, sodium sulphate, etc., having a total of 55.5 grains per gallon. If the water is too soft and does not contain sufficient sulphate, then gypsum can be added to remedy the defect, care being taken that it is as pure as possible and quite free from marl. A suitable analysis would be as follows:

	Per cent.
Gypsum	98.84
Silica	0.34
Alumina and Iron	0.34
Magnesia	0.08
Alkalies	0.14
Moisture and Organic Matter	0.26
Total	100.00

If the water is too hard, then it can be diluted with a softer water, or the calcium sulphate partly removed by the addition of sodium carbonate. In the manufacture of black beer the water should be soft and contain relatively large amounts of calcium and magnesium carbonate and but little gypsum, while water adapted for mild ales should have large amounts of chlorides and again little gypsum.

Gypsum in Foodstuffs.

The writer has seen it stated that the first grinders of gypsum were the millers and the first calciners were the bakers, so that it appears that they recognised some of its advantages, though possibly the poet Tennyson appreciated the other point of view when he wrote:

> "And chalk and alum and plaster are sold to the poor for bread."

The use of gypsum as an adulterant is not however confined to bread, for it is found in sugar, baking powder, and many other foodstuffs according to the ingenuity of the maker and his regard for the law. Although this use of gypsum is very small and, let us hope, decreasing, yet the presence of the mineral in water has considerable influence in bread making and in excessive quantities it checks the fermentative action of the yeast, this being noticeable in the waters of the great Cheshire plain which come from the new sandstone rocks and in the Burton water just mentioned. Soft alkaline waters possess great extractive powers and they also affect the protein constituents such as gluten and permit its being more readily modified and degraded, whereas hard waters, especially of the gypsum type, retard these actions. Gypsum in common with salt has an antiseptic action. Like sulphates in general, gypsum has a binding effect on flour and it also causes bread, after cutting, to become dry quickly, as may be noticed in the case of exhibition loaves to which it has been added to improve the texture.

Paper Making and Crayons.

In the manufacture of paper it is usual to add to the paper pulp a quantity of a cheap mineral loading agent or filler to make the paper more suitable for the particular purpose for which it is intended. Thus kaolin or china clay is used for newsprint and for any other papers of a low grade, but for the better qualities of writing paper gypsum is usually though not exclusively employed. The addition of a filler closes up the pores, gives a smoother surface and increases its absorbent powers for printing and other inks. It also gives it an improved surface for calendering and increases the opacity of the paper.

The common blackboard or school crayon, commonly known as chalk, is made of finely-pulverised crude gypsum. To this are added certain ingredients such as a suitable binder and, where coloured crayons are required, a small amount of a pigment of the necessary colour. After thorough mixing of the gypsum and the added materials, these are pressed into shape in suitable moulds by the application of pressure.

Miscellaneous Uses of Gypsum and Anhydrite.

Gypsum is employed in the cotton and lace trades to give a finish to cheap classes of goods; to some extent in the tin trade for polishing tin plates, although in this case an impure gypsum containing a large amount of marl is preferred; as an ingredient of Paris green and other insecticides; as a flux to galena concentrate in the Carmichael-Bradford blast-roasting process of reducing lead ore in the United States; as a smelter in New South Wales; as a flux in the concentration of lead-copper matte in reverberatory furnaces in Germany; as a source of the sulphur necessary for collecting the nickel into a matte in the smelting of certain ores of that metal in New Caledonia, in which case it also acts as a base to counteract and slag the siliceous gangue; for the dusting of coal mines as made compulsory by law and for many other purposes.

In the unground state large quantities of fine-grained semi-transparent or translucent gypsum or alabaster are used by sculptors for statuary and for ornamental and useful purposes such as electric light shades. The alabaster reredos by Gilbert Scott in Ely Cathedral is an excellent and beautiful example and it can also be seen as ornamental work in Manchester, Buxton and many other places. Another variety of gypsum called selenite occurs in nature in transparent, flaky pieces and has the property of cleavage so highly developed that it may be split into very thin flakes which caused its use in earlier days as a substitute for our present-day window glass. Selenite is also used to a limited extent in optical apparatus and for making examinations with polarised light.

On account of its solubility in water gypsum has not found any extensive application for external work, but in a few places in the arid regions of the south-western parts of the United States and in other parts of the globe where similar conditions hold, gypsum has been quarried in blocks and used for the walls of buildings, and under favourable climatic conditions such walls may remain secure for many years. Occasionally in the same localities gypsum has been employed as a road material.

The mammillated masses of gypsum that often occur at the top of the seam or in swallow holes where they have been attacked by water, are sometimes sold as rockery or grotto stone, especially the red or pink varieties. Anhydrite, which is always found associated with gypsum and satinspar, which is an aggregate of long fibrous crystals of gypsum, is also used for this purpose, while crushed spar for walks and screened spar for pebble-dashing find some sale. Anhydrite is always a nuisance to the owners of a gypsum deposit and is difficult to get rid of. In addition to the uses already mentioned, it has been employed occasionally as a road material.

The Uses of Plaster.

When gypsum is calcined the water of crystallisation is driven off in two stages,* usually called the first and second boil respectively, the first where plaster consisting mainly of $CaSO_4.\frac{1}{2}H_2O$ is obtained, which is known as plaster of Paris or first settle plaster, the second where the material is mostly anhydrous calcium sulphate and is termed second settle plaster. Since second settle plaster reverts to first settle on keeping, through picking up moisture from the air, it is only made for immediate use at the works and is manufactured in relatively small proportions. In the following enumeration of the uses of plaster, it is understood that the word plaster refers to first settle plaster only unless otherwise stated. In discussing the various uses to which gypsum plasters can be put it is clearer to adopt two main classifications, one where the material is used with the addition of water only and the other where other material is added to it before the water is applied.

Plaster in Pottery Moulds.

Large quantities of plaster are used annually by the manufacturers of pottery and architectural terra cotta in making moulds for their designs, a purpose for which it is very suitable for not only is there ample strength combined with light weight but the moulds are easily made and inexpensive. In addition the porosity of the set mould permits proper absorption of the moisture from the clay and its subsequent evaporation, whilst the surface of the ware is not exposed to dangerous draughts. It will also be recalled that plaster, in setting with water, expands owing to a change in its crystalline form, and it is due to this expansion that the moulds can take an impression of the smallest details of the original model. These details will then be reproduced faithfully in the pottery and ware made in these moulds. A plaster suitable for pottery moulds is usually very finely ground, probably all passing through a 100 mesh sieve, but there is not the same need for a fine material for terra cotta moulds.

Plaster in Plate Glass Manufacture.

Manufacturers of plate glass use large amounts of plaster on which to bed the glass during grinding and polishing. The rough glass plates are placed on large circular tables—up to 24 feet in diameter—which have been covered

* See also the article on "Plaster-of-Paris Technology," by Mr. C. Elliott, in *The Chemical Trade Journal and Chemical Engineer* June 15, 1923, page 725.

previously with a bed of plaster on which the glass settles. When the plaster has set it makes a firm support and relieves the glass from all strains. As soon as one face of the glass has been polished, the plaster is broken away from the edges, the plate removed and the table cleaned. A fresh layer of plaster is then spread out and the plate replaced with its polished side down, and the other side is ground and polished. For the first bed the old set plaster is often reground and recalcined, so that when mixed with fresh plaster it can be used for the rough side, but when the polished face is downwards only fresh plaster is used on account of the danger of scratches. The plaster used for this purpose must be very finely ground and free from grit.

An Invaluable Aid in Surgery and Dentistry.

Plaster is used by surgeons for casts around broken limbs, a purpose for which it is very valuable for it is plastic, sets quickly and gives good support to the injured member and is also a non-conductor of heat and unaffected by moisture. There is no equally-available and suitable substitute, but the idea is by no means novel since in earlier days the Persians immersed people whom they disliked up to the neck in a mass of wet plaster which, when expanding during setting, slowly crushed the unfortunates to death.

In orthopedic surgery, open-mesh bandages of various widths are passed through a tray containing dry plaster which is caught up by the meshes. The bandages are then rolled up very tightly and when required for use are immersed in water for a couple of minutes and then unrolled and wound round the injured part of the patient, forming when set a very strong splint.

The amount of plaster used in dentistry is not relatively very large, but it is important. In the United States in 1920, 1,721 short tons were used in this way out of a total of 1,578,360 short tons of plaster produced and considering the small quantities that are used at a time, this is a considerable total. The plaster is used in the construction of models of teeth and contiguous parts, as an investing material in the process of vulcanising and for taking impressions of the mouth. For the last purpose an extremely fine-grained material to which an accelerator has been added is preferred, since the qualities demanded in such work are reproduction of fine details and a quick set. The fines from the last screenings of reground calcined gypsum are suitable for this purpose. Plaster used for investing work and for dental casts and models is not so finely ground and it sets slower, but is harder when set. Impression plaster is not so strong, and this is really advantageous as it fractures easily and facilitates the withdrawal of the impression from the undercut spaces.

Methods of Reducing the Expansion of Plaster.

While the expansion which occurs on setting is advantageous and useful for obtaining good detail work, yet the errors due to it are important and very considerable research has been carried out on the subject. It has been found that an acqueous solution of potassium sulphate and especially sodium potassium tartrate (Rochelle salt) reduces the setting time and also the expansion. Thus a solution of 40 grains of the tartrate in 1½ ounces of water used with 2½ ounces of plaster, reduces the set by half and the expansion to one-fiftieth of that of pure plaster.

Plaster in Engineering Pattern Making.

In some copper refineries plaster is used to bind the flue dust and concentrates by mixing it with these and putting the whole into sacks which become solid when the plaster has set. The solid blocks can then be removed without difficulty to the furnaces for the recovery of the valuable constituents originally carried away in the flue dust.

For certain special castings and for casting Babbitt metal, plaster is used fairly extensively for the moulds, as it is porous and resistant to fusion while, mixed with a pure grade of wheat flour, the material is known as Corine flour and is employed to dust moulds for metal castings.

An increasing outlet for plaster is found in the construction of patterns in foundries, a purpose for which it can show considerable advantages, such as simplicity, cheapness and speed of construction. Thus the cost of some patterns in the best quality yellow pine usually used is twice that of those made of plaster, and one of the chief disadvantages of the former is liability to warp which need not be feared with plaster. In the case of circular designs, the plaster patterns may be finished direct by strickling with templates and by suitable methods much irregularly shaped work can also be made by templates. In other cases it may be necessary to cut or shave the patterns or to make additions, operations to which the material particularly lends itself. When the pattern is of large size, the setting time is increased by the addition of a suitable retarder, usually lime, and in the case of large blocks coke may be used as a centre on which only a thin layer of plaster need be run, so that the patterns are lighter and cheaper. Projections, corners, and other weak parts that might get broken, are often strengthened by white metal pieces, which can be either nailed on or placed in the mould before the plaster is poured.

Miscellaneous Uses of Pure Plaster.

A considerable amount of plaster is used in the manufacture of small statues, busts, etc., which find a ready sale and are inexpensive, and it is invaluable for making negative moulds for replicas of ancient statues and pieces of architectural ornament, for the reproduction of models of relief maps, and scientific models originally made in clay or any other plastic material. It is also used for the statues or maps themselves which are made from the negative moulds, all the minute details of the original being faithfully reproduced.

Amongst other minor uses may be mentioned the use of the material for the heads of matches, between the hollow walls of safes as a fire resistant; for the blocks on which hats are made; in taxidermy, for finishing the surface over which skin is drawn; in paleontology, for supplying missing parts and for imbedding fragile fossils for transportation; in mouldings, cornices and artistic designs, such as relief decorations on walls and ceilings; as a mould for rubber stamps into which the plastic rubber is poured and for other various purposes.

Gypsum Plaster Boards and Tiles.

Plaster with the addition of hair, wood fibre, sand and retarders is employed in buildings for walls and ceilings, for the exterior surfaces of temporary work such as exhibitions, for the setting up of marble construction and glazed tile walls and for making decorative artificial stones. The amount consumed in these ways is very great, but a description of and discussion on its use in this way would be more suitable for a journal catering for the building trade. A brief description of gypsum plaster boards and tiles and of reinforced gypsum will, however, be given, as these are of definite interest to the engineers of chemical works.

Gypsum plaster boards are thin sheets of plaster with a fibrous binding material—such as tough paper or wool felt—which gives the necessary strength and toughness. The simplest boards have one layer of plaster between two layers of felt, but 2 or 3 layers of plaster between 3 or 4 layers of felt are also common and all are made automatically and continuously by ingenious machinery. These boards are remarkably strong and much superior to lath and plaster. They are light, very markedly fire resistant, excellent non-conductors of heat and can be cut with the greatest of ease. Gypsum tiles are simply large blocks of set plaster with a suitable filler, such as wood fibre, added to decrease still further the weight and to give additional strength. Both plaster boards and tiles are made in this country and are extensively used. One of the principal uses of second settle plaster in America is in the manufacture of these tiles, a purpose for which it is very suitable.

Reinforced Gypsum as a Constructional Material.

Gypsum is weak in tension and shear but strong in compression, and when it is suitably reinforced it is an excellent material for roofs and floors. Its employment for these purposes, in fact, has reached very great proportions in North America where some firms have many acres of gypsum construction. The work may be either done *in situ* or precast at the mill and dropped in place and in both methods, one of the greatest advantages is the speed of erection. With poured-in-place construction a gang of men can easily lay 7,000 sq. ft. in one working day and it is very remarkable that an hour after pouring in the plaster, full load can be applied and all the wood form-work dropped, which contrasts very strongly with the weeks that must elapse before concrete can be put into service. Since gypsum as used in floor construction is less than half the weight of concrete, it is obvious that the supporting structure can be made much lighter and naturally the foundations needed are also less.

An important point is the complete absence of condensation where gypsum roofs and floors are employed, provided of course that there is reasonable ventilation. Being an excellent non-conductor of heat it is possible to have a bitter

frost outside a building and a hot steamy atmosphere inside without any trace of moisture or condensation on the inside surface of the roof. For the same reason extremes of temperature have little effect on the temperature of the interior of a building, which conduces to the greater comfort of the workers and therefore to increased output. If for any reason it is desired to cut through a gypsum floor or roof, the operation is carried out with the greatest of ease and speed, whereas most of us have experienced the great difficulties of cutting concrete and the long time required. When reinforced gypsum slabs are made at the mill then second settle plaster is often employed because it is stronger when set and also denser and harder.

One of the great advantages of gypsum construction is the resistance that it offers to heat, and in this respect it occupies a high position in the list of materials suitable for this purpose.* In a chemical works, it is very valuable for buildings where inflammable liquids are stored and in many cases a lower fire insurance rate can be obtained when gypsum is used in the construction, while its actual fire record is magnificent.

Gypsum is, of course, by no means a universal material. It has certain uses for which it is pre-eminent, others for which it gives every satisfaction, but in other cases is quite unsuitable. There is no doubt, however, that the uses of gypsum products will be extended considerably as time elapses, and with a more general appreciation of its properties, realisation of its advantages and improvements in its manufacture and subsequent technical treatment.

THE LIQUEFACTION OF COAL.

THE BERGIUS HYDROGENATION PROCESS.

By David Brownlie, B.Sc., M.I.Mech.E.

IN this article it is proposed to give a short account of the remarkable work now being undertaken in connection with the so-called "liquefaction" of coal, that is, the action of hydrogen on coal at enormous pressures whereby the volatile matter of the coal absorbs large amounts of hydrogen, and the complex chemical reactions result in the greater portion of the coal being converted into a thick liquid almost identical with crude petroleum. The extraction of oil from coal is, in my opinion, bound to be a large-scale commercial proposition in the very near future. For one thing the known reserves of coal in the world are enormous, sufficient at least for the next 4,000 years at our present consumption of, say, 1,400,000,000 tons per annum, allowing for a steady increase in this figure, and it is obvious further deposits remain to be discovered. Low temperature carbonisation of coal will in general give us 20-25 gallons of oils per ton of coal, in addition to sulphate of ammonia. It is true that so far low-temperature carbonisation is not a commercial proposition, but well over 30 processes are being investigated, and in many cases the work has been in progress for 10 years past, and a very small dividing line indeed now separates several of these processes from complete success.

The Preparation of "Artificial Coal."

The idea, however, of utilising the volatile matter present in coal to the extent of an average of, say, 25-30 per cent. by direct combination with hydrogen, and what may be described as increasing the amount of such material instead of decomposing part of it by carbonisation, so as to obtain the rest in a liquid condition, is a remarkable one. The pioneer in this field is undoubtedly Dr. F. Bergius, of Mannheim, in Germany, who about 10 years ago, commenced research work in connection with the constitution of coal. The general method adopted by Bergius, following on the work of earlier investigators such as Stein and Klason, was to endeavour to prepare an artificial coal substance. During this work Bergius discovered that if cellulose, peat, or similar woody material from which coal has been derived, is heated in autoclaves at very high temperatures and pressures, such as 1,500lb. and 640° F., after about 12 hours such cellulosic material is converted into a black substance somewhat resembling coal, and containing 84 per cent. carbon, 5 per cent. hydrogen, and 11 per cent. oxygen, a large amount of carbon dioxide having been given off in the process. This artificial coal, it will be noted, contains as high a percentage of carbon as very many existing coals, an achievement which the earlier investigators could never manage.

The Use of Enormous Pressures.

Bergius also discovered that in closed autoclaves the chemical reactions that took place were strongly exothermic, and that the large amount of heat evolved resulted in a considerable portion of the material being partially destroyed and converted into coke, but there was no method of controlling the sudden rise in temperature. This difficulty was finally surmounted by placing the autoclaves in water. The heat is then readily absorbed and no coke is formed. Bergius himself, however, encountered the greatest difficulty when endeavouring to raise the percentage of carbon much over 85 per cent., and finally was only able to obtain a product, containing 88 per cent. of carbon by the use of enormous and dangerous pressures, in some cases as high as 5,000 atmospheres (75,000lb. to the square inch). Under these conditions methane begins to be evolved, and we are therefore within the region of the true coal substance, since methane is a regular constituent of the coal seams.

The First Hydrogenation Experiments of Bergius.

It was whilst carrying out this fascinating work that Bergius discovered that his artificial coal substance containing 85-88 per cent. of carbon would combine with hydrogen, and that at very high temperatures and pressures in the autoclaves, such as, for example, 850° F. and 3,000lb. per square inch, a large volume of hydrogen was absorbed and the whole of the solid material converted into a thick liquid, which apparently had the same general complex composition as crude petroleum. Bergius then applied this discovery to natural coal, and found that the latter, in a pulverised condition at high temperatures and pressures, would readily absorb a large amount of hydrogen, and be nearly all converted into a liquid material with a very high hydrogen content. It may be stated that this process of hydrogenation is now being applied on a commercial scale in Germany to oils of every description, that is to say, the direct conversion of heavy petroleum and other oils of comparatively little value into much lighter and lower boiling-point oils. This work is being undertaken by the Company with which Dr. Bergius is associated at Rheinau, near Mannheim.

Plant Details for the Hydrogenation of Heavy Oils.

A given quality of heavy oil is first examined experimentally in the laboratory so as to find out the best method of dealing with it on a large scale. For this work a small 5-litre steel autoclave is used, in which is placed a weighed amount of oil, and hydrogen is then pumped in at the required pressure, after which the autoclave is heated. It is then slowly revolved whilst being heated by means of powerful gas jets, the operation being carried out in heavy reinforced concrete chambers. The pressure developed is enormous, often as high as 3,000lb. per square inch, and because of the dangerous nature of the work all the controls are electrical and operated from a considerable distance. So far, however, no accidents have occurred. The autoclave is then allowed to cool down and the liquid product examined and analysed, so that in this way the best conditions as regards temperature and the amount of hydrogen necessary are determined experimentally before proceeding with the work on a large scale.

The latter plant is on essentially the same lines, and consists of very heavy steel autoclaves with a capacity of about one ton of oil per 24 hours. The construction of these autoclaves seems to be to a large extent kept secret, and many points are not clear, but they are about 30 feet long, and of 3 feet internal diameter, having a replaceable steel liner and internal mechanical agitator. The heating is carried out in the most ingenious manner by passing continuously between the inner and outer lining of the autoclave, a current of very high pressure nitrogen gas heated to the necessary temperature. The oil is pumped into the autoclave by means of high pressure force pumps, on the way being heated in coils by the exit nitrogen from the autoclaves, and the action seems to be continuous in the sense that the hydrogen under pressure is passed in continuously, the lighter hydrocarbons formed from the oil being passed away at once to a dephlegmating apparatus, which is also under pressure, whilst the heavy liquid residue in the autoclaves is at the same time withdrawn continuously.

The complete installation is stated to have a capacity of 50 tons of oil per 24 hours, and as in the case of the laboratory trials, the whole equipment is worked behind enormous

* See footnote on page 246.

reinforced concrete chambers controlled from a distance, and here again no accident has yet occurred.

Practical Difficulties in Coal Liquefaction.

The application of this method, however, to the commercial manufacture of products like crude petroleum direct from the coal itself is a matter of extraordinary difficulty. In the first place coal, no matter how finely pulverised, is still a solid, and therefore it is impossible to get the same intimate contact between the hydrogen and the material to be hydrogenated. Consequently a much longer contact is necessary, say 12 hours, in place of the usual short period for a liquid, so that the output is seriously reduced. Another difficulty, as already indicated, is that the reaction is exothermic, and therefore it is extremely difficult to control the temperature and prevent a large amount of coked material being formed. However, there seems to be no doubt that the genius of investigators who are busy with the problem in various parts of the world will get over this trouble, and one method which is being investigated by Dr. Bergius is to suspend finely pulverised coal in heavy oil as a medium and circulate this through the autoclaves instead of ordinary oil.

Of course a very great deal depends on the composition of the coal itself, that is to say, the percentage of volatile matter present. If chemically-pure carbon in the form of charcoal is submitted to the action of hydrogen under enormous pressures there is no reaction whatever, and it is found also that it is practically impossible to obtain a chemical reaction at any known pressure between hydrogen and highly anthracitic coals, that is to say, qualities containing over 85 per cent. carbon, calculated on the ash-free basis, or very roughly, over 90 per cent. carbon in the coal. Ordinary coal contains on an average 25-35 per cent. volatile matter, and when this is treated at varying pressures from 600-3,000lb., and say 750° F. with hydrogen, a considerable portion of the coal is converted into a thick and complicated liquid, which seems to be almost identical with crude petroleum, and which in the same way can be separated by fractionation into an enormous range of different chemical compounds. The nature of the reaction occurring is at present being investigated, but it would appear that all the oxygen in the coal is converted into phenols, the nitrogen into ammonia or ammonium compounds, and the sulphur into sulphuretted hydrogen.

Recent Suggestions Involving the Use of Catalysts.

Already there are rumours of catalysts being applied to the hydrogenation of coal, in particular of the method of H. Magnus, of Freiburg, Baden. In this, pulverised coal is stated to be passed continuously through retorts in the presence of hydrogen, which is caused to combine at a quite moderate pressure and temperature by means of two separate catalysts, and is then converted into the liquid product. No details, however, are yet available, and this may be an exaggeration, but it shows the tendency, and there are further rumours of another process on somewhat similar lines which is now at work in Czecho-Slovakia.

Another possibility of causing coal to combine with hydrogen under moderate conditions of temperature and pressure is represented by the use of hydrogen in a nascent condition. The German chemists, H. Fischer and H. Schräder, use pulverised coal or lignite with sodium formate prepared in the ordinary way from formic acid. When sodium formate is heated at a temperature of about 680° F. it decomposes, forming sodium oxalate and liberating free hydrogen, which at the moment is in the nascent condition. It is stated that if one part of powdered sodium formate and four parts of pulverised lignite are intimately mixed and heated for three hours at 750° F. in a current of steam at ordinary pressures, the nascent hydrogen liberated by the decomposition of the sodium formate results in about 25 per cent. of the lignite being converted into a liquid product. If the same operation is carried out at high pressures very nearly 50 per cent. of the lignite is converted into liquid.

Finally much experimental work is also being undertaken in connection with the heating of powdered bituminous coal at about 450° F. for 10 hours in a strongly alkaline solution in the presence of compressed air, using iron or manganese salts as a catalysts. Under this treatment the coal substance is almost entirely decomposed by oxidation, a large amount of gas being formed, together with a complicated resinous material something like turpentine, and a considerable amount of complex fatty organic acids which dissolve in the alkali present.

AGITATION IN CHEMICAL ENGINEERING PRACTICE.*

THE CHOICE OF SUITABLE STIRRING DEVICES.

FUNDAMENTALLY, agitation is accomplished by applying force to a more or less fluid mass and then opposing the resulting movement in such a way as to alter its direction or otherwise emphasise its selective action on various parts of the mass. Movement must be brought about in parts of the mass in such a way as to force changes in the relative positions of its various particles. The means by which this result is accomplished in practice may be roughly classified into six groups: (1) simple paddles and modifications; (2) turbines and modifications; (3) propellers and modifications; (4) processes involving movement of the containing vessel; (5) combinations of two or more of the above; (6) miscellaneous unclassified types.

Paddle Agitators.

The simple paddle in the hands of a workman is seldom found profitable in modern operations, but frequently its immediate successor, single or multiple vanes mounted on a rotating shaft, is found quite efficient where movement need not be violent, as in those cases where liquids of very nearly the same specific gravity are to be mixed and where mixing is used as a means of aiding osmotic forces. Dissolvers and leachers of this class with slow-motion paddles are found to be efficient, as in these machines the problem is really the mixing of the strong solution in direct contact with the solute with the more dilute solvent.

Paddle agitators involve the application of force with two directional components, one in the direction of rotation and a second centrifugally and at right angles to the first. The rotating force is comparatively greatest and the centrifugal force least when the movement of the paddle is slow and tends to bring the mass as a whole into rotation at a speed approximating that of the paddle. Actual mixing in this event is comparatively slight. The inertia of the mass, as well as the resistance to rotation offered by the walls of the containing vessel, tends to start cross currents of various kinds and thus promotes some mixing. Increases in the resistance to this rotational motion are made by introducing stationary paddles or simple vanes projecting from the sides of the containing vessel in various ways which break up the otherwise solid stream of liquid caused by the rotating paddle. The centrifugal component of the applied force grows rapidly as the speed of rotation increases, and is ordinarily only opposed by the containing walls. The movement in the mass caused by this force is utilised more or less incidentally in the ordinary paddle mixer but becomes the principal force in turbine mixers. Motion from the centre toward the walls of the containing vessel is changed in direction at that obstruction into up or down motion following the wall, and is largely influenced by the strong rotational movement which is especially rapid at the periphery of the vessel. Few machines are now built which are of the simple paddle type, as most builders incline the paddles in such a way as to add a force component in the direction of the paddle's axis.

Combinations of paddles are frequently used. Two paddles mounted to revolve in the same direction at the foci of an elliptical vessel, three paddles in a clover-leaf vessel, etc., generate conflicting currents in the liquid and bring about very efficient mixing in many processes. The mounting of two sets of paddles on the same axis to revolve in opposite directions has been found to consume a disproportionate amount of power. The use of single or multiple sets of paddles mounted eccentrically in cylindrical tanks gives economical mixing in many cases where a centrally mounted paddle would result in a simple rotation of the mass without real mixing. Inclining the axis of a cylindrical vessel with a simple paddle revolving in its centre produces a marked increase in mixing by utilising gravitational force.

Stirrers of the Turbine Type.

The turbine type agitator is really a special case of the paddle type, but since the principal force used is centrifugal rather than rotational, it must be considered separately In this type of agitator the rotating unit is so designed as to minimise the rotational component of force and increase the centrifugal component to a maximum. Its operation is in

* Abstract of paper by D. H. Killeffer in *Industrial and Engineering Chemistry*. February, 1923.

all respects similar to that of a centrifugal pump, with the exception that the motion of the liquid is permitted in every radial direction instead of being forced in a single direction by a casing or pipe. The radial currents are directed toward and up along the walls of the containing vessel by placing the turbine itself close to the bottom. In general, the speed of the rotating member is high and sufficient force can be communicated to the liquids to bring about efficient mixing of liquids of widely differing specific gravities. Its use is practically limited to liquids of low viscosity and to those which do not contain solids except in very finely divided form. Its efficiency depends upon the mobility of the liquid and upon giving it a high velocity.

Usually, turbine mixers are most efficient when placed in the centre of the bottom of cylindrical tanks in such a way as to permit free movement of the radial streams to the walls of the vessel where they are turned in a vertical direction. The flow of liquid in this case is down in the centre to the impeller, out along the bottom to the sides of the tank, up the sides and thence to the centre at the surface of the liquid. The impeller itself is provided with a partial casing so arranged that the supply of liquid to the vanes is taken in near the centre and forced directly out toward the periphery through the guiding effect of vanes in the partial casing. In some cases, especially where the liquids to be mixed are of nearly the same specific gravity and where the volume to be mixed is large, it is advantageous to elevate the impeller unit from the bottom to the centre of the tank, as here two whorls are started, one above and one below the impeller.

Developments in Propeller Mixers.

Ship-propeller agitators introduce a third force component in a vertical direction to those already considered, and it is through the emphasis of this component to the detriment of others that such agitators are made efficient. A simple propeller set in the centre of the mass of liquid imparts motion to it in each of three directions, horizontally, rotationally, and vertically with respect to the propeller. At slow speed these effects are negligible, but they increase rapidly with the velocity of rotation, until a point is reached at which the resistance to motion, and hence the power consumed, becomes too great to permit efficient operation. The efficient speed of the propeller is ordinarily intermediate between those of the turbine and the simple paddle.

The first step in limiting the effects of the rotational and centrifugal components was to reduce the first by altering the shape of the containing vessel by vanes more or less vertically placed on its sides, or by otherwise altering it to increase the resistance to rotation. From this it was an easy step to place these vanes in a vertical open tube closer to the propeller than the walls of the vessel, in such a way as to limit both the rotational and centrifugal forces to action on a small part of the mass while permitting the vertical component to act freely on the whole. These draught tubes, as they are called, force high-velocity streams of liquid in a vertical direction, and it has been generally found that this method gives the greatest mixing of two liquids of markedly different specific gravities, such as acids and hydrocarbons. Since such reactions as nitration are strongly exothermic, the mass of liquid must be moved rapidly past large cooling surfaces. One type of agitator has been developed especially to accomplish this end. Here the propeller is placed in a tube outside the main container and a great mass of cooling coils is located in the main vessel. The inlet and outlet of this tube are so arranged that the stream of liquid through it causes a more or less pronounced swirl in the main volume around and through the mass of cooling coils. The effect of the marked difference in specific gravity of the liquids to be mixed is largely offset by introducing one of them, usually the hydrocarbon, at a point in the draught tube just before the stream comes to its point of greatest agitation at the propeller.

Still other makers of agitators find a propeller provided with a narrow ring around its circumference highly efficient in producing a maximum vertical component, with little energy wasted in the other two directions. Another type has two propellers mounted on the same shaft in such a way as to revolve in opposite directions, yet producing parallel vertical components. Here the rotational component is minimised by the action of the two opposed propellers, and a pronounced vertical flow is achieved, while the centrifugal component is neglected. The neglect of the latter feature is generally considered of little consequence, but it is conceivable that it might be more efficiently used than in present machines of this type. Other modifications of the application of the propeller principle involve setting one or more eccentric in much the same way as described for paddle stirrers, inclination of the containing vessel, multiple blades, propeller mounted on the same shaft to rotate in the same direction but to produce vertical components in opposite directions, continuous screws set in less fluid masses, and so on through every conceivable variation as varied in type and design as the engineers who have studied the question. The universal appeal of the propeller type agitator to the imaginations of designers is well borne out by even the most cursory survey of the field.

Moving Vessel Agitators.

The types of agitating devices so far considered lend themselves most readily to fluid masses but are decidedly less efficient in handling viscous masses. Usually such masses must be mixed slowly, and it is frequently found best to accomplish this by making use of the force of gravity. The mixture to be agitated is placed in a more or less cylindrical vessel which can be rotated about a horizontal axis. In this case the rotation of the container raises the mass by degrees, and its fall from slight elevations brings about the desired mixing. The vessel may be cylindrical, in which case it is usually provided with projections toward the centre from its inside periphery, or it may assume a variety of shapes from spherical to cubical that will assist the operation of raising parts of the mass and allowing them to fall back into the original mass, their relative positions being thus altered. Cement kilns and barrel dissolvers used in shellac manufacture are the simplest practical machines of this type. The ball mills are modifications of the same principle since they include balls to assist the motion in the mass as well as to perform the grinding operation.

The majority of agitators for mixing viscous masses—apart from those mentioned above, the application of which is not limited to this use—are modifications of the simple paddle mixer with some propeller action so altered as to permit the application of the greater forces required. In general, the principles involved are the same after allowance is made for the lack of fluidity of the mix and the consequently greater power requirement. As an engineering problem, however, viscous mixing presents many problems not involved in mobile mixing.

Combination Agitators.

Combinations involving two or more of the foregoing types of agitating devices may be found in most machines as commercially used. The combinations and their applications are as numerous as the uses to which they are put, as it is seldom that the operating engineer finds a tool ready built to suit his particular need, in spite of the variety offered by makers. Combinations of simple paddles with propellers and of turbines with propellers in greatest variety are to be found in most plants, yet the principles underlying them are much the same. One of the force components possible is emphasised at the expense of others. This practice has become so common that it is indeed difficult at present for one to find machines made in which the agitation is accomplished by a device which does not involve a variety of principles.

Various types of devices are encountered in special fields which do not involve any of the principles so far discussed. Blowing a gas through a liquid mass is often used for agitation where the interaction of the gas with the mass is either desired or not objectionable, as in the cases of the aeration of sewage and mixing of strong mixed acids, where it is desirable to blow out oxides of nitrogen. Many combinations of fluid streams, either liquid or gas, with paddles and propellers are met in practice. The stirring of a liquid being electrolysed in an electrolytic cell by surrounding it with a magnetic field has been found to be very highly efficient in many electrolytic operations where the presence of any foreign substance in the electrolyte is objectionable. The cascade principle is often applied to operations not usually considered agitation, as where it is desired to dissolve a solid in a liquid in the lixiviation of ores. Still another form which agitation takes is well illustrated in washing an immiscible liquid with water by pumping the heavier, in a stream more or less broken, into the lighter, as in washing nitrobenzene with water to free it from acid. The circulation is accomplished by a pump of any efficient type, although usually centrifugal, in a system virtually independent of the containing vessel which draws liquid from the bottom of the mass, and pumps it in again at the top through some kind of a spray head.

SUMAC PRODUCTION AND TRADE.*

COMPETITION BETWEEN SICILIAN AND AMERICAN PRODUCTS.

THE sumac of commerce consists of the dried leaves, leaf stems, and stalks from various plants of the *Rhus* family, which are found abundantly in almost all regions of the temperate zones. These varieties, however, do not all possess the same value as tanning agents. The principal European species, and most valued for their tannin content, are the Sicilian sumac (*Rhus coriaria*) and that from central Italy (*Rhus cotinus*), which varieties are also found in Yugoslavia; the sumac of France, Spain, and Greece belongs in the same category. American sumac is obtained from various species of *Rhus*, the best being that known as white sumac, derived from *Rhus glabra*; dwarf sumac, from *Rhus copallina*; and staghorn sumac, from *Rhus hirta*. There are several other varieties, but their yield of tannic acid is insufficient to render them commercially valuable.

Sumac is found abundantly in the United States, and is especially accessible east of the Mississippi River, from Maine to Georgia. Sumac is harvested on a large scale in Virginia, North Carolina, Maryland, and Pennsylvania. The American plant, owing to careless gathering and curing, gives a darker coloured leather than the sumac imported from Sicily, and, since sumac is mainly used for tanning light-coloured leather, this characteristic renders the American product less desirable than the Sicilian and therefore decreases its value.

Tannin Content of Sumac.

The leaves of the upper extremities of the stalks are always richer in tannic acid than those of the base; and the increase in the age of the plant is accompanied by a general diminution in tannin. The colouring matter in the leaves has an important influence in determining the value of the product. The portions of the plant usually considered of value for tanning purposes are the leaves and the stems; but as the stalks contain from 5 to 10 per cent. tannin—an amount too large to discard,—an extract could be made from them and the off-coloured leaves that would be a satisfactory tannage where colour is not of premier importance.

The tannin content of good sumac ranges from 25 to 28 per cent.; although some samples have, on analysis, been found to contain from 32 to 35 per cent. of a tannin allied to gallotannic, with some ellagitannic acid, and a colouring matter which gives yellows with alumina and tin mordants. Similar analyses have proved that the tannin content of dwarf sumac ranges from 19 to 35 per cent.; that of staghorn, from 21 to 30 per cent.; and that of white sumac from 21 to 28 per cent.

For white or light-coloured soft leathers, sumac is the best tannage known. It is also used for brightening leathers of darker tannages, such as mimosa and gambier, the colouring matters of which warm sumac liquors readily dissolve. Sumac-tanned leathers are less liable to decay than those of other tannages and are largely used for bookbinding, and other purposes in which durability is a primary requisite.

Extracts occur as liquids of 42° and 51°, containing about 22 and 26 per cent. of tannin respectively. The American production of sumac extract from both native and foreign leaf in 1914 amounted to 4,512,361 pounds; and in 1919 (the latest year for which statistics are available), to 4,507,433 pounds. The domestic consumption however, of the prepared extract in 1919 aggregated 6,669,642 pounds together with 4,656,000 pounds of raw sumac representing a total of 11,325,642 pounds.

United States Import Trade.

The marked tendency of American tanners has been to import less and less of the prepared extract both during the war and since. In 1913 for example there were imported into America 14,489,000 pounds of ground and unground sumac and 1,270,000 pounds of sumac extract. In 1917, the corresponding figures were 11,637,000 pounds and 161,000 pounds and in 1922, 12,378,000 pounds and 39,000 pounds.

Comparison of the American receipts of sumac for the first five months of 1923 with those of the corresponding period of 1922 would indicate that the total imports for 1923 will register a considerable increase over the preceding year, and that the preponderance of favour continues on the side of the ground product. The total imports of both ground and unground sumac during the January-May period of 1922 were 3,138,012 pounds; while the imports for the corresponding period of 1923 aggregated 9,031,680 pounds, or 73 per cent. of the total imports for the whole year of 1922. Italy has a virtual monopoly of this trade, the participation of other countries therein never having exceeded 4 per cent. in any year since 1919 when American imports of sumac were 100 per cent. Italian.

Decrease in Sicilian Output.

Sicily is the largest producer of sumac in the world, followed by the United States. The production, however, has considerably decreased within the past few years, owing to the cessation of cultivation during the war, and, since then, to the increased cost of labour and transportation which have been out of proportion to the rise in price of sumac. However, this situation may be only temporary. While formerly the annual output varied from 40,000 to 60,000 tons, it has ranged from 20,000 to 30,000 tons per annum within recent years. Palermo, the capital of Sicily, is the main distributing centre for sumac. This product is usually purchased from the small growers by middlemen who hold it for favourable market conditions. The output of Sicilian sumac for 1922 was considerably under that of the average year, not exceeding 20,000 tons. This yield was, however, of superior quality.

Italy's Export Trade in Sumac.

The foreign trade in Sicilian sumac for 1922 was exceptionally good, the United States being the principal market, followed by France, Great Britain, and Germany as active purchasers. So brisk was the buying for the 1922 crop that stocks have dwindled greatly during first half of this year. The following table gives the official statistics for the total exports of Italian sumac for the years 1913-1922, and the shares of the principal countries participating therein:

EXPORTS OF ITALIAN SUMAC FOR 1913–1922, WITH PRINCIPAL COUNTRIES OF DESTINATION.

Years.	Total Exports.	Exported to—			
		United States.	Great Britain.	France.	Germany.
	Kilos.	Kilos.	Kilos.	Kilos.	Kilos.
1913	23,724,900	3,841,800	6,660,900	6,205,800	926,900
1914	19,698,000	5,415,100	5,982,500	2,540,000	1,240,800
1915	21,336,100	7,178,900	6,537,100	4,830,100	1,291,700
1916	20,182,900	7,433,100	5,740,400	5,287,800	—
1917	16,779,800	6,315,300	5,247,200	3,872,000	—
1918	15,165,600	5,505,700	5,952,100	2,461,900	—
1919	19,191,600	7,647,300	3,927,900	4,500,700	237,300
1920	19,300,500	4,769,700	6,480,000	4,842,100	1,002,100
1921	14,240,100	*	*	*	*
1922	20,546,100	6,361,900	5,050,400	5,201,300	2,186,200

* Figures not available.

Price Fluctuations in Recent Years.

The price of American extract, which usually contains about 25 per cent. of tannin and is sold on a basis of its tannin content, has increased materially in recent years. In 1914 the quoted price per pound was about 3¾ cents; in 1915 it ranged from 3¾ to 9 cents; in 1916, from 5½ to 10 cents; and in 1917 and 1918 the price fluctuated in the neighbourhood of 5 cents per pound.

The trend of prices for Sicilian sumac has been consistently upward since 1913. In that year pure Sicilian sumac with a guaranteed content of 28 per cent. of tannin was quoted c.i.f. New York, Boston, or Philadelphia at 53 to 56 dollars per ton in the first half of the year and at 58 to 65 dollars per ton during the remaining six months. In 1914 and 1915 prices fluctuated between 63 and 65 dollars per ton for ground and 2.43 dollars a ton higher for leaf sumac, because of additional freight cost. In 1918 Sicilian sumac reached a peak of 105 dollars per ton at the principal Atlantic ports. In 1920 prices varied from 80 to 85 dollars per ton c.i.f. New York. In 1921 demand was very light, owing to the world-wide industrial depression of that year, and as a consequence prices receded to 55 and 50 dollars per ton. In 1922, however, greater activity in the leather industry considerably increased the foreign need for sumac, which resulted in prices fluctuating between 60 and 70 dollars per ton. New York quotations for July, 1923, show a still further gain, prices reaching the 1920 level of 85 dollars per ton for spot Sicilian sumac and 80 dollars per ton for the domestic product.

* Report by H. M. Hoar, of the Hide and Leather Division of the U.S. Bureau of Foreign and Domestic Commerce. Abstracted from *Commerce Reports*, July 30, 1923.

CASEIN IN THE PAINTS INDUSTRY.*

USE AS A BINDER IN DISTEMPERS.

(Continued from page 220.)

IN addition to the casein, water colours of the class under consideration always contain inert or loading materials. These are mineral matters, almost always white, such as China clay, powdered chalk, talc, hydrated lime, and barytes. As for the pigments themselves the majority of the colours generally used in washes may be applied. The following may be especially mentioned:—*White*: barium sulphate, white lead, zinc white, lithopone. *Red*: vermilion, vermilionettes, Indian red, chrome red, madder lake. *Yellow*: Naples yellow, cadmium yellow, chrome yellow, yellow ochre, sienna. *Blue*: Paris blue, Bremen blue, cobalt blue, ultramarine, indigo. *Green*: chrome green, cobalt green, victoria green, permanent green, Schweinfurt green, malachite green. *Brown*: Cassel brown, brown ochre, sienna, umber. *Grey and Black*: ivory black, bone black, Paris black, lamp black. A large number of aniline lake colours are also capable of being utilised in the preparation of casein-containing paints. As a general principle it may be taken however that colours and pigments precipitated upon or mixed with calcium sulphate are not suitable for casein paints, since in contact with water such a paint would quickly scale and peel off.

Grinding and Mixing the Paints.

The casein, filling material and pigment are ground up separately into fine powders and then sieved. The sieving is best effected mechanically in an apparatus consisting essentially of a shallow wooden vat, the bottom of which consists of a semi-circular sieve. A shaft lies horizontally above the sieve, and upon the shaft are mounted brushes which almost touch the sieve. The shaft is rotated by a crank and the brushes as they are turned, force the powder through the meshes of the sieve. The sieved materials are then mixed in a Werner and Pfleiderer "Universal" mixer of two differential speeds. As the operation comprises the mixing of powders of widely differing densities, it is advisable to commence with the machine at slow speed and then gradually to increase the speed, when a homogeneous mixture is obtained. As a type of a white wash with a basis of casein, the following formula may be given:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	120 kilos.
Fine Ultramarine Blue	0.15 kilos.

Use of Pure Lime Essential.

To obtain a good colour in this case, it is absolutely essential to use pure lime and, in fact, the only lime suitable, is the quicklime prepared from marble such as is utilised for the neutralisation of rosin in the preparation of varnish and siccatives. This lime, which is of a purity of from 99.0 to 99.5 per cent. should be slaked with three times its weight of hot water in an enamelled well-covered vessel. A simple test to discover whether the materials have been mixed to a condition of perfect homogeneity is to place a small sample of the powder on to a piece of damp glass. On pressing down this sample with the finger it should appear absolutely uniform when viewed through the glass.

Regulation of Casein Content.

Pigments of pale shade require less casein than dark pigments, and organic colours require less casein than inorganic colours. In addition the casein content of a good mixing ought also to be regulated by the nature of the surface to which the paint is to be applied. Thus on a permanent and resistant foundation such as zinc, cement, oil paint, cloth, boarding, and linoleum, the colour should contain more casein than on a foundation so unstable as plaster. In the latter case, where the tendency to scale is marked, the casein content is reduced and the lime content increased, especially when organic colouring matters are used. If the surface is very stable, such as wood or stone, the amount of casein in the mixing is so regulated that a sample of the paint coated on parchment dries without peeling when the parchment is bent or twisted, and also shows not the slightest sign of solution when dried for three days after treatment with a powerful jet of water.

* From article by Maurice de Keghel in *La Revue des Produits Chimiques*, July 31, 1923.

Typical Mixings for Bright Distempers.

The type formula given above may serve as a general formula for all those paints in which precipitated calcium carbonate is utilised as the filling or shading material, but whilst the respective contents of casein and hydrated lime may remain invariable, the amount of filling material will alter with the quantity of pigment added. For a blue water paint we have, for example, the following typical formula:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	90 kilos.
Bremen Blue	30 kilos.

One of the characteristics of casein colours is the purity of the tones that can be obtained. The finest distempers in pale and at the same time vivid reds, blues, greens, greys and violets are made with mixtures containing little colouring matter and much filling material. The following formulas may serve as bases for making very pretty tones:

For a *Rose-red*:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	113 kilos.
Burnt Sienna	2 kilos.
Vermilion	5 kilos.

For a *Green*:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	90 kilos.
Permanent Green	30 kilos.

For an *Olive*:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	75 kilos.
Yellow Ochre	36 kilos.
Lamp Black (surfine)	9 kilos.

For a *Lilac*:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	83 kilos.
Red Ochre	15 kilos.
Ultramarine Blue	22 kilos.

For a *Grey*:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	90 kilos.
Ultramarine Blue	3 kilos.
Frankfort Black	27 kilos.

For a *Yellow*:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	100 kilos.
Naples Yellow	17 kilos.
Yellow Ochre	3 kilos.

For a *Brown*:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	83 kilos.
Cassel Brown	15 kilos.
Brown Ochre	12 kilos.
Umber	2 kilos.

Casein colours are often employed for the preparation of paints for facades and also for the interior decoration of houses, workshops and hospitals, on foundations of wood, brick or cement. Imitation of stone or brick work is often desired. A typical formula for a paint possessing a brick colour is the following:

Soluble Casein	15 kilos.
Hydrated Lime	15 kilos.
Sodium Borate	0.15 kilos.
Precipitated Chalk	110.25 kilos.
Cassel Brown	2.25 kilos.
Red Ochre	4.5 kilos.
Chrome Yellow	3 kilos.

(To be continued.)

EGYPTIAN INDUSTRY AND TRADE.

CHEMICALS AND ALLIED PRODUCTS IN 1922.

IN a report on the trade and industry of Egypt up to April, 1923, Mr. E. H. Mulock, the British Commercial Agent for Egypt, states that the year 1922, as compared with its three post-armistice predecessors, has been mediocre and unsatisfying in spite of indications to the contrary, such as a favourable trade balance, large exports of cotton, and a considerable budget surplus on March 31, 1923, the end of the financial year 1922-23. While it is true that the decrease in imports from the United Kingdom is not large, relatively speaking, it is serious, says the report, in view of the fact that it constitutes a further downward step in the steady decline in the percentages of the British Empire in the total imports into Egypt that has been a feature of the years 1919 to 1922 inclusive.

Imports and Consumption of Cement.

Egypt's total annual consumption of cement for the years 1919-1922 is estimated at 33,000; 66,000; 89,000 and 113,000 metric tons respectively. For 1923, however, the total consumption is estimated at 150,000, of which 100,000 will have to be imported. Of the 63,000 tons imported in 1922 the bulk—viz., 38,000, came from Dalmatia, whose success as compared with British and Belgian imports is purely a matter of price, the c.i.f. Alexandria quotation being P.T. 220 for Dalmatian, as against 240 for Belgian and 280 to 290 for British. To these prices must be added about P.T. 40 for clearance charges in order to compare them with the lower manufacturer's quotations, which are, for delivery at Alexandria, lower than those of any imported cement. As regards foreign cement, it should be noted that, although Dalmatian imports have increased from 23,000 metric tons in 1921 to 38,000 in 1922, Belgian imports have risen from 5,360 to 11,440, whereas British cement has only increased from 6,300 to 7,200 tons, and it is understood that Dalmatian imports will tend to decrease, but Belgian to increase still further in view of its superior quality over Dalmatian, and its price being lower than British. It is important to note in this connection that importers prefer British cement to all others because of its superior quality, and would buy it instead of Belgian if the difference in price between the two were only 2s. a ton instead of 8s. to 10s. as at present. In view of Egypt's increasing demand for cement in 1923, and possibly in subsequent years, owing to the house shortage and building activity so much in evidence in Cairo and Alexandria, it would seem to be worth the while of British manufacturers (whose cement is largely dependent for its sale in Egypt on the insistence by certain public authorities on the use of British "Portland") to study the possibilities of making the necessary reduction in their prices with the object of capturing the entire foreign supply of cement for private consumption, which will probably otherwise eventually become a virtual monopoly for Belgium.

General Local Industries.

The forms of industry arising out of and necessitated by the handling and treatment of cotton for marketing it are too obvious in a country like Egypt to need any reference, but cognate industries such as cottonseed crushing for edible oil and cattle-cake, and soap-making with the use of cottonseed oil mixed with locally produced or imported caustic soda are worthy of mention in connection with cotton. Soap is also manufactured locally from caustic soda and edible oils, or sulphuric oil, tallow, etc.

Phosphates, from the Red Sea Coast and Upper Egypt are mined chiefly for export to the United Kingdom, Europe and Japan, and they are also used in a pulverised state mixed with farm-yard manure—but only to a small extent—locally. Owing to the absence of the raw material necessary for the production of sulphuric acid, the cost of converting Egyptian phosphates into superphosphates in the country is so prohibitive that schemes for the erection of works and creation of this industry have had to be abandoned, as competition with imported superphosphates would be out of the question. Only 60,220 metric tons of phosphate were produced in 1922 as against 122,024 in 1921, and 114,813 in 1920. This considerable diminution in output was due to poor demand and offers of prices in some cases below the cost of production, with the result that the mines remained partially shut down. The exports in 1921 were 84,390 metric tons, of a value of £E.185,598, and in 1922 were 18,084 metric tons, of a value of £E.41,806.

The manufacture of paints, etc., from mineral colouring materials available in the neighbourhood of Aswan, is a recently established industry due to purely Egyptian enterprise and initiative. The factory erected at Helouan has now been completely equipped, and the promoters hope to increase their production, which amounted to only 430m. tons in 1921 and 350 in 1922. The optimism as regards output has not been justified up to the present. One important industrial concern, which is due to Italian enterprise, exploits the refractory and other kinds of clay, limestone, etc., available in the country for the manufacture on a large scale of all kinds of earthenware, ceramics and pottery, laboratory appliances, hydraulic lime and cement, plaster, etc. Staffordshire pottery is also produced at this factory, under English supervision, of so good a quality that the head of this concern contemplates holding exhibitions in Cairo and London.

Manganiferous iron ore is mined in Sinai, and is exported chiefly to Belgium, Holland and the United Kingdom. Nitrate shale in Upper Egypt is used locally in its natural state as a fertiliser. Crude carbonate and sulphate of soda is recovered from salt lakes in the Delta and from the large soda lakes at Wadi Natroon where caustic soda is manufactured. The salines near Alexandria and Port Said are also exploited for the production of sufficient salt for local consumption and for large exports to the East. Crude sulphate of magnesia is to be found in Kharga Oasis. The limestone and clay found at Massara, near Cairo, are converted into "Portland" cement by a factory on the spot. This belongs to a Belgian company, whose annual production is 50,000 tons, all of which is absorbed by the local market owing to successful competition in prices, rather than quality, with the imported article. Gypsum is found near Suez and Cairo, and is used both for the manufacture of plaster, and as a fertiliser in finely ground powder form.

THE OXIDATION OF CARBON.

USE OF SILVER BICHROMATE.

THE well-known method of oxidation of organic substances by a mixture of chromic and sulphuric acids has been recently re-examined by J. L. Simon, and the results, some of which were unexpected, have been communicated in a series of notes to the *Comptes rendus* of the Paris Academy of Sciences. With the usual mixture of potassium bichromate and sulphuric acid some compounds are completely, others only partially, oxidised. The substitution of silver bichromate for potassium bichromate in the mixture was found to give complete combustion in some cases where the classical mixture gave only partial oxidation.

The Structure of Graphite.

Interesting and unexpected results were obtained on applying these two mixtures to the oxidation of the various forms of carbon. Pure graphite, using the silver oxidising mixture, was completely oxidised to carbon dioxide (with a trace of carbon monoxide) in half an hour at 100° C.: in the absence of silver the combustion was partial, from 66 per cent. to 72 per cent. being burnt. In a later communication (July 23) it is shown that the deficit in the absence of silver is related to the constitution of the compound, and the aromatic compounds can be clearly distinguished from others by the different figures given by the two reagents.

As regards the different forms of carbon: in the presence of silver, graphite is completely burnt, diamond is not oxidised at all, while for various forms of charcoal, coke, and coal, only from 1 per cent. to 6 per cent. is burnt. The fact that it is possible to oxidise graphite by thirds is in agreement with the view of a hexagonal distribution of the carbon atoms, and there is a marked experimental difference between graphite and certain varieties of black carbon which it is natural to attribute to a difference in constitution.—*Nature.*

MERCURY OUTPUT IN SPAIN.—The production and sale of mercury from the Almaden Mines, which are under Government control, continue to show an increase over 1922, and sales are greatly in excess of production. During May the output was 21,800 flasks, while sales reached about 35,000 flasks, valued at approximately 9,000,000 pesetas. Only 20,619 flasks were sold during the whole of 1922. Stocks on hand at the middle of June were 17,300 flasks.

ITEMS OF INTEREST.

Another Tin-plate Merger.—The Wern Tin-plate Works, Briton Ferry, which comprise four mills, has been acquired by the Briton Ferry Works, Ltd., of which Baldwins, Ltd. are the proprietors.

Industrial Development in Widnes.—By invitation of Sir Max Muspratt and the directors of the United Alkali Company, members of the Widnes Chamber of Commerce visited the company's Pilkington and Sullivan works on Wednesday of last week.

Reparation Dyestuffs.—The British Chemical and Dyestuff Traders' Association has forwarded to its members a list of dyestuffs received recently from Germany as reparations, together with the current selling prices. This is the first list under the new arrangement whereby the Association is supplied with such lists by the Board of Trade.

Erratum.—In the report of the official referee's decision in the formaldehyde appeal case under Part I. of the Safeguarding of Industries Act (the *Chemical Trade Journal and Chemical Engineer*, August 24, 1923), the line in the last paragraph on page 217 reading "heavy in Harris, Hart and Co.'s advertisements," should read "heavy in Heyworth, Hart and Co.'s advertisements."

Tariff Notes.—The duties on the export of guano and calcined bones from Madagascar have been fixed at 10 per cent. by a French decree dated July 31. An export duty of 3 per cent. is placed on animal wax, vanilla, common graphite, oil seeds, volatile or essential oils, vegetable wax, gums, and resins. Standardised graphite is subject to an export duty of 1½ per cent.

State Factory Explosion.—It was explained on Wednesday by Major McKenna, of the Magazines and Safety Services Department of the Disposals Board, at the inquest held at Banbury on Maurice Parkhoe, that an explosion, which killed Parkhoe, must have arisen from a detonation in the ammonal used for extricating aluminium at the Banbury Breaking Down Factory. A verdict of "accidental death" was returned.

Norwegian Production of Ferrovanadium.—Stavanger Tinfabrik A/S, Stavanger, intends to commence production of ferrovanadium towards the end of the present year. Arrangements have been entered into with a Philadelphia firm, one of whose engineers will be attached to the new works, and supplies of a certain raw material have been secured from Colorado. The Stavanger company has obtained the sales rights for Europe.

Chemical Workers' Strike.—The executive members of the Chemical Workers' Union having failed to reach a settlement with the employers, operatives of the Linenleaf Chemical Works, Falkirk, to the number of about 120, came out of strike on Monday. Following a recent stoppage of work in consequence of a reduction of 2s. 6d. per week for shift men, and 2s. for labourers, the men agreed to resume at the reduced rate while the executive negotiated for them.

Institute of Metals.—The official programme of the autumn meeting to be held in Manchester from September 10-13 next has now been issued. On Monday, September 10, Sir Henry Fowler will lecture on "The use of non-ferrous metals in engineering." This lecture will be given in the Milton Hall, Deansgate, at 8 p.m., and not in the College of Technology as stated in the programme. Papers will be presented and discussed on the mornings of Tuesday and Wednesday. Visits to works, and various social events, have also been arranged.

University Department of Chemical Engineering.—The work of the Ramsay Memorial Department of Chemical Engineering at University College, London, will begin in October. This department has been instituted with the object of enabling young graduates in chemistry and engineering, who have already obtained a good training in the fundamental sciences of chemistry, physics, and mathematics, to direct their studies and investigations towards the application of the principles of physical chemistry to the scientific design and operation of the apparatus and processes of chemical industry in general. Mr. E. C. Williams, M.Sc., of the University of Manchester, has been appointed Professor in charge of the department. The University College Committee will shortly appoint an Assistant Lecturer in the department.

Business Notice.—Mr. S. N. Brown, F.C.S., consulting chemist of the Broughton Analytical Laboratories, 7, Chapel Walks, Manchester, has recently formed a partnership with Mr. James Booth, A.M.I.Chem.E., F.C.S., who will act as consulting chemical engineer to the above laboratories.

Whitehaven Coal Dispute Ended.—The longest dispute in the history of the Whitehaven collieries was brought to an end on Friday of last week at a mass meeting of the miners, who decided to accept the colliery company's offer to submit the questions in dispute to arbitration. The dispute has lasted nearly fifteen weeks.

Trade with Cuba.—The British Consul at Santiago de Cuba, Mr. E. V. B. Brice, who is now on a visit to the United Kingdom, will be pleased to interview firms interested in trade with Cuba at the Department of Overseas Trade, until September 8, inclusive. Interviews will be given only by appointment, and applications should be addressed to 35, Old Queen Street, S.W. 1, reference 8622/F.L. being quoted.

Obituary.—We regret to announce the death of Mrs. Hertha Ayrton, on Sunday last, at North Lancing, Sussex. Her name is connected with researches on the electric arc. She was awarded the Hughes Medal of the Royal Society and was the only woman member of the Institute of Electrical Engineers. During the war she invented the "Ayrton Fan," used for dispersing accumulations of poison gas in trenches.

British Peppermint Oil.—An attempt is being made to revive the peppermint-growing industry in Surrey, and White, Tomkins and Courage, Ltd., have acquired land in the neighbourhood of Reigate which has been laid out as a peppermint farm, to which is attached a distillery for the extraction of the oil. The tests already applied to the distilled oil have been so satisfactory that more land will be put into cultivation next year.

Canadian Copper Resources.—It is stated that negotiations are under way at the present time toward obtaining the control and purchase of Manitoba's recently discovered copper belt. Two representatives of the Russo-Asiatic Consolidated, Limited, were in Winnipeg for several days negotiating with holders of the largest groups of claims in the district, when they left for the new mining district to investigate more thoroughly its resources and possibilities.

The Sir John Cass Technical Institute.—The session 1923-24 will commence on Thursday, September 20. Students will be enrolled on Monday, Tuesday, and Wednesday, September 17, 18, and 19, from 6 to 8.30 p.m. The courses of instruction at the Institute, which are held from 6 to 10 p.m., meet the requirements of those engaged in chemical, metallurgical, electrical, petroleum, and the fermentation industries. Full facilities are provided in the well-equipped laboratories of the Institute for special investigations and research. The instruction in experimental science also provides systematic courses for the examinations of the London University, the City and Guilds of London Institute, and of the Institutes of Physics, Chemistry, and Brewing.

Modern Millgearing.—We have received from David Bridge and Co., Ltd., of Castleton, a comprehensive treatise on modern millgearing in the form of an attractively-produced catalogue. The work contains 132 pages and includes many illustrations, diagrams and working formulæ. The text is clearly printed on art paper and prices for all classes of millgearing are quoted. The 52-page appendix covers the whole field of power transmission and is of especial value to engineers, draughtsmen, etc., who want a pocket-size authority on this subject. Among the points dealt with are: Shafting, Keys and Keyways, Couplings, Rope Driving, Belt Driving, Gearing, Chain Driving, Speed Change Gears, etc. A copy will be sent free on request.

The Formaldehyde Decision.—The British Chemical and Dyestuff Traders' Association have complained to the Customs authorities that although the referee's award in the Formaldehyde Appeal Case was dated August 10, and the Board of Trade's notice dated and published on the 13th inst., the alteration in the List of scheduled articles did not take effect until the 20th inst. Certain importers appear to have had consignments of this product arrive in this country between the date of the referee's award and that on which the duty was taken off, and have thus been made to pay the duty. The matter is being taken up by the Association on the ground that the alteration in the list of dutiable articles should have corresponded with the date on which the referee's award was signed.

Change of Address.—The Continuous Reaction Co., Ltd., a constituent company of Nobel Industries, Limited, who, until recently, had offices at 155, Church Road, Battersea, S.W. 11., have now removed these offices to Newton Works, Hyde, Cheshire, to which all correspondence should be sent. —James C. Barr, Limited, announce that they have removed to more central and commodious offices at 67, Great Clyde Street, Glasgow. Telephone Nos., 2965 and 2966 Central.

Swedish Copper Anniversary. — The Store Kopparbergslaga Company, probably the oldest definitely established industrial concern in the world, has been celebrating its 700th anniversary in Sweden. The company was founded during the first half of the 13th century, and the first deliveries of copper from the mine at Falun were made in the year 1225. Since that time the company has continued, with almost unbroken regularity, to play an important part in the economic life of Sweden.

Chinese Groundnut Crop.—Climatic conditions were favourable to groundnuts, and a crop of 20 per cent. above the average in Shantung and North Kiangsu in 1922 was reported. Of the total export of 1,335,400 piculs of groundnut kernals, which is less by 66,400 piculs than in 1921, 663,800 piculs were sent to Chinese ports. The shipment in bulk of groundnut oil is growing in importance, 113,000 and 12,750 piculs having been so sent to the United Kingdom and America respectively during the year.

Carbide Manufacture in Sao Paulo.—The use of calcium carbide is gradually decreasing in the State of Sao Paulo, Brazil, states an American Consular Report. Formerly, foreign manufacturers supplied this field to a considerable extent, but imported calcium carbide has been driven from the market because of its inability to compete in price with the native product, especially that manufactured at Palmyra, Minas Geraes. The present exchange situation, together with a high import duty, has resulted in giving Brazilian carbide practically a monopoly of the market.

Detection of Nickel in Solution.—C. G. Vernon (*Chem. News*, 1923, 126, 200) has found that on passing hydrogen sulphide through a nickel solution to which concentrated ammonia solution has been added, and boiling, nickel is deposited in the form of a bright mirror with darkening of the solution, or, in quite dilute solutions, as an iridescent film. The presence of cobalt does not interfere, and the test may be introduced into an ordinary qualitative analysis by adding excess of strong ammonia solution before precipitating the metals of the nickel group with hydrogen sulphide. —*The Analyst*.

Estimation of Alcohol in Benzol.—The removal of alcohol from benzene by washing it with pure water is difficult, since emulsions are formed which separate with difficulty even if a centrifuge is used. According to P. Schwarze (*Chem. Zeit.*, 1923, 47, 462), however, such emulsions are not formed if the benzene is previously mixed with spindle oil. Hence the estimation of alcohol in benzol is rapidly carried out by mixing the benzol with about its own weight of spindle oil, extracting the mixture 3–4 times with a 5–10 per cent. solution of salt, distilling the aqueous extract, and determining the alcohol in the distillate by the usual method.—*J.S.C.I.*

The Diazotisation of Para-Nitraniline.—The preparation of a solution of diazotised *p*-nitraniline is satisfactorily carried out, according to a *J.S.C.I.* abstract of a paper by C. and H. Sunder (*Bull. Soc. Ind. Mulhouse*, 1923, 89, 237), by quickly adding dilute hydrochloric acid (an excess not greater than 0.1mol. is used) to a solution containing sodium nitrite and *p*-nitraniline at 10°–14° C. Although, for the production of a good Para-red shade, it is usually necessary to convert all the diazotised *p*-nitraniline into the corresponding diazonium acetate, this may be partly avoided if diazotisation is effected in the presence of an excess of hydrochloric acid not exceeding 0.1mol. For instance, satisfactory dyeing is obtained by means of a solution containing diazotised *p*-nitraniline, 85.9 per cent. as the diazonium chloride and 14.1 per cent. as the diazonium acetate. A satisfactory printing paste (the excess of sodium acetate contained therein could probably be reduced) is prepared by the addition of 6,515g. of hydrochloric acid of 20° B. (sp. gr. 1.16) and 21 l. of gum tragacanth thickening, to 2,800g. of *p*-nitraniline and 1,540g. of sodium nitrite dissolved in 2 l. of cold water (temperature not higher than 10° C.), and afterwards adding 6,300g. of sodium acetate crystals dissolved in 15.5 l. of cold water, the mixture being then diluted with water to 100 l.

Modern Electrical Pyrometry.—In the article in this subject by Mr. David Brownlie in our issue of last week, the illustration in page 215 of a switch panel recording electrical pyrometer, made by Negretti and Zambra, Ltd., is not of the plug-in type of instrument, as might have been inferred from the context, but of the switch type. The makers claim that this type has a distinct advantage over the plug-in system, inasmuch as there is no danger of leaving in the plug, and so inadvertently wasting current.

British Coal Output.—During the quarter ended March 31 last the amount of saleable coal raised in Great Britain was 67,077,543 tons, and the quantity disposable commercially was 61,335,892 tons, of which 23,262,722 tons were shipped. The net costs were £50,663,203., or 16s. 6.24d. per ton disposable commercially, of which wages formed £35,441,768., or 11s. 6.68d. per ton. The total number of workpeople employed was 1,087,733, the average output per man-shift worked being 18.25cwt., and the average earnings per man-shift worked 9s. 7.72d.

CHEMICAL TRADE OF THE NETHERLANDS.

JULY IMPORTS AND EXPORTS.

THE following statistics, which have been furnished by the Bureau voor Buitenlandsche Bedrijfsberichten, of The Hague, show the imports into and exports of chemical products from Holland during the month of July, 1923.

Imports of Chemical Products.

		Kilogrammes.	Florins.
Calcium acetate	Total	393,000	83,000
	Belgium	89,000	17,000
	U.S.A.	304,000	66,000
Lead acetate	Total	11,000	5,000
Acetone	Total	23,000	19,000
Methyl alcohol	Total	32,000	20,000
Soda ash	Total	1,761,000	132,000
	Belgium	244,000	19,000
	United K'dom	300,000	22,000
	France	500,000	46,000
	B.E. Africa	512,000	32,000
Soda crystals	Total	71,000	4,000
Caustic soda	Total	590,000	112,000
	United K'dom	100,000	19,000
	France	137,000	25,000
	U.S.A.	253,000	50,000
Bleaching powder	Total	371,000	35,000
	Germany	19,000	1,000
	Belgium	167,000	15,000
	United K'dom.	72,000	8,000
	Italy	113,000	10,000
Calcium carbide	Total	381,000	46,000
	Germany	1,000	—
	Sweden	74,000	9,000
	Switzerland	303,000	36,000
Magnesia	Total	1,692,000	91,000
	Greece	1,682,000	91,000
Alum	Total	21,000	2,000
Boric acid	Total	85,000	26,000
	United K'dom.	83,000	26,000
Iron sulphate	Total	42,000	1,000
Copper sulphate	Total	23,000	6,000
Sodium sulphate	Total	469,000	23,000
Sulphuric acid	Total	9,886,000	183,000
	Belgium	9,854,000	180,000
Hydrochloric acid	Total	515,000	11,000
Liquid carbonic acid	Total	76,000	27,000
Salammoniac	Total	19,000	5,000

Exports of Chemical Products.

Lead acetate	Total	36,000	16,000
Soda ash	Total	11,000	1,000
Caustic soda	Total	35,000	7,000
Calcium carbide	Total	36,000	5,000
Magnesia	Total	1,108,000	88,000
	Germany	21,000	2,000
	Belgium	18,000	2,000
	United K'dom.	162,000	13,000
	France	138,000	11,000
	U.S.A.	410,000	32,000
	Norway	14,000	1,000
	Sweden	50,000	4,000
	Ireland	20,000	2,000
	Switzerland	120,000	10,000
	Finland	10,000	1,000
Sodium sulphate	Total	531,000	29,000
Sulphuric acid	Total	1,314,000	42,000
	Germany	442,000	12,000
	Egypt	227,000	7,000
	Argentina	363,000	13,000
Nitric acid	Total	3,000	1,000
Hydrochloric acid	Total	3,000	—
Liquid carbonic acid	Total	23,000	7,000

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

A NOVEL NITROGEN FIXATION PROCESS.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—With reference to the interesting editorial entitled "A Novel Nitrogen Fixation Process," in the issue of *The Chemical Trade Journal and Chemical Engineer* of August 17, I am glad to say that about ten years ago I made some successful attempts by a process identical with the one alluded to in your remarks. It might perhaps interest the American research workers that I found silicate of ammonia containing peroxide of manganese in suspension to be a suitable catalyst for promoting the reaction at ordinary temperature and pressure, which, of course, is increased by the increase of pressure.

In my process, which is covered by patent rights, I also took great care that the reaction should take place in a solution containing sufficient ammonia to keep the solution at all times alkaline, and also to increase the solubility of nitrogen in the mixture. The use of anodes made of ordinary ferro-manganese seemed to increase the yield, and at the same time to lessen the corrosion of the anodes which were originally made of chemical sheet lead. By using ordinary gas liquor I succeeded in producing sulphate of ammonia by combining the sulphur contained in the liquor with the ammonia already present, and also with the hydro-electric ammonia obtained in the process, etc. A French copy of my Belgian patent is enclosed.—Yours, etc.—

17, Boulevard du Nord, Courtrai, Belgium. August 24, 1923. J. J. van der Bossche.

[We have perused carefully the patent specification to which M. van der Bossche refers in the above letter. The process described therein, whilst of great interest, is not strictly comparable to the hydrolytic method for the decomposition of nitrogen in solution referred to in the editorial in our issue of August 17. The method proposed by M. van der Bossche is an electrolytic one, and consists essentially in forcing nitrogen under pressure into a solution such as gas liquor, whilst the solution is being electrolysed between electrodes of ferro-manganese. In the presence of the catalysts, such as the silicate of ammonia and the manganese dioxide referred to in the letter, the hydrogen liberated at the cathode combines with the ntirogen in the solution. The complete specification is very detailed and we shall give a translation of it in an early issue. Meanwhile, although the two methods under consideration are not exactly comparable, the catalysts found most efficient by M. van der Bossche might be tested profitably in the nitrogen-hydrolysis method.—Ed., *C.T.J. and C.E.*]

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

British West Indies.

A firm of builders, auctioneers and furniture dealers in Trinidad, who hold purchasing agencies for hardware, sanitary ware, and concrete reinforcing materials, desire to secure the representation of British manufacturers of paint, varnish, and oil on a purchasing basis. (Ref. 216.)

Belgium.

A Belgian agent in Brussels desires to secure the representation, on a commission basis or otherwise, of British manufacturers of shellac, manilla gum, fish glues, and chemical products. (Ref. No. 220.)

Italy.

A British firm of anti-friction metal makers wish to secure additional lines, especially metals and other alloys, including phosphor bronze, for their Italian agent, who is well established and will deal direct. (Ref. No. 222.)

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Anchor China Clay Syndicate, Ltd., London, E.C.—Registered August 7, Trust Deed dated July 18, 1923, securing £3,000. deb. stock.

Brooksbank (E.) and Co., Ltd., Manchester, soap manufacturers and oil refiners.—Registered July 30, mortgage, to National Provincial and Union Bank of England, Ltd., securing all moneys due or to become due to the Bank.

Lamplough (F.) and Co., Ltd., London, S.W., oil and manufacturing chemists.—Registered July 27, Trust Deed dated July 10, 1923, securing £20,000. debs. and bonus of 30 per cent. on redemption.

Leeds Flint Glass Company, Ltd.—Registered August 10, £2,000. 2nd debs. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £700.

Snelling and Sons, Ltd., Norwich, tallow refiners.—Registered August 7, £8,000. debs., part of £33,000.

Taylors' Drug Company, Ltd., Leeds.—Registered August 7, £1,000. mortgage, to Emily Wight and another, Combermere, The Drive, Roundhay.

Tomlinson and Co., Ltd., Stairfoot, flint glass manufacturers.—Registered July 30, £4,000. deb., to Branch Nominees, Ltd., 15, Bishopsgate, London, E.C.

Tunnel Portland Cement Company, Ltd., West Thurrock.—Registered August 8, deb., to Barclay's Bank, Ltd., securing all moneys due or to become due to the Bank.

Welsh Drug Houses, Ltd., Mountain Ash.—Registered August 10, mortgage, to London Joint City and Midland Bank, Ltd., securing all moneys due or to become due to the Bank.

Irish Disinfectants, Ltd., Dublin.—Registered August 9 (by order of court), charge, to Munster and Leinster Bank, Ltd., securing all moneys due or to become due to the Bank.

SATISFACTIONS.

Pearson (E. T.) and Co., Ltd., London, W.C., manufacturing chemists.—Satisfaction registered August 13, £2,250., registered October 13, 1919.

South African Carbide and By-Products Company, Ltd., London, E.C.—Satisfaction registered August 14, £360., part of amount registered April 8, 1922.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Veeta Chemical Company, Ltd.—Resolved August 8, that the company be voluntarily wound up. G. R. Lawson, 20, Exchange Buildings, Bradford, liquidator.

Water Softeners, Ltd.—Resolved July 17, confirmed August 2, that the company be voluntarily wound up, having regard to the agreement dated May 15, 1923, entered into by this company for the sale of the goodwill and assets to United Water Softeners, Ltd. W. G. Luton, 93, Queen Victoria Street, London, E.C., liquidator.

Woodcroft Manufacturing Company, Ltd., Liverpool, manufacturing chemists.—J. C. Oldfield ceased to act as receiver July 23 (under 1st deb. only, dated August 17, 1922).

BANKRUPTCY INFORMATION.

Burlin, Adolph Lionel, 297, Seven Sisters Road, Finsbury Park, consulting chemist. Adj. August 17.

Curtis, Wm. Hy., Atlas Chemical Works Cottage, and trading at Atlas Chemical Works, New Mills, as W. H. Curtis and Co., manufacturing chemists. 1st meeting, O.R.'s, Manchester, August 30. Exam., C.C., Stockport, Sept. 25.

Hirchberg, Leon M., 20, Birchington Road, Stroud Green, and Ely Place, London, E.C., consulting chemist. 1st and final dividend, 1s. 6d., at 28, Kimberley House, Holborn Viaduct, London, E.C., August 13.

DISSOLUTIONS OF PARTNERSHIP.

(*Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.*)

Auto By-Products Company (Frank Stringer, Arthur Roscoe, and Thos. Jas. Sumner), 41, North John Street, Liverpool, motor accessory and chemical manufacturers. August 9. Debts by F. Stringer and A. Roscoe, who continue. (August 14.)

Rhodes, D., and Co. (Kenneth Saul and Ralph Frdk. Holdsworth), Beck Street, Bradford, grease refiners. August 1. Debts by K. Saul, who continues. (August 14.)

Index to Advertisers.

	Page
Adlam & Sons, Ltd.	18
Allen, Marcus, and Sons, Ltd.	40
American Hard Rubber Co.	8
Anderson, D. & Son, Ltd.	13
Anderston Foundry Co., Ltd.	9
Appleton, Howard & Co.	5
Bailey, Sir W. H., and Co., Ltd.	5
Baker, J., Sons, & Perkins, Ltd.	39
Bakers (Leeds), Ltd.	1
Bayley, F. S., Clanahan & Co.	35
Beaumonts, Ltd.	6
Berk, F. W., and Co., Ltd.	8
Blackstone H. B., and Co.	16
Blackwell, Sons & Co., Ltd.	1
Blagden, V., and Co., Ltd.	11
Blair, Campbell & McLean, Ltd.	13
Blythe, Wm., and Co., Ltd.	22
Boake, Roberts & Co., Ltd.	1, 7
Boehm, Fredk., Ltd.	32
Borax Consolidated, Ltd.	1, 10
Bottomley, J. C., & Emerson, Ltd.	33
Bramwell, E., and Son, Ltd.	12
British Metal Corporation, Ltd.	26
British Oxygen Co., Ltd.	31
British Thomson-Houston Co., Ltd.	23
Brothers Chemical Co. Ltd.	34
Brotherton & Co., Ltd.	34, 35, 44
Bruce, W. T., and Co.	35
Brown, J. M.	34, 35
Burckhardt Eng. Works	24
Burton, W., and Sons	11
Bush, Beach & Gent, Ltd.	4
Bush, W. J., and Co., Ltd.	3
Buyer's Guide	36, 37, 38, 39
Cannington, Shaw & Co., Ltd.	12
Capper, Pass & Son, Ltd.	1, 33
Carmichael, J. F., and Co.	41
Casein (Industries) Ltd.	1
Castner, Kellner Alkali Co., Ltd.	33
Christie & Co.	20
Christopherson, C., and Co.	32
Clark, T. & C., & Co., Ltd.	31
Cole & Wilson	42
Collett, J. M., and Co., Ltd.	33
Cross and Sons, A., Ltd.	15
Cruickshank, Ltd.	14
Currie, J.	33
Daglish & Co., Ltd.	1
Dekker, Jan	34
Dempster, R. & J., Ltd.	8
Douglas, Wm., and Sons, Ltd.	12
Drum Engineering Co.	5
Epenhuysen, C. van	33
Evans, J., & Sons (Wolverhampton), Ltd.	30
Everitt & Co.	34
Follows & Bate Ltd.,	15
Foster, Blackett & Wilson, Ltd.	28
Frickers Metal Co., Ltd.	34, 42
Fullerton, Hodgart & Barclay, Ltd.	29
Gardner, Henry & Co., Ltd	3
Gardner, Wm., and Sons, Ltd.	28
Garner, Telford & Hardman, Ltd.	27
Garroway, R. & J.	2
Gas Light and Coke Co.	1
Graves Patent Roofing Co.	28
Greeff, R. W., & Co., Ltd.	9
Griffin, C., and Co., Ltd.	1
Griffin, J. J., and Sons, Ltd.	27
Griffiths Bros. & Co., Ltd.	1
Hadfield, J. & Sons, Ltd	1
Hallams, Ltd.	25
Harris, P. L. & G. S., Ltd.	23
Harrison Blair & Co., Ltd.	37
Hathern Station Brick and Terra Cotta Co., Ltd.	32
Hendon Chemical Co.	20
Hickson, E.	2
Hickson & Partner, Ltd.	17
Hill-Jones, T., Ltd.	30
Hill, Samuel, Ltd.	24
Holliday, L. B., and Co., Ltd.	28
Honeywill Bros. Ltd.	8
Houlder, W., Son & Co.	34
Hulsen, J., and Co.	12
Humphreys & Glasgow, Ltd.	i
Hunt, J. T., and Son, Ltd.	35
Hurst, Nelson & Co., Ltd.	19
International Electrolytic Plant Co., Ltd.	41
Jenkyns, Claudius P.	iii
Johnson & Sons, Ltd., Mnfg. Chemists	14
Keeling's Oxides, Ltd.	24
Kestner, E. and E., Co., Ltd.	iv
Lankshear, Wickstead, and Co., Ltd.	35
Le Bas & Co.	6
Leigh & Sons, Ltd.	2
Lennox Foundry Co., Ltd.	10
Leroy, F. and Co.	6
Liverpool Chemical Co.	30
Locke, Blackett & Co., Ltd.	39
Manchester Oxide Co. Ltd	19
Mann, Egerton and Co., Ltd.	11
Mason, Adam, and Son, Ltd.	5
Mather & Platt Ltd.	21
McCarthy, J. H., Ltd.	19
McKechnie Bros., Ltd.	35
McLauchlan, J.	28
Meade-King, Robinson & Co., Ltd.	14
Merchant Trading Co., Ltd	17
Meldrums, Ltd.	4
Metcalf, J., Chemical Co., Ltd.	33
Metcalf, Wm., Ltd.	33
Mitchell, L. A.	iv
Mond Nickel Co., Ltd.	20
National Gas Exhibition	15
Neill, W., and Son, Ltd.	5
Newcastle Alloy Co., Ltd.	35
Page, C., and Co., Ltd.	26
Patent Hygienic Strainer Co.	22
Perry & Hope, Ltd.	27, 33
Petri Bros.	7
Pieterse, H. P.,	16
Potdevin, J.	32
Pott, Cassels, and Williamson	41
Potter, E. P., and Co., Ltd.	34
Poynter, J., Son, and Macdonald	12
Pratchitt Bros.	24
Premier Filter Press Co., Ltd.	44
Pure Bone Phosphate and Chemical Co., Ltd.	34
Rare Metals, Ltd.	34
Reavell and Co., Ltd.	21
Ritchie-Atlas Engineering Co.	8
Riley, J., and Sons, Ltd.	31
Rose, J. L.	35
Rose, Downs & Thompson, Ltd.	i
Sachsenburg (London) Engineering Co.	42
Scales, W. T., and Co., Ltd.	32
Shaw, Francis and Co., Ltd.	22
Sheffield Chemical Co., Ltd.	34
Sherman, J., & Co., Ltd.	11
Siebe, Gorman, and Co. Ltd.	30
Simon, R., and Sons, Ltd.	5
Sofnol, Ltd.	37
South Metropolitan Gas Co.	25
Spence, P., and Sons, Ltd.	12
S. S. Mond Gas Co.	16
Staveley Coal & Iron Co., Ltd.	25
Staniar, J., & Co.	33
Stockton-on-Tees Chem. Wks., Ltd.	31
Suda and Co.	14
Tanks & Drums, Ltd.	7
Taylor, J., & Co., Ltd.	39
Tennants, Chas., & Co. Ltd.	20
Thermal Syndicate, Ltd.	2
Tyrer, T., and Co., Ltd.	35
United Alkali Co., Ltd.	43
Varley, J., and Co., Ltd.	16
Washington Chemical Co., Ltd.	20
Watson, H. T.	iv
Waugh, W., and Co.	21
Westinghouse Brake and Saxby Signal Co., Ltd.	23
White, J. & J., Ltd.	15
White, R., and Sons	33
Wilkinson, J., and Son	26
Willcocks, H. S., and Co.	26
Womersley, A., and Son, Ltd.	33

REPORTS OF COMPANIES.

Goodlass, Wall, and Co., Ltd.

The annual general meeting was held on Thursday, of last week, at Liverpool. Mr. John Byrne, who presided, said he attributed the splendid results obtained, amongst other things, to the fact that the company were manufacturing paints, colours, and varnishes of a very high quality, which were greatly appreciated in all the principal markets. They had obtained only a slight relief from taxation, and had not yet benefited from the reduction in corporation profits tax. Additional new modern buildings were in course of erection, equipped with the most up-to-date plant, which would greatly increase the output, and give further facilities for manufacturing the company's specialities. The Cardiff premises had been practically rebuilt, with all modern conveniences, which would assist in the development of the trade in that area. The company's investments had increased to £68,000. He was hopeful that if normal conditions prevailed during the ensuing year that at least equally good results would be obtained. The recommendations embodied in the directors' report, including payment of a dividend of 2s. 6d. per share (12½ per cent.), less tax, on the ordinary shares, were confirmed..

Broken Hill Proprietary Co., Ltd.

Net loss for the year to May 31, 1923, was £106,086., after allowing for depreciation £155,304., and £131,277. debenture interest. £100,000. was transferred from reserve to appropriation. Accounts presented cover about nine months' idleness and three months' working; also cover costs of starting up, which are necessarily heavy. Unfortunately, it has not been possible to realise full benefit of all improvements before the close of the year, owing to cessation of work at Maitland Collieries, which is now settled. A subsidiary company has been formed to utilise blast-furnace slag and tar for road-making material. The directors decided that it was desirable to have a more direct interest in coal supply, and steps have been taken in this direction; approximately 3,800 acres of good coal-bearing lands in Maitland district have been purchased, and it is expected to commence developments of this property shortly. Slimes dumps from which lead and zinc concentrates have been produced during the last two years will be exhausted about August, but there still remains 60,000 tons of slimes from which zinc concentrates can be obtained profitably. Tailings dumps, which are being retreated by zinc flotation plant, will last about six months. It is anticipated that underground mining operations will be resumed next October. Reserves of ore at mine are estimated at about 954,000 tons.

Minerals Separation, Ltd.

At the annual meeting in London on Tuesday last, Mr. F. L. Gibbs, presiding, said that there was now little doubt that the department of their business which would prove to be the first to become income-bearing on a considerable scale would be that which dealt with the cleaning of coal and the briquetting of coal. The first fruits of the process would be in the shape of plants treating from 500 to 1,000 tons a day, until in 1925 he anticipated that the company's processes for briquetting coal would be producing over 10,000 tons every day, and possibly very much more than that figure.

Referring to the ore reduction process for the treatment of oxidised silicate and carbonate copper ores in which they were largely interested, the Chairman said they had made a decided advance, and they were making great advances in Northern Rhodesia. The reputation already created for their new coal processes could not fail to be of immense benefit to the coal mining industry, and he hoped later on in the year to be able to give information that a similar reputation had been established for their new metals processes, with special application to the world's copper industry.

The report was unanimously adopted.

DIVIDENDS.

Dominion Tar and Chemical Co., Ltd.—The directors have declared a final dividend of 2½ per cent., free of tax, making 5 per cent. for half-year ended June 30.

Standard Chemical Company.—Net profits for the year ended March 31 were 42,626dol., reducing the debit balance brought forward to 581,462dol.

Staveley Coal and Iron Co., Ltd.—Final dividend of 1s. per fully-paid share, 9d. per share on each share with 15s. paid, and 3d. per share on shares with 5s. paid, making 7½ p.c. for the year ended June 30 last. It is also proposed to pay a diamond jubilee bonus of 2½ per cent. on the paid-up capital of the company. For the preceding 12 months the shareholders received a dividend of 7½ per cent., to which figure it was reduced from 10 per cent. paid for 1920-21.

British Broken Hill Proprietary Co., Ltd.—The liquidator announces that he intends on September 10 to declare a first and final dividend of 35s. per share, payable on and after September 24 next to all shareholders now on the register.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

It is a curious thing, and one seldom noted in Cumberland, that while the coal trade is growing slacker the coke trade is becoming brisker. Of course, conditions are not normal. The Whitehaven ovens are still out of operation, and the production, therefore, is considerably below that which in an ordinary way is forthcoming. So that when the Whitehaven coking plant resumes operations—as it shortly will, the dispute having at last been referred to arbitration—it is quite likely that there may be rather more coke available than can be marketed. Still, it is rather remarkable that coke should be in so much brisker request than coal, and it cannot be said that Cumberland coke is in less keen competition with other makes than the coal is with the product of other coalfields. It has to be remarked that the hematite pig-iron trade is characterised by a firmer tone than has been the case for some time past. True it is, at all events, that stocks in works' yards are now being reduced, and that at the present rate of progress, provided the make of the twelve furnaces in blast continues to go into consumption, they may be exhausted by mid-autumn. It would appear as though there may now be some prospect of a revival of the iron trade towards October, and if this should prove to be the case it goes without saying that the coking and coal industries would immediately benefit. All the small coal, as it is, has to be reserved for the coking plants, and neither Irish nor local needs can be satisfied. Workington and Furness smelters are taking the greater part of the make of coke at 29s. to 33s. per ton, according to carbon content, and the Continent about 1,500 to 1,700 tons per week at 34s. to 37s., f.o.b. East Coast coke supplies for the furnaces on special qualities of iron are 8,200 tons per week. Residuals are active. The chemical works are accepting the whole of the tar, and sulphate of ammonia and crude benzol are in fairly good request.

PUBLICATIONS RECEIVED.

Egypt: The Economic and Financial Situation.—Report (to April, 1923) by E. Homan Mulock, British Commercial Agent for Egypt at Cairo. London: H.M. Stationery Office. 1s. 6d. net.

Japan.—Department of Overseas Report (to June 30, 1923). By Sir E. T. Crowe, C.M.G., Commercial Counsellor, and Mr. H. A. F. Horne, Commercial Secretary, H.M. Embassy, Tokyo. London: H.M. Stationery Office. Price 2s. net.

The British Acetylene and Welding Handbook, dealing with the acetylene and oxy-acetylene welding industries. Publishers: *The Acetylene and Welding Journal* (Raggett and Co.), Red Lion Square, Holborn, London, W.C. 1., 7s. 6d. net.

Silica in Canada—Occurrence, Exploitation, and Uses. Ottawa: Government Printing Bureau.

"The Professional Photographer."—An attractive issue (July), containing an interesting article on the applications of photography to general business for commercial purposes, Messrs. Avery, Ltd., being the special instance. Publishers: Kodak, Ltd., Kingsway, London, who will be pleased to send a copy to those of our readers who are interested.

FERTILISER NEWS.

Nitrate of Soda.—The fertiliser trade in this country remains very quiet, and the home demand in all classes is slow. Harvesting operations, which are very much interfered with by the unsettled weather, are proceeding in most districts, and until these are over, farmers will scarcely turn their attention to forecasting their fertiliser requirements on next season's account. Until this is done, however, merchants are unable to estimate the quantities they are likely to want, so that interest is very small apart from the needs of makers of compound manures and proprietary mixtures. Business in nitrate is almost at a standstill, not only here, but in America. In that country, the market is very dull, buyers considering the present scale of prices too high. The only recent purchase of any importance was by a group of consumers, who bought through a committee, thus securing some small concessions in the matter of price. Conditions have been so quiet of late, however, that even for small lots, the official prices have been shaded almost to the level at which business was done by the group committee. It is felt that the Chilean producers could reduce prices and still operate at a profit, and the widespread nature of this belief is mainly responsible for the lack of interest in the material. Sales by the producers are disappointingly small, but the low price of competitive nitrogenous fertilisers is no small factor in the situation. The Chilean Government, alarmed at the continued indifference of buyers, proposes to allow exporters to place their stocks of nitrate abroad without immediate payment of the export tax. To encourage consumption, therefore, payment of the tax will be postponed, it is reported, on exports up to the quantity of about 300,000 tons. Official statistics show the amount owing to the Chilean Government by the nitrate industry to be over 30,000,000 dollars at the end of July. It may be inferred from this that if the Government are willing to add considerably to this amount, the industry must be in a very needy state, despite the recent optimistic announcements on the subject.

Sulphate of Ammonia.—In the market for this product, there is very little change, and the demand on home account remains on the quiet side. Inquiry for export continues to be satisfactory, however, and with the cessation of the dock strike, shipments of arrears are steadily proceeding. Japan continues to take considerable quantities, and the official returns for the current month should place that purchaser high up in the list of importing countries. From France comes the interesting announcement of the proposed formation of an association known as the "Groupe de defense des acheteurs de sulphate d' ammoniaque anglais," which might be freely translated as the "French Buyers of British Sulphate Mutual Protection Society." It is understood that the reasons for the action of certain French importers in thus organising themselves are in the first place that verbal promises are said to have been given by English exporters and merchants, that prices should be fixed at certain stated levels, whereas it is claimed that contracts made out at agreed prices have been followed by further offers at lower quotations. Secondly, the organisers say that the difficult situation resulting from the prohibition of the export of sulphate of ammonia from France is another reason for uniting; while thirdly, it is the professed intention of the "groupe" to entirely boycott those British sellers who do not subscribe to the doctrine that, having bought British sulphate on contract prices, the French sellers should be free to compete with the British sellers in other markets where the rate of exchange allows them to do so. Our contemporary, *L'Engrais*, does not think that such a project will meet with success. Commenting on the facts given above, the paper states that when buyers and sellers have mutually agreed upon quantities and prices in a contract to which they have added their signatures, that contract should stand, otherwise, commercial honesty is at a discount, with disastrous results. What happens outside that agreement does not, and should not, affect its provisions. The weakness in the first reason, therefore, is that verbal promises in the matter of price stabilisation are of no legal value, while market fluctuations frequently mean changed circumstances in which such verbal assurances become useless. The whole incident seems to savour of the disappointment of a number of merchant speculators who made heavy purchases at last season's higher prices, and are now unable to dispose of their stocks except at a loss. As our contemporary justly remarks, however, "when an error of judgment has been made, the least that one can do is to "play the game," and to accept the risks involved in such transactions."

SOUTH WALES NOTES.

[Specially Contributed.]

There is a more cheerful tone in the tinplate industry, the demand is showing signs of a slight but steady improvement. Requirements for the Far Eastern markets have expanded. A marked improvement is to be noticed in the galvanising trades, especially in corrugated sheets for which a fair demand has arisen and prices are firmer. Supplies of spelter for immediate delivery have become rather restricted, and a further advance in values is expected. With the slight relaxation in patent-fuel prices, business has become more lively, and there are indications that further reductions may be made. Messrs. Baldwin's Ltd., have acquired the Wern Tinplate Co.'s undertaking at Briton Ferry on advantageous terms. A new blast furnace is being rapidly completed, and it is expected that in a few weeks' time it will be put into activity. Rumours are heard of further amalgamations both in the tinplate and steel industries in South Wales. There is a quiet market for cokes and prices have dropped to about 50s. for best qualities. The ovens are fully operating owing to the fact that there is a brisk demand for residuals. Nickel makers report improvements in their business, and by-products find a good market.

The imports for the week are 17 tons copper precipitate from Havre to Swansea; 3,486 tons iron ores from Bilbao to Newport; 2,188 tons precipitate of copper from Huelva, 6,830 tons of iron ore from Walana to Port Talbot. Among the exports were 700 tons sulphate of ammonia from Cardiff to Lisbon, and 31 tons painters' colours from Newport to South Africa.

Plant, Apparatus, and Materials For Sale—*continued.*

SALAMMONIAC
LUMP (FIRSTS & SECONDS),
FINE WHITE CRYSTALS,
COMPRESSED BLOCKS.

CHROME ALUM

MANN BROTHERS, 40, Trinity Sq., E.C. 3.
Telephone: Avenue 9192.
Telegrams: "Manifold, Fen, London."

Plant, Apparatus, and Materials For Sale—*continued.*

ACETONE.
CARBOLIC ACID.
CASEIN.

MANN BROS., 40, Trinity Sq., London, E.C. 3.
Phone: Avenue 9192. 'Grams: Manifold, Fen, London.

Miscellaneous.

GRINDING of every description of Chemical and other materials for the trade, with improved mills. — Thos. Hill-Jones, Ltd., "Invicta" Mills, Bow Common Lane, London, E. Telegrams: "Medikaster, London." Telephone: 3633 East

Miscellaneous—*continued*

ELOF HANSSON,
Importers — Representatives,
Packhuspl. 2, GOTHENBURG.

Saltcake, Nitrecake, Soda, Sulphur, Alumcake, Bleaching Powder, etc., etc.

Phosphor, Borax, Casein, Caustic Soda & Potash, Blanc Fixe.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

August 13 *to* 18 (*inclusive*).

Increasing Porosity of Decolourising Charcoal. Adler, R. 20,769.
Mixing and Agitating Machines. Aluminium Plant and Vessel Co., Ltd. 20,866.
Rubber Substitutes. Bigger, F. J.; and Falls, D. 20,525.
Rubber Latex. Calvert, G. 20,641.
Acetaldehyde. Canadian Electro Products Co., Ltd. 20,718.
Distillation of Tar. Chemical Engineering and Wilton's Patent Furnace Co., Ltd. 20,574.
Ammonium Chloride from Ammoniacal Hot Distillation or Generator Gases. Christenson, O. L. 21,022.
Calorimetric Bombs. Darroch, J. 20,530.
Preparing and Mixing Cement Mixture. Dorr Co., Inc. 20,787.
Drying and Coating Porous Materials for Absorbents and Catalysts. FitzPatrick, G. D. 20,880.
Sulphurised Dyestuffs. Fröhlich, J.; Reber, E.; and Soc. of Chemical Industry in Basle. 20,925.
Drying Peat. Greenwood, R. G.; Hinchley, J. W.; and White, W. W. 20,741.
Vat Colouring-matters. Johnson, J. Y. (*Badische Anilin- and Soda-Fabrik*). 20,748.
Centrifugal Separator Bowl. Lundblad, N. G. D. 20,780.
Products from Urea and Formic Aldehyde. Neuss, O. 20,949.
Nitric Oxide. Redfern, C. G. (*Pintsch Akt.-Ges.*). 21,008.
Purifying and Sterilising Liquids and Gases. Sauer, J. N. A. 21,018.
Low Temperatures. Woodmansey, A. 20,642.
Prisms for Dipping Refractometer. Zeiss, C. (firm of). 20,794.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1*s. in stamps to the Comptroller, Patent Office Sales Branch*, 25, *Southampton Buildings, Chancery Lane, W.C.* 2.

1922.

Producing Intimate Mixtures of Substances and Obtaining Chemical Products Therefrom. Spensley, J. W.; and Chemical Engineering Co. (Manchester), Ltd. 9,681. **201,968**
Refining Mineral Oil. Sharples, P. T. 12,167. **201,986**
Separating Mixed Bodies of Different Specific Gravity. Warren Seed Cleaning Company. 12,523. **180,658**
Purification of Hydrocarbons. Allgemeine Ges. für Chemische Industrie. 12,625. **193,802**
Fuel Briquettes. Jacobs, K. 12,744. **180,661**
Obtaining Lignone from Wood in New Derivative Forms. Cross, C. F.; and Engelstad, A. 12,943. **202,016**
Bituminous Emulsions. Mackay, H. A. 13,022. **202,021**
Purification of Gases from Hydrogen Cyanide. Taplay, J. G.; and Galbraith, W. L. 13,083. **202,024**
Continuous Kilns. Dean, C.; Redfern, J. W.; and Osman, A. E. 13,876. **202,061**
Furnaces Producing Sulphurous Gases. Imison, C. S.; Bligh, J. A.; Wright, R. R.; and Carmichael and Co., Ltd., J. F. 14,345. **202,078**
Filters. Bechhold, Dr. H. 19,640. **202,143**
New Shades on Acetyl Silk. British Dyestuffs Corporation, Ltd.; Baddiley, J.; Hill, J.; and Anderson, E. B. 20,829. **202,157**
1-phenylimino-2-napthoquinone. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis; Wahl, A. R.; and Lantz, R. 35,328. **191,064**

1923.

Bituminous Emulsions and Their Use in Road-making Mackay, H. A. 2,939. **202,230**
Bituminous Emulsions and Their Use as Binding-mediums. Mackay, H. A. 2,940. **202,231**
Ozone. Ozon Hochfrequenz Ges. 4,703. **193,422**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1922.

Soaps Poor in Water. Legradi, Dr. T. 33,226. **202,263**

1923.

Zirconium Steel. Electro Metallurgical Co. 15,667. **202,279**
Burning of Sulphur. Texas Gulf Sulphur Co., Inc. 17,237 **202,283**
Electrolytic Recovery of Zinc from Ores. Electrolytic Zinc Co. of Australasia, Ltd. 19,606. **202,299**
Preventing the Flammability of Easily Inflammable Articles. Eichengrün, A. 19,985. **202,302**
Conversion of Gaseous Aliphatic Ethylene Carbides into Liquid Carbides. Soc. Ricard. Allenet, et Cie. 20,298. **202,311**
Constructive Conversion of Hydrocarbons. Berry, H. R. 20,400. **202,317**

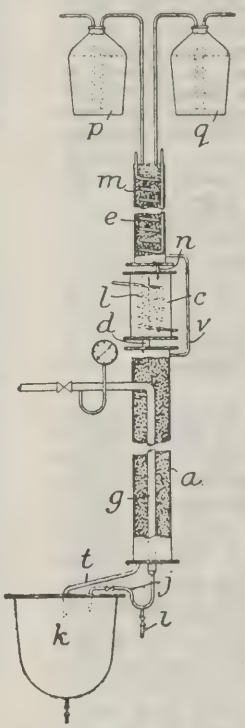
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Alkali Cyanide Retorts. H. G. C. Fairweather, London. (Air Reduction Company, Inc., New York, U.S.A.) British Patent, **199,900**, of 1922.

Retorts for use in the manufacture of alkali metal cyanides are made with a body portion of nickel-chrome alloy and a thin non-porous lining of iron, steel or other ferrous metal. The lining may be spaced from the body portion by a flange at one end and adjusting screws at the other, so that the two parts can expand independently, and the intervening space is packed with finely divided iron, or a mixture of iron and a reducing-agent such as carbon. Nichrome or alloys containing about 85 per cent. of nickel and 10 to 15 per cent. of chromium, or 50 to 60 per cent. nickel, 10 to 20 per cent. chromium and 10 to 30 per cent. iron may be used for the body portion of the retort. Specification 136,750 is referred to.

Production of Hydrazine. R. A. Joyner and Nobel's Explosives Company, Ltd., Ardeer Factory, Stevenston, Ayrshire. British Patent, **199,750**, of 1921.

In the production of hydrazine by reaction between ammonia and a hypochlorite in presence of a catalyst, a high concentration of ammonia is maintained at the point where the reaction takes place. Apparatus for the execution of the process comprises two tower-sections *a*, *e*, packed with pumice or similar material and divided by the trap *c*. The bottom section *a* is traversed by the iron tube *q* connected to a steam-supply and terminating in a blow-off, *i*, and a connection *j* to the hydrazine-receiver *k*, or alternatively the sections *a*, *e*, may both be heated by the introduction of steam through the lead *t*. The middle section or trap *c* and the upper section *e* are provided with coils *l*, *m* respectively. In operation, the bottom and middle sections are warmed, and ammonia solution of 18 per cent. strength is poured down the top section until the trap *c* is full. When the temperature in the trap has risen to about 40° C. the reacting solutions—*e.g.*, a 1.5 N. ammonia-solution containing 1.5 grs. glue per litre and a 0.8 N. sodium-hypochlorite solution, are fed to the section *e* at constant and equal rates from the vessels *p*, *q*. The mixed solution pass by the pipe *n* into the bottom of the trap *c*, where the reaction is completed, and trickles out therefrom by the pipe *d* to the upper part of the section *a*. Here the excess ammonia is expelled, passing by the pipe *v* to the bottom of the top section, where it is re-dissolved in the reaction-mixture, while hydrazine liquor collects in the receiver *k*. Generally it is necessary to cool the liquor in the trap *c* to maintain the desired temperature of 40-50° C.; the concentration of ammonia in the trap is thus maintained at about 18 per cent. The glue used as catalyst is preferably prepared by boiling two litres of 20 per cent. glue solution containing 65 grm. of hydrochloric acid gas under reflux for one hour, and then adding sodium hydroxide until the mixture is alkaline to phenolphthalein. Specification 139/08 is referred to.



Formaldehyde. L. M. Hirchberg, London. British Patent, **199,759**, of 1922.

Aqueous solutions of formaldehyde which contain only a minimum quantity of methyl alcohol are obtained by subjecting a mixture of formaldehyde, methyl alcohol and water vapours—as it issues from a methyl alcohol oxidation plant or obtained by distilling commercial formaldehyde solutions—to fractional condensation in a rectifying column, the aqueous condensate on the lowermost plates being withdrawn at a temperature in the neighbourhood of 90-95° C. as soon as formed. The absence of methyl alcohol inhibits the production of acetals, such as methylal, which are stated to be conducive to the polymerisation of the formaldehyde.

Formaldehyde. L. M. Hirchberg, London. British Patent, **199,760**, of 1922.

In the catalytic oxidation of methyl alcohol to formaldehyde in the presence of steam, the amount of oxygen-containing gas present relative to the methyl alcohol does not substantially exceed the proportions corresponding with one

molecule of oxygen to two molecules of methyl alcohol. The steam is preferably introduced as dry superheated steam and the proportions by weight of steam relative to methyl alcohol preferably vary from 1:24 to 1:9.

Vegetable Charcoal. L. H. Bonnard, London. British Patent, **199,751,** of 1921.

A vegetable material, preferably of fibrous character, for example sawdust or peat, is comminuted and intimately mixed with slaked lime and heated in a retort to a temperature of about 1,000° C., until carbon monoxide ceases to be evolved, when the temperature is maintained for a further short period. The mixing with lime is preferably facilitated by the presence of a small proportion of water. According to examples equal weights of sawdust and water are mixed with calcium hydroxide in a ball- or edge-runner-mill, and then heated to about 1,000° C. in a retort, preferably that described in Specification 196,958, the period of further heating varying with the amount of lime. After cooling, the lime may be again slaked and the whole submitted to a further heat treatment. Chalk may be used instead of lime, but in this case the second heat treatment is essential. The lime may be removed by any known means. The charcoal is suitable for purifying sugar, or oils, or for sterilising liquids, etc. By-products from the distillation are collected.

Catalytic Oxidation of Organic Compounds. J. Y. Johnson, London. (Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany.) British Patent, **199,886,** of 1922.

The partial oxidation of organic compounds is effected by passing the compound in the gaseous or vapour phase, in admixture with an oxygen-containing gas, over boric or phosphoric acid or their salts. The catalytic materials are preferably mounted on a carrier; thus clay, firebrick or magnesia is soaked with boric or phosphoric acid, or silica, kieselguhr, a metallic oxide, carbonate or nitrate is introduced into molten boric acid. Mixed catalysts, obtained by adding boric or phosphoric acid to molten metal salts such as nitrates, may be used. According to the examples: (1) formaldehyde is produced by passing ethylene and oxygen over boric or phosphoric acid or their salts mounted on burnt clay or diatomaceous earth; the gases may circulate over the contact mass, the formaldehyde being absorbed in water and further ethylene and oxygen being introduced continuously or at intervals; methane, acetone, ethyl alcohol and cyclohexanone may also be oxidised to formaldehyde in a similar way; (2) anthracene and air passed over the catalytic material yield anthraquinone, benzyl alcohol gives benzaldehyde and ethyl alcohol produces acetaldehyde.

Thermo-resistant Glass. C. J. van Nieuwenburg, Delft, Holland. British Patent, **200,020,** of 1922.

In the manufacture of thermo-resistant glass, lithium-alumino-silicate, preferably as lepidolite, is added to the ordinary materials, with the addition of a substance such as zinc oxide or boric acid compounds which promotes the melting process. The glass produced has an increased tensile strength with a resultant increased coefficient of thermal endurance.

Purifying Clay. W. Feldenheimer, London; and W. W. Plowman, East Sheen, Surrey. British Patent, **199,795,** of 1922.

A process for the purification of clay comprises peptisation of the clay in an aqueous solution of caustic alkali, such as caustic soda, which contains the hydrate of an alkaline-earth, such as hydrate of calcium, barium, or strontium, the amount of reagents added for suspending any given clay being varied according to the hardness of the water used. The solution of mixed hydrates may be obtained by the interaction of an excess of caustic alkali and an alkaline-earth hypochlorite such as bleaching-powder in the presence of water. The suspension of clay may be separated from the unpeptised impurities, when such are present, and the clay recovered in any desired manner. A soluble hypochlorite may also be present in the liquid for bleaching, deodorising and sterilising the clay, in which case a longer period of contact is usually necessary, or the hypochlorite may be added to the suspension after the impurities, if any, have been removed.

Inks. W. J. Mellersh-Jackson, London. (Alchemic Gold Company, Inc., Manhattan, New York, U.S.A.) British Patent, **199,923,** of 1922.

Metallic-pigment and other inks for application by heated stamps to bookbindings, labels, etc., are made with a vehicle consisting of a resinous thickening-agent, such as colophony, dammar, copal, Burgundy pitch, Canada balsam, or benzoin, dissolved in a solvent having a boiling-point between the limits 200°—300° C., specified solvents being terpineol and other derivatives of the terpene series, such as terpinyl acetate, benzyl alcohol, aromatic esters such as terpinyl acetate, benzyl acetate and ethyl benzoate, and oil of dammar resin.

NEW COMPANIES.

Banff and Moray Agricultural Company, Ltd.—Private company. Capital £20,000., in £1. shares. Manufacturers of chemicals, acids, fertilisers, etc. Office: Grand Hotel Buildings, Elgin.

Beswick's Lime Works, Ltd.—Private company. Capital £25,000. Limestone quarry proprietors and lime burners, etc. Office: Brierlow, Hindlow, near Buxton.

Commercial Petroleum Company, Ltd.—Private company. Capital £3,500. Dealers in and refiners of petroleum. Solicitors: Francis and Johnson, 62, London Wall, London, E.C. 2.

Geo. Osmond Hutchins Oils, Ltd.—Private company. Capital £1,500. Oil refiners. Address: 6, Trafalger Place, Swansea.

Hightensite and Ebonite Manufacturing Company, Ltd.—Private company. Capital £15,000. Manufacturers of ebonite, etc. Office: 54, Conduit Street, London, W. 1.

Lactobacilline, Ltd.—Private company. Capital £100. Manufacturing chemists, dealers in chemicals, etc. Office: 15, Great St. Andrew Street, London, W.C. 2.

Permanent Bronzing and Restoring Syndicate, Ltd.—Private company. Capital £2,500. Manufacturers and treaters of and dealers in bronze, brass, and similar metals, etc. Office: 146, St. John's Street, London, E.C. 1.

Sopex Company, Ltd.—Private company. Capital £1,000. Manufacturers of soaps, manufacturers and refiners of and dealers in all kinds of oils, etc. Solicitors: Harold Elwell and Co., 65, Coleman Street, London, E.C. 2.

Standard Match Company, Ltd.—Private company. Capital £40,000. Office: Hempstead, Gloucester.

Sublima, Ltd.—Private company. Capital £1,000. Manufacturers of cleansing materials. Office: Stevenage House, 40-44, Holborn Viaduct, E.C. 1.

Tomlinsons (Manchester), Ltd.—Private company. Capital £2,000. Manufacturers and dealers in medical preparations, etc. Office: 21 and 23, Embden Street, Chorlton-upon-Medlock, Manchester.

William Pinchin and Co., Ltd.—Private company. Capital £6,000. Colour, paint, and varnish manufacturers and white lead merchants. Office: 2, Hague Street, London, E. 2.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," September 1, 1888.)

Transport of Liquefied Gases.—Some new regulations which have been published concerning the transport of liquid carbonic-acid and nitrous-oxide gases may be of interest to export agents. It is ordered that the liquids must be filled into wrought-steel or wrought-iron vessels previously tested to a pressure of 250 atmospheres. The taps must be secured by special caps. The cylindrical form is not allowed unless it be designed in such a manner as to counteract the tendency to roll along plane surfaces. Carbonic-acid gas will be also allowed if the pressure does not exceed 20 atmospheres, and it is to be kept in vessels similar to those above described. These latter must have been subjected to a pressure at least one and one-half times as great as that which the contents will exert. Acids are also considered worthy of more attention as regards transport, and now, though they may be still stored in carboys, yet the hay or straw in which the vessel itself is packed must be impregnated with solution of calcic chloride, sodic sulphate or chloride, or ferric chloride, so as to diminish its tendency to ready inflammability. Other directions are given, but these apply only to Continental railway companies.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—A number of important reductions in prices are recorded this week. Business continues slowly, and for small quantities at cut prices. Carbonate and caustic potash are easier. Citric acid is a weak feature. Hyposulphite of soda is cheaper. Prussiate of potash has once more moved in buyers' favour. **Acetic Acid,** 80% technical, £47.; 80% pure, £51.; 98% glacial, £60. in casks, and about £73. in glass demi-johns, ex wharf, London; with spot supplies still rather limited the position keeps very firm. **Acetone,** British Government specification, £125. to £127. per ton, in drums; the state of world supplies certainly tends towards higher prices in the future. **Alum,** lump, in casks, £10. per ton; Continental offers are free and cheap, but there seems to be little demand at present. **Arsenic,** Cornish, white powdered, on spot, about £73. per ton; there is no change as regards spot supplies; slightly easier prices are mentioned for forward delivery. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; there is little interest shown in this item now that the season has ended. **Barium Chloride,** 98/100%, £15. per ton; the demand from dealers keeps very restricted, with prices asked a shade easier. **Bleaching Powder,** 35/37%, £10. per ton; importers are quoting in the region of this figure for shipment, but find business slow. **Borax,** commercial, granulated, £26. 10s.; crystals, £27.; powdered, £28.; extra fine, £29.; B.P. crystals, £31.; powdered, £32.; extra fine, £33.; per ton, for home trade only, in two cwt. bags, carriage paid to destination; British makers' prices are unchanged at these levels; dealers are offering for home consumption under similar conditions to makers at, granulated, £25. 10s.; and powdered, £27. per ton **Borax Glass,** lump, £74.; powdered, £75. per ton, in tin-lined cases; British makers' prices for home trade only, packages free, carriage paid to destination, remain at these figures. **Boric Acid,** commercial, crystals, £50.; powdered, £52.; B.P. crystals, £56; powdered, £60.; extra fine, £62. per ton, in free bags, carriage paid to destination; British makers offering at these unchanged rates for home trade only; dealers are offering at competitive rates. **Cream of Tarter,** 99/100%, about 90s. to 92s. per cwt., less 2½%; this market keeps fairly steady, and some limited business continues. **Citric Acid,** B.P., crystals, about 1s. 6d. per lb., less 5%; spot holders quote at this price, but any business would be at much cheaper prices. **Epsom Salts,** commercial quality, about £5. per ton, in bags; there is little activity here, and dealers' prices are unaltered. **Formaldehyde,** 40% volume, on spot, about £95.; forward delivery, about £75. per ton; most inquiry is for forward delivery at the easier prices mentioned. **Glauber's Salt,** commercial quality, £3. 15s. to £4. per ton, in bags; this product is seldom called for from dealers, whose prices show no change. **Lead Acetate,** brown, about £40. to £41.; white, about £42. per ton; business has been slower, and dealers are quoting at lower prices. **Litharge,** about £35. 10s. to £36. per ton; dealers in imported material are selling limited quantities at about these figures. **Lithopone,** 30% Continental red seal, £22. to £22. 10s. per ton; dealers continue to find some limited business at about these figures, with the market keeping very steady. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; occasional business has been done at a shade under these rates. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers quote at these unaltered prices. **Oxalic Acid,** about 6d. per lb.; this market remains very much on the quiet side, with quoted rates unchanged. **Carbonate of Potash,** 90/92%, £26. 10s. to £27.; 96/98%, £30. to £31. per ton; dealers are quoting at these easier prices; but there is still no great volume of business on the market. **Chlorate of Potash,** crystals and granulated, about 3d. per lb.; the position is unchanged on the week. **Caustic Potash,** 88/92%, on spot, £30. to £31. per ton, in drums; dealers' prices have been substantially reduced for this product; the market remains dull. **Permanganate of Potash,** commercial quality, about 9½d. per lb.; there is a slightly easier feeling in this market, and fair business has been done. **Prussiate of Potash,** yellow, about 1s. 1d. per lb.; a further reduction has been made by spot holders, and business is still keenly competed for. **Sulphate of Potash,** 96%, £11. 10s. per ton, ex ship; there is no change in the position. **Mercury,** about £9. to £9. 5s. per bottle of 75/76 lbs; this market remains quiet, and prices show a further reduction, but the position appears somewhat steadier. **Red Lead,** imported, about £35. 10s. to £36. per ton; dealers quoting at about these levels are doing a limited business. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49.; medium, £43. to £44.; fine white crystals, £25. to £26. per ton; dealers' prices, which were reduced last week, seem steadier this week, although the market is still quiet. **Saltcake,** ground and unground, home trade, about £4. 5s., delivered; export, about £5. to £5. 5s. per ton, f.o.b.; the tone holds very steady. **Acetate of Soda,** about £25. 10s. per ton; dealers are offering at about this figure, with little doing. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid to destination; British makers' prices are unchanged for this product, for home trade only. **Caustic Soda,** 70/72%, £18. 10s.; 76/77%, £20. 10s. per ton, in drums, ex wharf, shipping port; dealers prices are so far unchanged, with practically nothing doing; British makers' prices have been reduced, with 70/72%, £16. 17s. 6d. per ton, and 76/77%, £18. 7s. 6d. per ton, in drums, on contract, for home trade, carriage paid to destination; prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers' prices are unchanged on the week, carriage paid. **Bichromate of Soda,** home trade, about 4½d. per lb., for export slightly more; British makers selling at these prices. **Cyanide of Soda,** 98/100%, export, 8½d. to 9d. per lb.; home trade, about 10d. to 10½d. per lb.; British makers' prices quoted. **Nitrate of Soda,** 96%, £13. 7s. 6d. per ton, f.o.r. Liverpool; the position shows no change on the week. **Nitrite of Soda,** 100%, about £26. 10s. to £27. per ton; the market keeps steady at this level rate. **Prussiate of Soda,** about 6d. to 6¼d. per lb.; a further reduction has been made by dealers in their quoted rates; business is still poor. **Hyposulphite of Soda,** pea crystals, about £15. per ton, in one-cwt. kegs; commercial quality, about £9. to £9. 10s. per ton, in casks; dealers are asking about these prices, with business restricted. **Sodium Sulphide,** 60/62%, solid, £14. to £14. 10s.; ditto, broken, £15. to £15. 5s. per ton, in drums; 60/65% concentrated, £14. 10s. in casks; prices quoted are about the same, with business dull. **Sulphate of Copper,** £25. 15s. to £26. per ton; dealers are offering Continental material at these and slightly easier rates; business is very limited. **Tin Crystals,** 1s. 4d. per lb.; there is no change on the week. **Tartaric Acid,** B.P., crystals, about 1s. 2d. per lb., less 5%; the spot position is weak; supplies are ample, with the demand very small, and the few sales made have been at very cut rates. **White Lead,** imported, about £43. per ton; dealers are finding a little business at about this figure. **Zinc Oxide,** B.P., about £51; white seal, about £43.; 99.5%, about £37. 10s. per ton, f.o.r. makers' works; British makers report their prices firm at these levels.

Pharmaceutical Chemicals.—The quietness of the market during August is more pronounced than usual. There are no changes of importance to record, but many items are rather unsteady owing to weak spot holders. **Acetanilid,** crystals and powder, about 1s. 6d. per lb.; some cheaper offers are being made for quantities, with little doing. **Acetyl-Salicylic Acid,** B.P., about 3s. to 3s. 1d. per lb.; it is difficult to obtain orders at the higher rate quoted. **Benzoic Acid,** B.P., about 2s. 6d. per lb.; no business recorded, quoted nominally. **Diethylbarbituric Acid,** B.P., (barbitone), about 18s. per lb.; there is no further fall in price to record, and market still flat. **Salicylic Acid,** B.P.,

2s. 3d. to 2s. 4d. per lb.; this market seems to keep up very well indeed, with fair business passing. **Tannic Acid,** leviss, about 3s. 4d. to 3s. 6d. per lb.; quoted at these levels on a slow market. **Amidopyrin,** about 14s. 3d. per lb; inquiry is only occasional, for small lots. **Ammonium Bromide,** about 7d. per lb.; there is no improvement in this market, and values are weak, with business poor. **Benzonaphthol,** about 5s. per lb., nominal; no interest shown in spot offers. **Benzaldehyde 03,** 3s. per lb.; some little business has been done at about this level. **Betanaphthol,** resublimed, 1s. 11d. to 2s. per lb.; the demand for this article remains slow. **Calcium Lactate,** 1s. 9d. per lb.; this market keeps quite steady, with business moderate. **Chloral Hydrate,** duty paid, 4s. per lb.; some sales have been made at about this figure of small quantities. **Creosote,** B.P., 2s. 5d. to 2s. 6d. per lb.; at these rates the market seems quite steady, although not at all active. **Creosote Carbonate,** about 8s. 6d. per lb.; spot holders are finding only small business—quoted rates unaltered. **Guaiacol Carbonate,** about 8s. 3d. per lb.; the market remains almost inactive, and dealers' prices unchanged. **Hexamine,** about 3s. 9d. per lb.; there is a slightly steadier tone here, but the market is still affected by a few cheap offers. **Hydroquinone,** about 3s. 6d. per lb.; inquiry has been small during the week, and prices quoted are not firm. **Methyl Salicylate,** about 2s. 6d. per lb.; this rate is being asked in most quarters, and some fair business has been done. **Methyl Sulphonal,** about 15s. per lb.; this market keeps rather dull, with quoted rates easy. **Paraformaldehyde,** 3s. 6d. per lb.; a steadier tone is recorded here, and a slight recovery may take place. **Paraldehyde,** 1s. 5d. to 1s. 6d. per lb.; spot offers are being made at these figures for good quantities. **Phenacetin,** about 6s. per lb.; business on spot remains quiet, and prices still tend to weaken. **Phenazone,** about 7s. 6d. per lb.; sales are mostly slightly cheaper than the quoted rate given. **Phenolphthalein,** about 6s. 6d. per lb.; this item is none too steady at this quoted rate. **Potassium Bromide,** B.P., crystals and granular, 6¼d. to 6¾d. per lb.; the position on spot is as reported last week, stocks ample, demand small, market unsteady. **Potassium Permanganate,** B.P., about 10d. per lb.; this market seems quite good at this level, with a fair business passing. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; this market remains neglected, with quotations unchanged. **Sodium Benzoate,** about 2s. 6d. per lb.; the market appears to be idle. **Sodium Bromide,** B.P., crystals and granular, 7d. to 8d. per lb.; offers on spot are varying, with some big lots at cheap rates; business has been poor. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; quoted rates show no further drop in value, but there is hardly any inquiry about. **Sodium Salicylate,** powder, about 2s. 5d. per lb.; crystals, about 2s. 8d. per lb.; pure flake, about 2s. 11d. per lb.; inquiry has been fairly good, with not much spot material on offer; prices seem firm. **Sulphonal,** about 14s. 6d. per lb.; this market remains very flat. **Terpin Hydrate,** about 1s. 9d. per lb.; a steady but quiet market. **Thymol,** about 15s. per lb.; some offers are said to be at cheaper rates than that quoted.

Coal-tar Products, Intermediates, etc.—Business is still very limited in volume. Carbolic acid crystals are again a shade cheaper. Pitch is almost nominal. Creosote oil is somewhat easier. Other products are unaltered on the week. **Aniline Oil,** about 9d. to 9½d. per lb., drums free; this market remains slow, with quoted rates unchanged. **Aniline Salt,** 9½d. to 10d. per lb., casks free; there is no change here, market dull. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; quoted rates are level, with little business about. **Benzol,** 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; the quotation given is unchanged, with business very quiet. **Toluol,** about 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; quoted rates have reverted to their recent level. **Xylol,** pure, 2s. 3d.; commercial, 1s. 9d. per gallon, drums extra; the market remains dull, with values unchanged. **Naphtha,** about 1s. 4d. per gallon; there is no further reduction in price to record, but the market is still flat. **Heavy Solvent Naphtha,** 90/190, about 1s. 4d. per gallon, drums extra; prices mentioned are unchanged, but the market is quiet and weak. **Solvent Naphtha,** 90/160, 1s. 5d. per gallon, drums extra; there is little business about, and quoted rates are not at all firm. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; there is no change to record here. **Burning Oils,** crude No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; there is no change record, business slow. **Creosote Oil,** about 9½d. per gallon, f.o.b.; slightly easier rates are being quoted, with inquiry small. **Carbolic Acid,** crystals, about 1s. 1½d. per lb., f.o.b.; dealers are offering at the slightly reduced figure on a quiet market. **Naphthalene,** £20. per ton; dealers' quotations are maintained at about this level; crude, £7. to £13.; flakes, £24.; powder, £17.; crystals, £23.; balls, £24.; tablets, £28.; candles, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; dealers' prices are unchanged, with the market flat. **Pyridine,** 20s. per gallon; this high rate is fully maintained, with spot material very scarce. **Hexamethylene,** about 3s. 9d. per gallon; this market seems steadier after recent reductions in prices. **Pure Methyl Alcohol,** £100. per ton, ex wharf, London; values are well maintained on a steady market. **Pitch,** about 140s. per ton, spot, London; this market is reported quiet, but inquiry for next season is expected shortly. **Sulphate of Ammonia,** home trade, about £14. 10s. per ton; business remains very restricted.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £63. to £63. 2s. 6d., cash; £63. 15s. to £63. 17s. 6d., three months; electrolytic, £68. 15s. to £69. 5s. **Tin:** Standard, £193. 5s. to £193. 7s. 6d., cash; £194. 7s. 6d. to £194. 10s., three months; Straits, £197. 5s.; English, £194. **Lead,** soft foreign, £24. 12s. 6d., prompt; English, £33. 12s. 6d.; chemical sheet, 34s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 2s. 6d.; hard, £27. 5s. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £8. 15s. to £8. 17s. 6d. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. 6d. to 12s. 9d. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust,** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. There is no Australian material on offer, stocks having been cleared.

MANCHESTER CHEMICAL MARKET. Wednesday.

Business generally continues exceedingly flat, both for home and export trade, with very little promise of improvement, and prices still show a downward tendency. Quotations for **Alkali** products remain steady at the recent reductions. **Bleaching Powder** is easier at £11. 5s., softwoods on rails, and there is only small inquiry. **Chlorates** are moving off slowly, **Potash** 3d., and **Soda** 2¾d. per lb., carriage paid. **Bichromates** unaltered. The export inquiry for **Saltcake** continues brisk, but there is little doing in the home market, and prices are firm at £4. 10s., carriage paid. **Glauber's Salt** has a slow sale at £4., carriage paid. Amercian **Sulphur** steady at £5. 5s., ex store. **Copper Sulphate** is in small demand, and price nominal at £26., f.o.b. **Phosphate** and **Commercial Hyposulphite of Soda** without improvement. **Nitrite of Soda** scarce on the spot, and price is firm at £26. 10s., ex store. White powdered **Arsenic** has an easier tendency; to-day's price for Cornish brand is £68., on rails, at works. The demand for **Yellow Prussiates** is slow; prices nominally 1s. 1½d. for **Potash** and 6¼d. for **Soda. Carbonate** and **Caustic Potash** is in rather better request, but price easy. Grey and Brown **Acetate of Lime** are unchanged in position or value. Prices for **Acetic Acid** and **Acetate of Soda** are steady, but only small business is reported. **Lead Salts** have a higher tendency; spot quotations are firm; white **Acetate** £41., brown £43.; **Nitrate,** £42., delivered. All **Zinc, Tin,** and **Ammonia Salts** are lower. **Barium Chloride** easier at £14. 10. on rails. **Oxalic Acid** in only small demand, and price weak at 5¾d. to 6d. per lb. Green **Copperas** continues to move off readily, but prices do not show much improvement. **Permanganate of Potash** firm, at 9¾d. per lb.

SWANSEA MARKET REPORT. Wednesday.

More interest is being exhibited in **Tinplates,** and business is on the increase; quotations are based on £1. 3s. 1½d., per standard box, f.o.b. **Galvanised Sheets** are firm at

£18. 7s. 6d. per ton. **Copper** better; prompt, £64. 2s. 6d. per ton, and three months, £64. 17s. 6d. **Tin** somewhat irregular at about £190. 12s. 6d. per ton prompt, and £191. 12s. 6d. three months. **Lead** quiet at £24. 7s. 6d., prompt delivery, and £24. 10s. 6d. forward; English, £25. 15s. **Spelter** dearer at £33. 12s. 6d., and for three months, £31. 17s. 6d. per ton. **Zinc Sheets** firmer at £39. 2s. 6d. per ton. **Linseed Oil,** raw, £2. 3s. 3d., boiled, £2. 5s. 3d. per cwt. **Cottonseed Oil,** common edible, £2. 2s. 3d.; and deodorised, £2. 5s. 3d. **Coconut Oil** firm at £2. 1s. 9d. per cwt. **Olive Oil** steadily quiet at £66. 17s. 6d. per ton. **Rape Oil** dull; best refined, prompt, £2. 3s. 3d. per cwt., net, in barrels. **Cod Oil** quiet, with Newfoundland at £1. 19s. 3d. per cwt., ex ship. **Palm Oil,** quietly steady; Lagos, £34. 15. 3d.; mediums, £35. 10s. 6d.; softs, £34. 10s. 6d., prompt, and £34. 15s. 6d. forwards; hards, £35. 15s. 6d. per ton, at docks. **Turpentine** quiet at £3. 13s. 9d. per cwt. for American refined. **Sulphate of Ammonia** quiet, with home trade quotations at £13. 7s. to £14. 10s. per ton, delivery over month. **Sulphate of Copper** dull at £26. 7s. 6d. per ton, less 5%. **Nitrate of Soda** in slow trade at £13. 7s. 6d. per ton, in cwt. bags. **Bone Meal** dull at £9. 2s. 6d. per ton. **Oxalic Acid** remains quiet at 6¼d. per lb. **Sulphuric Acid** in better request. **Arsenic** quiet at £71. 17s. 6d. per ton, for white powdered. **Benzol** in good call at 1s. 4d. per gallon at ovens. **Pitch** rather easier at £6. 12s. 6d. per ton. **Copperas** quiet at £2. per ton, delivered. **Coal** prices steady for Admiralty qualities, with best smokeless at £1. 9s. 3d.; seconds, £1. 8s. 3d.; ordinaries, £1. 7s. 3d.; Monmouthshire black vein, £1. 8s. 6d.; all per ton, f.o.b. **Anthracite** was keenly inquired for, with rising prices; best large, £2. 10s.; seconds, £2.; Paris nuts, £3. per ton, all f.o.b. **Patent Fuel** in quiet request from £1. 10s. to £1. 13s. per ton, f.o.b. **Cokes** rather dull, with export prices £2. 7s. 6d. per ton, f.o.b.; foundry £2., and furnace £1. 10s.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Inquiries for chemicals of the heavier class, for use in the United Kingdom, have been made more freely, conditions in the principal consuming industries being more settled. In the export branch of the trade, business with distant markets has gone on more actively and shipments have been fairly heavy. **Bleaching Powder** has been rather more in demand for the home trade, and has had a fair shipment on foreign account; it is £10. 5s. to £10. 17s. 6d. per ton for use in the U.K., and £11. 5s. to £11. 17s. 6d. per ton for export. **Chloride of Calcium** has had a moderate sale, and is £5. 12s. 6d. per ton. **Caustic Soda** has been in fair request for home-trade uses, and has had a fairly active shipment to distant ports; the price for use in the U.K. and for export is £19. to £20. per ton, carriage paid. **Bicarbonate of Soda** has been in very fair demand for home-trade uses, and has had a fairly heavy shipment for foreign ports; it is £10. 10s. per ton, carriage paid, for use in the United Kingdom. **Soda Crystals** have had a steady sale on home-trade account, but have been quiet in the export branch; they are £5. 5s. per ton for home-trade uses. **Nitrate of Soda** has again been in moderate demand, and is £13. 5s. to £13. 10s. per ton. **Borax** has had a very fair inquiry, and is £26. 10s. to £27. 10s. per ton for commercial crystals, and £28. for powdered; higher grades are £31. per ton for crystals, £32. for powdered, and £33. for superfine. **Saltcake** has had a steady inquiry; it is £4. 10s. to £5. per ton for use in the U.K., and £5. to £6. per ton for export. **Bichromate of Soda** has been but little in request, and is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has been rather more in demand on home-trade account and has had a heavy shipment for export; the price is £7. 12s. 6d. per ton for the home trade, and £8. per ton for export, varied according to destination. **Hyposulphite of Soda** has been more in demand, and is £10. to £10. 10s. per ton, in 2cwt. bags, for commercial, and £15. to £16. per ton, in 1cwt. kegs, for photographic. **Sulphide of Soda** continues quiet; solid is £14. 10s. to £15. per ton, and crystals £9. to £10. per ton. **Chlorate of Soda** has been inactive, and is 3d. to 3¾d. per lb. **Phosphate of Soda** has been very quiet, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been but little called for, and is 6¾d. to 7d. per lb. **Yellow Prussiate of Potash** has been in fair request, and is 1s. 2½d. to 1s. 3d. per lb. **Red Prussiate** has been but little called for, and is 3s. 3d. to 3s. 6d. per lb. **Carbonate of Potash** has had a limited inquiry, and is £25. to £33. per ton, according to quality. **Nitrate of Potash** has had a very fair sale, and is £33. to £35. per ton for refined. **Chlorate of Potash** has been quiet, and is 3½d. to 4d. per lb. **Caustic Potash** has been more in request, and is £32. to £33. per ton. **Permanganate of Potash** has been in rather good demand, and is 9¾d. to 10d. per lb. **Bichromate of Potash** has had a moderate sale, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in quietly steady request; first quality is £63. per ton, second quality is £60., and third £57. **Sulphate of Ammonia** has been but little in demand for home-trade use but has had a heavy shipment to overseas ports; it is £14. 10s. per ton for neutral of 25¾%, and £13. 7s. for ordinary of 25¼%, for use in the U.K. **Carbonate of Ammonia** has been in fair demand, and is 4d. per lb. **Muriate of Ammonia** has had a small sale, and is £32. to £33. per ton. **Magnesia** has been steadily called for; **Carbonate** is £2. 5s. per cwt., and **Sulphate** from £5. to £6. per ton. **Alum** has been in quietly steady demand, and is £12. per ton for home-trade uses, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has had a moderate inquiry, and is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been steadily called for; flowers are £10. per ton; roll is £8. 10s. per ton; rock £8. to £8. 10s.; and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has had a fair inquiry, and is 1s. 2½d. to 1s. 3d. per lb. **Cream of Tartar** has had a somewhat freer sale, and is £4. 10s. to £4. 15s. per cwt. **Boric Acid** has been more inquired for; commercial crystals are £52. per ton, and powdered £58., £2. per ton extra being charged if in casks. **Citric Acid** has been in moderate demand, and is 1s. 7½d. to 1s. 8d. per lb. **Oxalic Acid** has been but little in request, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** continues quiet, and is £42. to £43. per ton. **Sulphate of Copper** has had a small sale for use in the U.K., and has moved but slowly in the export branch; it is £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been more in request; white powdered is £68. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

There has been a rather better demand for chemicals on home-trade account during the week, though inquiries for export are scarce. On the whole, prices generally continue steady at about previous figures. Arsenic and citric acid are lower, but brown acetate of lead is rather better. Quotations, at Glasgow, are as follows:— **Alum,** quiet, and in small demand; prices steady at £12. 5s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; the quotation is further reduced to £74. per ton, net, on spot. **Barium Chloride** remains very quiet, despite the recent reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation stands at £11. 7s. 6d. **Boric Acid** and **Borax Crystals** are little sought for; makers' prices for the former stand at £50. per ton, and £27. per ton for the latter. **Borax,** granulated, is on offer at £26. 10s. per ton net, in 2cwt. bags. **Calcium Chloride,** 70—75%, solid, £5. 12s. 6d. per ton. **Citric Acid** is a quieter market, with the price shaded at 1s. 7d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure at £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar** quieter, with smaller inquiry at £4. 7s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in fair request; brown rather better at £41. 10s. per ton, net; and white steady at £41. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid** is 6¼d. per lb. **Paraffin Wax** experiences a quietly steady trade at 2½d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at the lower figure of 1s. 3¼d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 10s. per cwt., but business is nominal at this reduced figure. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb. **Chlorate** is quieter at 3½d.; white **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic,** 43—44%, rather easier, and inclined to be dull at 1s. 1d. **Tartaric Acid** still shows a quiet tendency at 1s. 2¾d. per lb., less 5%, Glasgow.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending August 25.

ACETIC ACID—
Antwerp, 1 brl.

BEESWAX—
Lisbon, 105 bls.

BITUMEN—
New Orleans, 1,912 brls.

CARBON BLACK—
New Orleans, 100 cs.

COAL TAR PRODUCTS—
Tar
Kota, 12 brls., 1 cs.

CREAM OF TARTAR—
Bordeaux, 1 ck.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 650 bxs.
Logwood
New York, 120 cks.

FULLER'S EARTH—
Jacksonville, 380 bgs.

GLUCOSE—
New York, 31 brls.

IRON PYRITES—
Huelva, 3,629 t.

PLUMBAGO—
Colombo, 184 brls.

ROSIN—
Jacksonville, 1,200 brls.; Lisbon, 332 brls.; Mobill, 1,000 brls.; Savannah, 700 brls.

SOAP—
Marseilles, 75 cs., 217 brls.; New Orleans, 200 brls.; New York, 30 kgs.

SODIUM NITRATE—
Iquique, 11,102 bgs.

STEARINE—
Harbor Grace, 15 cks.

TANNING MATERIALS—
Myrabolans
Calcutta, 6,000 pkts.

TURPENTINE—
Gothenburg, 6 cks.; Jacksonville, 450 brls.; Savannah, 300 brls.

WAX (*otherwise undescribed*)—
New Orleans, 608 brls.

ZINC OXIDE—
Antwerp, 24 brls.

GOOLE.

Week ending August 25.

HYDROGEN PEROXIDE—
Ghent, 80 crbys.
Hamburg, 11 cs.

MAGNESITE—
Amsterdam, 150 bgs.

MAGNESIUM SULPHATE—
Rotterdam, 50 bgs.

SOAP—
Hamburg, 3 cs.

WHITE LEAD—
Antwerp, 60 cks.

GRANGEMOUTH.

Week ending August 25.

FERRO SILICON—
Antwerp, 3,299 bars, 20 brls.

LITHOPONE—
Rotterdam, 28 cks.

TALLOW—
Denmark, 130 brls.

GRIMSBY.

Week ending August 25.

ACETIC ACID—
Rotterdam, 20 cks.

ACID (*otherwise undescribed*)—
Antwerp, 1 ck.

NICKEL OXIDE—
Hamburg, 10 cs.

SALT—
Santa, Pola, qty.

SOAP—
Hamburg, 3 cs.

HULL.

Week ending August 25.

ALBUMEN—
Rotterdam, 16 c.

AMMONIUM NITRATE—
Hamburg, 98 t.

CALCIUM CARBIDE—
Sebenico, 151 t.

CARBON (DECOLOURISING)—
Amsterdam, 1 t. 2 c.

CAUSTIC POTASH—
Bremen, 5 t.

CHEMICALS (*otherwise undescribed*)
Antwerp, 40 t.
Bari, 5 t.
Hamburg, 28 t. 1 c.
Rotterdam, 9 t. 6 c.

COAL TAR PRODUCTS—
Tar Oil
Gothenburg, 1 t.

DEXTRINE—
Harlingen, 4 t. 16 c., 197 lb.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Hamburg, 507 lb.
Rotterdam, 1,440 lb.
Unspecified
Hamburg, 50 lb.
Rotterdam, 806 lb.

DYESTUFFS (NATURAL)—
Logwood
Cartagena, 32 t. 12 c.

FERRO CHROME—
Antwerp, 16 t.; Dunkirk, 10 t.; Gothenburg, 5 t.; Hamburg, 2 c.; Trondhjem, 20 t.

FERRO MANGANESE—
Gothenburg, 5 t.

GLUE—
Antwerp, 1 t. 4 c.

KIESELGUHR—
Stavanger, 1 t.

MAGNESIUM SULPHATE—
Rotterdam, 10 t.

ROSIN—
Bordeaux, 18 t.
Copenhagen, 1 c.
Savannah, 578 t. 14 c.

SALT—
Hamburg, 23 t.

SALTPETRE—
Rotterdam, 2 t.

SOAP—
Hamburg, 5 c.
Marseilles, 10 t. 10 c.

TALLOW—
Bowen, 80 t.

TANNING MATERIALS—
Sumac
Palermo, 18 t. 8 c.

TAR (WOOD)—
Gothenburg, 19 t.

TURPENTINE—
Savannah, 15 t. 17 c.

LEITH.

Week ending August 25.

BARYTES—
Bremen, 150 bgs.

CREAM OF TARTAR—
Amsterdam, 21 pkgs.

PLUMBAGO—
Bremen, 85 bgs.

ROSIN—
Bremen, 300 brls.

SOAP—
Copenhagen, 3 cs.

LIVERPOOL.

Week ending August 25.

ACETIC ACID—
Rotterdam, 20 cks.

ACETONE—
Hamburg, 30 drms.

AMMONIUM CHLORATE—
Hamburg, 54 cks.

AMMONIUM MOLYBDENATE—
Stavanger, 2 cs.

AMMONIUM NITRATE—
Hamburg, 1,139 cks.

BARIUM SULPHATE—
Antwerp, 200 bgs., 17 cks.

BARYTES—
Bremen, 372 bgs.
Hamburg, 164 cks.

BITUMEN—
San Francisco, 100 brls.

BONE FERTILISER—
Buenos Aires, 500 bgs.

BORAX—
Los Angeles, 2,501 sks.

BORON MINERAL—
Wilmington, 500 sks., 3,396 bgs.

CARBON BISULPHIDE—
Hamburg, 42 cks.

CARBON BLACK—
New York, 10 cs.

CARNAUBA WAX—
Ceara, 23 bgs.

CASEIN—
Buenos Aires, 8,029 bgs.

CAUSTIC POTASH—
Hamburg, 317 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 9 cks.

CHROME ORE—
Piraeus, 500 t.

COAL TAR PRODUCTS—
Carbolic Acid
Antwerp, 1 drm.
Naphthalene
Amsterdam, 36 cks.

COBALT—
Montreal, 5 brls.

CREAM OF TARTAR—
Bordeaux, 50 brls., 15 cks.
Hamburg, 80 cks.

CRYOLITE—
Copenhagen, 50 bgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 140 cks.

FERRO MOLYBDENUM—
Stavanger, 40 drms.

FERTILISER (DRIED BLOOD)—
Rio Galligos, 368 bgs.

GELATINE—
Bordeaux, 8 cks.
Hamburg, 10 cs.

GLUCOSE—
Ghent, 80 bgs., 25 brls.

KIESELGUHR—
Bremen, 83 bgs.
Los Angeles, 100 bgs.

LACTIC ACID—
Hamburg, 30 cks.

LACTOSE—
Amsterdam, 2 cs.

LITHOPONE—
Bremen, 20 cks.
Hamburg, 60 cks.
Rotterdam, 140 sks.

MAGNESITE—
Rotterdam, 125 bgs.

MAGNESIUM (METAL)—
Hamburg, 1 cs.

MAGNESIUM CHLORIDE—
Hamburg, 116 drms.

MANGANESE ORE—
Calcutta, 5,000 t.

MOLYBDIC ACID—
Stavanger, 1 ck.

OCHRE—
Bordeaux, 33 cks.
Marseilles, 33 cks.

PARAFFIN WAX—
Baltimore, 250 brls.; New York, 132 cs.; Philadelphia, 100 brls.

POTASSIUM CARBONATE—
Hamburg, 19 cks.

POTASSIUM CHLORATE—
Hamburg, 750 cks.

POTASSIUM PRUSSIATE—
Rouen, 3 cks.

RED LEAD—
Rotterdam, 12 cks.

SALT—
Hamburg, 460 bgs.

SODA—
Hamburg, 10 cs.; Marseilles, 370 cs., 55 pkgs.; Teneriffe, 1 cs.

SODIUM ACETATE—
Antwerp, 36 kgs.; Hamburg, 76 cks.; Rouen, 77 cks.

SODIUM HYPOSULPHITE—
Marseilles, 40 cks.

STEARINE—
Buenos Aires, 100 trcs.

TALLOW—
Auckland, 15 cks.; Buenos Aires, 2,561 cks., 423 pps.; Dunedin, 136 cks.; Fredriksstad, 3,389 brls.; Gisborne, 221 cks.; Gladstone, 626 cks.; Rio Galligos 247 cks.; Rio Grande, 143 pps., 286 hhds.; Townsville, 122 crts.; Wellington, 94 cks.

TALLOW—
New York, 70 brls.

TANNING MATERIALS—
Gambier
Batavia, 60 cs.
Quebracho
Rosario, 5,152 bgs.
Valonia
Smyrna, 1,622 bgs.
Unspecified
Bordeaux, 300 cks.
Hamburg, 78 cks.

TITANIUM WHITE—
Fredriksstad, 10 cs., 35 brls.

ULTRAMARINE BLUE—
Amsterdam, 270 bls.
Antwerp, 2 brls.

WAX (*otherwise undescribed*)—
Amsterdam, 25 bls.; Beaumont, 152 bgs.; New Orleans, 720 brls.; Philadelphia, 1,000 brls.

WHITE LEAD—
Rotterdam, 31 cks., 10 drms.

ZINC DUST—
New York, 1,568 cs.

ZINC OXIDE—
Antwerp, 40 brls.; Hamburg, 5 brls.; New York, 250 brls.

LONDON.

OFFICIAL AMENDMENT.

From the return for week ending May 26, *deduct*—

DYESTUFFS (NATURAL)—
Indigo
Brit. India, 15 chsts.

Week ending August 25.

ACETIC ACID—
Canada, 295 pkgs.
Germany, 167 V. Blagden

ACETONE—
Italy, 9 t. 16 c. V. Blagden

ADRENALIN—*
£865.

AMMONIA—
Germany, 15 c. Bush, Beach & Gent.

ARGOL—
Algeria, 397 pkgs.
France, 105

* Entered under the Safeguarding of Industries Act.

ARGOLS—
Italy, 21 pkgs. Morrison, Pollexfen & Blair
,, 16 Fellows, Morton, & Clayton
,, 537
Spain, 724
Portugal, 36 Morison, Pollexfen & Blair

ARSENIC—
Chiap, 6 c. Weber, Smith & Hoare
Japan, 5 t. 15 c.

ARSENIOUS ACID—
Brazil, 400 pkgs. W. & S. Bowditch
Portugal, 72 Coverley, Wall & Westray

BARYTES—
Germany, 238 cks. Pallister, Luck
,, 60 Felton & Crepin
,, 46 W. Harrison
,, 300 bgs. ,,
,, 33 cks. Taylor & Cox

BEESWAX—
E. Turkey, 50 bgs.
Pt. E. Africa, 25 A. H. Brandt
,, 353 pkgs.
B.W.I., 9 Weber, Smith & Hoare

BONE BLACK—
U.S.A., 231 pkgs.
,, 150 Taylor & Cox

BUTYRIC ACID—*
——— £300.

CALCIUM CARBIDE—
Norway, 120 drms. J. Spurling
,, 105 t. C. J. Quirk

CALCIUM CHLORIDE—
Germany, 5 t. 12 c. Petri
,, 28 14 J. Bailey
,, 51 12 W. Cannell

CAMPHOR—
China, 15 drms. W. M. Smith
Japan, 50 cs. R. Warner
U.S.A., 5 ,,

CARBON BLACK—
U.S.A., 100 cs.
,, 100 Binney, Smith
,, 168 Hughes & Hughes

CARNAUBA WAX—
France, 12 bgs. Van Oppen

CASEIN—
Argentine
Rep. £1,800. A. J. Mills
Brit. India, £400. Jones, Moore

CAUSTIC POTASH—
Belgium, 29 pkgs. Beck & Pollitzer
Czecho-Slovakia, 99 Brotherton & Ratcliffe
Germany, 50 Bush, Beach & Gent.

CELLULOSE ACETATE—*
——— £357.

CERESINE WAX—
Czecho-Slovakia, 25 sks. Scheikers

CHEMICALS (*otherwise undescribed*)
Denmark, £13. L. Walford
Germany, £128. J. Schnurmann
,, £6. Europ. & Gen. Exp.
,, £17. W. H. Winter
,, £12. Gerhard & Hey
,, £27. J. Bailey

CHEMICALS (*otherwise undes.*)—*
——— £2,260.

CITRATE OF LIME—
Italy, 77 pkgs. Fellows, Morton & Clayton
Japan, 26 L. Rose

CITRIC ACID—
B.W.I., 3 pkgs. L. Rose

COAL TAR PRODUCTS—
Naphthalene
Belgium, £29. J. Bailey
Pitch
Norway, £900. Holmwood & Holmwood

COBALT SULPHATE—
Canada, £373.

COCAINE HYDROCHLORIDE—*
——— £237.

CREAM OF TARTAR—
Italy, 100 pkgs.

DEXTRINE—
Germany, 21 t. 13 c. K. J. Mulder
Holland, 1 19 Gough, Kidstone
,, 37
U.S.A., 9

DYESTUFFS (ARTIFICIAL)—
Alizarine
Switzerland, 6 pkgs.
Unspecified
Germany, 7 pkgs.
,, £163.
,, 29 pkgs. Greeff
Switzerl'd, £336. H. P. Maskell

DYESTUFFS (NATURAL)—
Annatto
Denmark, 2 pkgs.
Cutch
Burmah, 250 pkgs.
,, 250 A. Howdon
Saffron
Spain, 1 pkg. W. M. Smith

FERTILISERS (*otherwise undes.*)—
Norway, 50 t.
N.S.W., 16 J. W. Cook

FORMALDEHYDE—*
——— £285.

GELATINE—
France, £160. Soc. des Prod. Chim.
Germany, £45. A. C. Berens
,, £296. Crowe
,, £123. A. Zimmermann
,, £125. A. C. Berens
,, £24. W. A. J. Tilleray
,, £340. C. W. Hartrodt
,, £8.
Switzerl'd, £705. Europ & Gen. Exp.

GLUE—
Austria, £864. P. Ingenlath
,, £221. Stonecourt & Muir
Belgium, £27.
France, £245. Soc. des Prod. Chim.
,, £46. A. J. Malicet
,, £62. Van Oppen
Holland, £167. P. Ingenlath
Hungary, £750.
Italy, £280.
,, £434. Union Glue & Gel.
N.Z., £8. Ray
Switzerland, £50. Amer. Exp.
U.S.A., £265. Knight & Morris

GLYCERINE—
Holland, £76.

HYDROGEN PEROXIDE—
U.S.A., 2 t. 2 c. Allen & Hanburys

IODINE—
Chile, £33,616.

ISINGLASS—
Belgium, 1 cs.
Brazil, 2 W. M. Smith
Brit. India, 14 Major & Field
Japan, 20 bls. W. M. Smith
,, 10 R. Warner
Venezuela, 59. F. Gower

KIESELGUHR—
Algeria, 10
,, 12
U.S.A., 9 2 c.

LITHOPONE
Belgium, 20 cks. Taylor & Cox
Holland, 120 F. T. H. Nye
Spain, 200
U.S.A., 82 Taylor & Cox

MAGNESITE—
Holland, £135. Scheuer
,, £170. Ray

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 23 pkgs. S. Heim
,, 12 E. W. Taylor
Holland, 2 Scheuer
U.S.A., 5 C. S. Lovell
Italy, 4 Lavington

MONTAN WAX—
Germany, 165 bgs. E.E.Mayer
,, 20 Holroyds Oil & Cer.

NICKEL OXIDE—
Canada, £116.

OCHRE—
France, 143 cks. W. Harrison
,, 14 E. W. Taylor
,, 28 Burrell
,, 25 N. J. Fenner
H. B. Adler
U.S.A., 28 J. Johnson
,, 10 A. Royle & Willan

OZOKERITE—
Germany, 200 bgs. Holroyds Oil & Cer.

PARAFFIN WAX—
Burmah, 150 t. Asiatic Petro.
,, 15 Burmah Oil
,, 50
Poland, 56 10 c.
U.S.A., 117 10 Anglo-Amer. Oil

PHENACETIN—*
——— £243.

PHENOLPHTHALEIN—*
——— £249.

PHOSPHATE (*otherwise undes.*)—
Egypt, 1,347 t. F. W. Raisin

PLUMBAGO—
France, 27 cks. G. T. Symons
,, 50 bgs. A. Branwell
,, 50 Hernu, Peron
Germany, 314 H. Johnson.
Japan, 267 cks. J. W. Cook
U.S.A., 6 H. Johnson

POTASSIUM CARBONATE—
Germany, 39 pkgs. T. Potter Priestley
,, 6

POTASSIUM NITRATE—
France, 30 pkgs. C. Wimble

PRUSSIAN BLUE—
Belgium, 10 cks.
Holland, 10

QUININE ETHYL CARBONATE—*
——— £125.

ROSIN—
Holland, 570 brls.
Portugal, 52 cks. H. J. Hughes
Sweden, 113
U.S.A., 500 brls. Langley Smith
,, 1,100 Rosin & Turps. Imp.
,, 100 Bigland & Jeffries
,, 250 Fox, Stockell
,, 250

SALAMMONIAC—
Germany, 14 t. 5 c. Bush, Beach & Gent.
,, 10 Van Oppen

SALT—
Germany, 600 t. Gas Light & Coke
,, 85 W. R. Williams
Japan, 400 Wettern

SHELLAC—
Brit. India, 17 t. 6 c. Litchfield & Saundy
,, 52 10 J. W. Cook
France, 4 9 Lind, Mayer
Germany, 10
U.S.A., 6 W. H. Muller

SOAP—
Austria, £380.
Denmark, £25.
France, £67.
,, £185. Coveney, White & White
,, £200. C. E. Wood
,, £31. E. Fellingham
,, £432. P. Le Brun
Germany, £72.
U.S.A., £1,575. Knight & Morris
,, £11. Gerhard & Hey
,, £55.
,, £27. H. Bowden
,, £16. G. W. Sheldon

SOAP—
Victoria, £1,800. L. F. Smith

SODA ASH—
U.S.A., 1 t. 19 c. O. Harris

SODA CRYSTALS—
Belgium, 10 t. P. Winn

SODIUM BICARBONATE—
U.S.A., 1 c. H. Boden

SODIUM HYPOSULPHITE—
Germany, 10 t. 3 c. W. I. Crook

SODIUM NITRATE—
Chile, 2,000 t.

SULPHUR—
Italy, £91.

TALLOW—
Argentine Rep. 342 t. 2 c. A. W. Page
,, 17 17 T. C. Sayer
Brazil, 10 2 M. M. W.
Belgium, 29 tres. Armour
Norway, 5 t. 16 c. F. C. Sayer
N.Z., 333 10
,, 16
,, 6 cks.
,, 74 t. 10 c. Anning & Cobb
,, 12 11 Weber, Smith & Hoare
U.S.A., 28 Co-op. W'sale Soc.

TANNING MATERIALS—
Chestnut
France, 500 pkgs. E. G. Boize
Divi-Divi
B.W.I., 23 pkgs. Perkins & Homer
Myrabolans
Brit. India, 1,000 pkgs. B. J. Howlett
Unspecified
Natal, 77 t. I. I. Williamson
,, 60 W. G. Travers
,, 502
Pt. E. Africa, 10
U.S.A., 5 pkgs.

TARTARIC ACID—
Germany, 12 pkgs. Stott & Hotopf
Italy, 100

TIN OXIDE—
Germany, 135 t. R. Wolff

TURPENTINE—
U.S.A., 5,525 brls. Fairclough, Dodd & Jones
,, 175
,, 1,106 pkgs.

ULTRAMARINE—
France, 8 cks. H.C.Davies
,, 2 Mory
Germany, 13 W. Harrison

WHITE LEAD—
Canada, 83 cks. W. Waugh
Germany, 38 Burrell
Holland, 81 drms. W. H. Muller

ZINC OXIDE—
Belgium, 150 cks. M. Ashby
Holland, 50 ,,
,, 25 F. T. H. Nye

MANCHESTER.

OFFICIAL AMENDMENTS.

To return for week ending August 18, 1923, *add*—

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 1 ck., 6 pkgs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 27 cks.

SALTPETRE—
Hamburg, 20 bgs.

SALAMMONIAC—
Hamburg, 38 brls.

Week ending August 25.

ACETIC ACID—
Rotterdam, 30 cks.
Rouen, 50 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
Antwerp, 6 cs.

* Entered under the Safeguarding of Industries Act.

CARBON (DECOLOURISING)—
Amsterdam, 99 bgs.

CARBON BLACK—
New York, 100 cs.

CASEIN—
Galatz, 530 cs.

CHEMICALS (*otherwise undescribed*)
Antwerp, 81 cks.

CITRIC ACID—
Amsterdam, 40 kgs.

DEXTRINE—
Danzig, 137 bgs.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 40 cs.

DYESTUFFS (NATURAL)—
Hematine Crystals
Baltimore, 1 brl.
Indigo
Calcutta, 25 chts.
Unspecified
Philadelphia, 15 brls., 2 bxs.

FORMALDEHYDE—
Antwerp, 15 drms.

IRON PYRITES—
San Juan, 2,097 t. 10 c.

GLUCOSE—
New York, 20 brls.

GLUE—
Antwerp, 2 bls.

GLYCERINE—
Rotterdam, 4 drms.

LITHOPONE—
Antwerp, 28 cks.
Rotterdam, 200 cks.

MAGNESITE—
Amsterdam, 200 bgs.
Rotterdam, 150 bgs.

MANGANESE ORE—
Calcutta, 4,500 t.

OCHRE—
Bordeaux, 65 cks.
Norfolk, 127 brls.

PARAFFIN WAX—
Baltimore, 218 bgs.

SALTPETRE—
Antwerp, 30 bgs.

SOAP—
Philadelphia, 600 bxs.
Valencia, 90 cs.

SODIUM ACETATE—
Rouen, 33 cks.

SODIUM BICHROMATE—
Baltimore, 64 cks.

SODIUM CHLORATE—
Gothenburg, 80 kgs.
Rouen, 180 cks.

TALLOW—
Fredriksstad, 810 brls.

TANNING MATERIALS—
Unspecified
Bordeaux, 100 cks.

TARTARIC ACID—
Amsterdam, 29 cks.

ULTRAMARINE BLUE—
Antwerp, 10 cs.

WAX (*otherwise undescribed*)—
New York, 85 brls.
Philadelphia, 294 bgs.

NEWCASTLE-ON-TYNE

Week ending August 25.

ACETIC ACID—
Montreal, 56 brls.

CALCIUM CARBIDE—
Christiania, 100 drms.

COPPER PRECIPITATE—
Huelva, 55 t.

OXIDE (*otherwise undescribed*)—
Lisbon, 200 sks.

PHOSPHATE OF LIME—
Sfax, 5,620 t.

N. & S. SHIELDS.

Week ending August 25.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending August 25.

COAL TAR PRODUCTS—
Unspecified
New York, 6 t. 16 c.

CHEMICALS (*otherwise undescribed*)
Calcutta, 13 pkgs.
Montreal, 400 pkgs.

LEAD ASHES—
Antwerp, 6 t. 10 c.

PARAFFIN WAX—
Leghorn, 50 t.
New York, 5 t.

SODIUM BICHROMATE—
Marseilles, 15 t. 2 c.

GRANGEMOUTH.

Week ending August 25.

PARAFFIN WAX—
Bordeaux, 33 t.; Dunkirk, 1 t.

POTASSIUM BICHROMATE—
Dunkirk, 3 t. 10 c.

SODIUM BICHROMATE—
Dunkirk, 5 t. 10 c.

TANNING MATERIALS—
Unspecified
Stockholm, 2 t.

HULL.

OFFICIAL AMENDMENT.

Week ending August 14.

COAL TAR PRODUCTS—
Creosote
New York, 1,066,258 brls.
should read—
New York, 1,066,258 galls.

Week ending August 21.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 1 cs., 1 ck., 1 pkg.; Antwerp, 12 drms.; Alexandria, 6 drms.; Christiania, 9 kgs., 3 cs., 2 cks., 298 pkgs.; Copenhagen, 1 cs., 40 cks., 226 drms.; Dunkirk, 11 cks.; Harlingen, 2 cs.; Malmo, 25 cks.; Rotterdam, 30 bgs.

COAL TAR PRODUCTS—
Carbolic Acid
Rouen, 63 brls.
Pitch
Rouen, 22 brls.

DISINFECTANTS (*otherwise undes.*)
Colon, 2 cs.

GLUE—
Alexandria, 60 bgs.; Christiania, 37 bgs.; Copenhagen, 4 bgs.; Rotterdam, 1 cs.; Rouen, 4 brls.

IRON SULPHIDE—
Antwerp, 3 brls.

LEAD SALTS (*otherwise undes.*)—
Rouen, 77 cks.

MINERAL WHITE—
Antwerp, 1 bg.
New York, 200 bgs.

SALT—
Reval, 50 cs.
Riga, 102 bgs.

SHELLAC—
Iquique, 2 cs.

SOAP—
Alexandria, 20 drms.; Christiania, 3 cs.; Copenhagen, 19 cs.; Lisbon, 20 drms.; New York, 150 brls.

TURPENTINE—
Copenhagen, 5 cks.

WHITE LEAD—
Malta, 6 kgs.

WOOD PRESERVATIVE—
Lisbon, 5 brls., 80 drms.

LEITH.

Week ending August 25.

AMMONIUM CARBONATE—
Odense, 5 cks.

GLUE—
Rouen, 5 brls.

MAGNESIUM CARBONATE—
Amsterdam, 6 cs.

MANGANESE—
Copenhagen, 2 cks.

PARAFFIN WAX—
Antwerp, 80 bgs.

POTASSIUM BICHROMATE—
Dunkirk, 29 cks.

SALT—
Reykjavik, 40 bgs.

SHEEP DIP—
Reykjavik, 100 drms.

SOAP—
Reykjavik, 20 cs.

TALLOW—
Rotterdam, 70 cs.

TALLOW OIL—
Copenhagen, 50 trcs.

LIVERPOOL.

Week ending August 23.

ACETIC ACID—
Algoa Bay, 2 c., £17.
Cape Town, 5 c., £39.

ACIDS (*otherwise undescribed*)—
Danzig, 30 t. 6 c., £610.
Santos, 7½ c., £96.

ALUM—
Aden, 3 t. 1 c., £31.; Melbourne, 2 t. 2 c., £21.; Shanghai, 10 t. 3 c., £300.; Sydney, 2 t. 1 c., £21.

ALUMINIUM SULPHATE—
Bombay, 5 t. 1 c., £49.; Calcutta, 82 t. 19 c., £858.; Kotka, 50 t., £483.

AMMONIA—
Durban, 3 c., £15.

AMMONIUM CARBONATE—
Bilbao, 19 c., £29.; Barcelona, 1 t., £40.; Buenos Aires, 4 t. 18 c., £173.; Helsingfors, 10 c., £14.; Hamburg, 19 c., £28.; Marseilles, 3 t. 3 c., £100.; Mollendo, 4 c., £13.; Madras, 10 c., £22.; New York, 5 t., £168.; Rangooon, 1 t., £50. Santander, 2 t. 18 c., £103.; Shanghai, 2 t., £77.; Valencia, 1 t. 10 c., £50.

AMMONIUM CHLORIDE—
Adelaide, 1 t. 2 c., £36.; Alexandria, 5 t. 18 c., £244.; Amsterdam, 10 c., £17.; Bourgas, 1 t., £43.; Constantinople, 2 t. 19 c., £123.; Durban, 1 t. 16 c., £81.; East London, 9 c., £20.; Jaffa, 1 t., £41.; Melbourne, 3 t. 6 c., £108.; Montreal, 25 t. 1 c., £788.; Pt. Said, 2 t. 9 c., £109.; Rangoon, 1 t., £40.; Santos, 2 t. 9 c., £89.; Varna, 10 c., £21.

AMMONIUM SULPHATE—
Bombay, 150 t., £2,775.; Helsingfors, 3 t., £23.; Hong Kong, 100 t., £1,650.; Las Palmas, 150 t., £2,316.; Teneriffe, 20 t., £309.

AMYL ACETATE—
Sydney, 3 qrs., £10.

ANTIFOULING PAINT—
Bilbao, 1 t. 16 c., £177.; Cape Town, 9 c., £52.; Demerara, 2 c., £12.; Piraeus, 2 t., £207.; Reval, 13 c., £64.; St. John, 2 t. 5 c., £235.; Teneriffe, 14 c., £52.; Talcahuano, 7 t. 16 c., £680.; Vancouver, B.C., 3 t. 1 c., £277.

ANTIMONY—
Christiania, 5 c., £11.

ANTIMONY OXIDE—
Adelaide, 2 t., £68.
Amsterdam, 1 t., £29.

ANTIMONY REGULUS—
Sydney, 5 t., £210.

ANTIMONY SULPHIDE—
Salaverry, 4 c., £10.

BARIUM CHLORIDE—
East London, 1 t., £55.

BARIUM PEROXIDE—
Cape Town, 4 t., £241.
Sydney, 7 t. 15 c., £485.

BITUMEN—
Buenos Aires, 1 t. 1 c., £30.

BLEACHING POWDER—
Algoa Bay, 2 t., £24.; Calcutta, 46 t. 3 c., £450.; East London, 3 t., £43.; Gothenburg, 58 t. 3 c., £523.; New Orleans, 16 t. 1 c., £434.; New York, 6 t. 13 c., £170.; Oporto, 7 t. 8 c., £70.; Piraeus, 1 t. 18 c., £24.

BOILER COMPOSITION—
Buenos Aires, 7 t. 16 c., £362.

BORAX—
Alexandria, 1 t., £28.; Durban, 5 c., £5. 10s.; Hamburg, 1 t. 9 c., £40.

BORIC ACID—
Bombay, 1 qr., £2.; Callao, 4 c., £18.; Samarang, 1 c., £3 5s.; Santiago, 2 c., £11.

CALCIUM CHLORIDE—
Algoa Bay, 3 t. 4 c., £20.; Melbourne, 22 t. 3 c., £127.; Newcastle, N.Z., 9 t. 19 c., £57.

CAUSTIC POTASH—
East London, 5 c., £12.
Valparaiso, 1 t., 3 c., £48.

CHEMICALS (*otherwise undescribed*)
Auckland, 1 t., £30.; Alexandria, 50 t., £440.; Bahia Blanca, 26 t. 7 c., £1,375.; Durban, 1 t. 7 c., £116.; Greymouth, 1 t., £44.; Lisbon, 2 t., £54.; Melbourne, 5 t. 4 c., £270.; Rotterdam, 20 t. 10 c., £511.; Rockhampton, 1 t., £36.; Santander, 10 c., £14.; Sydney, 1 t., £30.; Wellington, 2 t. 2 c., £73.

CHLORINE—
Bilbao, 19 c., £37.

CHLOROFORM—
Montreal, 1 c., £57.

CHROMIUM OXIDE—
Valencia, 4 c., £55.

CITRIC ACID—
Barcelona, 1 t. 19 c., £314.
Sydney, 1 t., £172.

COAL TAR PRODUCTS—
Aniline Oil
Abo, 1 t., £90.
Lisbon, 2 t., £180.
Aniline Salts
Hamburg, 5 t., £609.
Carbolic Acid
Calcutta, 18 c., £30.
East London, 4 c., £18.
Hamburg, 76 t. 2 c., £9,566.
Hong Kong, 11 c., £19.
Riga, 15 t., £1,855.
Creosote
Cape Town, 4 c., £10.
Sydney, 1 t. 3 c., £50.
Dinitrochlorbenzol
Petrograd, 10 t. 3 c., £798.
Mirbane Oil
Auckland, 4 c., £14.
Naphthalene
Salonika, 2 t., £33.
Sydney, 1 t., £15.
Tar
Lagos, 1 t. 7 c., £15.
Unspecified
Rio de Janeiro, 5 t., £252.

COBALT OXIDE—
Hankow, 9 c., £462.
Sydney, 2 qrs., £31.

COPPER SULPHATE—
Auckland, 6 c., £6.; Lyttleton, 1 t., £26.; Madras, 3 t. 10 c., £91.; Soerabaya, 20 t., £494.; Timaru, 10 c., £14.; Vera Cruz, 10 c., £13.; Wellington, 2 t. 10 c., £66.

COPPERAS—
Bombay, 1 t. 10 c., £10.

CREAM OF TARTAR—
Auckland, 1 t., £92.
Brisbane, 10 c., £46.

DISINFECTANTS (*otherwise undes.*)
Boston, 25 t. 10 c., £1,111.; Batavia, 1 t. 18 c., £64.; Buenos Aires, 2 c., £13.; Cape Town, 2 t. 2 c., £35.; Calcutta, 3 t. 17 c. £144.; Lome, 1 c., £12.; Lyttleton, 3 c., £11.; Monte Video, 4 c., £18.; Perth, 1 t. 11 c., £68.; Pt. Swettenham, 2 t. 1 c., £47.; Samarang, 2 c., £15.; Teneriffe, 9½ c., £12. 10s. Warri, 3 c., £11.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 2 t. 10 c., £375.
Indigo
Chefoo, 11 t. 18c., £1,550.
Unspecified
Calcutta, 1 c., £28.; Dunedin, 2 qrs., £16.; Danzig, 10 c., £140.; Hamburg, 13 t. 3 c., £2,025.; Melbourne, 6 t. 7 c., £3,450.; Montreal, 3½ c., £101.; Oporto, 4 c., £104.; Piraeus, 3 qrs., £14.; Penang, 30 lb., £10.; Rio de Janeiro, 11 c., £183.; Sekondi, 1 qr., £23.; Sydney, 13½ c., £381.; Yokohama, 1½ c., £30.

ESSENTIAL OILS (SYNTHETIC)—
Montreal, 1 c., £61.

ETHER—
Sydney, 2 qrs., £15.

GLYCERINE—
Algoa Bay, 7 c., £31.; Antwerp, 1 t. 19 c., £140.; Copenhagen, 2 t. 18 c., £209.; Cheribon, 1 t., £85.; Delagoa Bay, 70 t. 19 c., £6,035.; Madras, 4 c., £18.; Piraeus, 10 c., £46.; Riga, 4 c., £18.; Suez, 2 c., £8.

HYDROFLUORIC ACID—
Bahia Blanca, 3 c., £18.

IODOFORM—
Bonny, 15 lb., £20.

IRON SULPHATE—
Rio de Janeiro, 3 c., £11.

LEAD ACETATE—
Sydney, 3 t. 6 c., £70.

MAGNESIA—
Auckland, 2 c., £38.; Cartagena, 13 c., £60.; Vera Cruz, 17 c., £131.

MAGNESIA (CALCINED)—
Buenos Aires, 1 qr., £27.

MAGNESIUM CARBONATE—
Bombay, 8 c., £23.
Boston, 25 t., £637.

MAGNESIUM SALTS (*otherwise undescribed*)**—**
Valparaiso, 10 c., £17.

MAGNESIUM SULPHATE—
Abonema, 2 c., £3. 5s.; Accra, 2 c., £3.; Alexandria, 1 c., £1. 5s.; Barbados, 1 t. 12 c., £12. 10s.; Bombay, 2 c., £3.; Calabar, 5 c., £6. 5s.; Durban, 3 c., £4. 10s.; Egwanga, 3 c., £5. 10s.; Karachi, 5½c., £8. 5s.; Pt. Harcourt, 4 c., £5. 15s.; Porto Novo, 1 c., £1. 5s.; Sapele, 2 c., £2. 15s.; Shanghai, 1 c., £1.; Warri, 1½ c., £5.; Winnebah, 5 c., £7.

NICKEL SULPHATE—
Melbourne, 7 c., £28.; Oporto, 3 c., £13.; Shanghai, 1 t. 1 c., £43.; Yokohama, 4 c., £19.

PHOSPHORUS—
Barranquilla, 5 c., £55.

PHOSPHORUS (AMORPHOUS)—
Rio de Janeiro, 1 t. 9 c., £470.

PITCH (*otherwise undescribed*)**—**
Santos, 9 t., £20.

PLATING SALTS (*otherwise undes.*)
Melbourne, 2 c., £23.

POTASH—
Algoa Bay, 10 t., £105.

POTASSIUM BICHROMATE—
Alexandria, 2 t., £97.
Gothenburg, 14 c., £35.
Hong Kong, 15 c., £35.
Riga, 2 t., £99.
Tripoli, 19 c., £46.

POTASSIUM CHLORATE—
Wellington, 2 t. 10 c., £99.

POTASSIUM IODIDE—
Bonny, 19 lb., £18.; Cape Palmas, 15 lb., £16.; Calabar, 20 lb., £20.; Pt. Harcourt, 2 qrs., £14.; Warri, 19 lb., £17.

POTASSIUM PRUSSIATE—
Antwerp, 1 t. 1 c., £130.; Barcelona, 7 c., £46.; Kobe, 8 t. 10 c., £780.; Melbourne, 1 t., £160.; Sydney, 12 c., £92.

SALAMMONIAC—
Madras, 1 t. 1 c., £54.

SALICYLIC ACID—
Fremantle, 1 c., £16.

SALTCAKE—
Auckland, 5 t. 2 c., £36.

SALTPETRE—
Salaverry, 4 c., £11.

SHEEP DIP—
Algoa Bay, 6 t. 15 c., £404.; Argentine, 4 t. 10 c., £289.; Bahia Blanca, 10 c., £625.; Beira, 10 c., £41.; Buenos Aires, 20 t. 12 c., £979.; Dunedin, 1 t. 9 c., £56.; Durban, 5 t. 3 c., £393.; East London, 5 t 7 c., £408; Geraldton, 1 t. 3 c., £44.; Gisborne, 6 t. 13 c., £240.; Nelson, 2 t. 16 c., £105.; Napier, 2 t. 16 c., £105.; Pto. Deseado, 6 t. 17 c., £537.; Punta Arenas, 4 t. 10 c., £289.; Rio Gallegos, 6 t. 19 c., £525.; San Julian, 4 t. 13 c., £350.; San Francisco, 4 t. 14 c., £150.; Timaru, 4 t. 5 c., £153.; Wellington, 11 t. 14 c., £437.; Wanganui, 3 t. 18 c., £140.

SULPHUR—
Christiania, 5 c., £18.
Punta Arenas, 20 t., £197.

SUPERPHOSPHATE—
Nyasaland, 6 t., £25.

TANNING MATERIALS—
Unspecified
Auckland, 7 t. 16 c., £158.; Barcelona, 1 t. 3 c., £43.; Durban, 2 t. 4 c., £42.; Hamburg 1 t., £39.

TARTARIC ACID—
Brisbane, 2 t., £266.; Boston, 2 t. 10 c., £326.; Malta, 6 c., £42.; Sydney, 3 t., £409.

TIN OXIDE—
Sydney, 7½ c., £87.

WOOD PRESERVATIVE—
Durban, 2 t. 4 c., £112.; Nyasaland, 5 c., £10.; Sekondi, 1 t., £36.; San Sebastian, 11 c., £18.

ZINC CHLORIDE—
Calcutta, 2 t. 5 c., £58.; Durban, 2 t., £55.; Colombo, 10 c., £18.; Shanghai, 7 t. 18 c., £211.

ZINC FORMOSUL—
Sydney, 3 c., £28.

ZINC SULPHATE—
Montreal, 4 t., £44.

Week ending August 24.

CALCIUM CHLORATE—
Bombay, 19 pkgs.

CARBON BLACK—
Melbourne, 72 cs.

CAUSTIC SODA—
Alexandria, 289 drms.; Algoa Bay, 202 pkgs.; Berbice, 20 drms.; Barranquilla, 25 drms.; Batavia, 30 drms.; Barbados, 12 drms.; Cape Town, 101 drms.; Bombay, 140 drms.; Buenos Aires, 7 drms.; Christiania, 140 drms.; Bourgas, 110 drms.; Ceara, 45 drms.; Corral, 30 pkgs.; Christiania, 60 drms.; Copenhagen, 25 drms.; Delagoa Bay, 100 drms.; Durban, 10 drms., 475 pkgs.; Fremantle, 30 pkgs.; Geelong, 14 pkgs.

CAUSTIC SODA—
Haiffa, 10 drms.; Hong Kong, 84 drms.; Jaffa, 54 drms.; Kilindini, 14 drms.; Kobe, 434 drms.; La Guaira, 48 drms.; Manaos, 6 drms.; Maranham, 10 drms.; Melbourne, 262 drms., 165 pkgs.; Monrovia, 10 cs.; Monte Video, 50 drms.; Para, 59 drms.; Pt. Said, 4 cs.; New York, 15 drms.; Pernambuco, 550 drms.; Piraeus, 20 drms.; Salaverry, 15 drms.; Pt. Swettenham, 50 drms.; Rangoon, 20 drms.; Santos, 299 drms.; Rotterdam, 127 drms.; Sekondi, 100 drms.; Shanghai, 252 drms.; Singapore, 290 drms.; Sydney, 153 cs., 31 drms.; Trondhjem, 17 drms.; Varna, 50 drms.; Yokkaichi, 434 drms.; Zanzibar, 59 drms.; Yokohama, 434 drms.

FERRO-CARBON TITANIUM—
Havre, 8 cs.

FERRO MANGANESE—
Baltimore, 3,079 t.; Boston, 100 t.; Danzig, 50 t.; Hamburg, 50 t.; New Orleans, 500 t.; Philadelphia, 585 t.; Seattle, 60 t.; Vancouver, B.C., 20 t.

FERRO TITANIUM—
Rio de Janeiro, 3 cks.

FERRO VANADIUM—
Havre, 20 drms.
Rouen, 1 kg.

GLUE, SIZE, AND GELATINE—
Adelaide, 24 pkgs.; Antofagasta, 4 pkgs.; Arequipa, 1 pkg.; Boston, 16 cks., 448 pkgs.; Brisbane, 20 bgs.; Calcutta, 20 bgs.; Cartagena, Col., 12 pkgs.; Durban, 26 pkgs.; Gefle, 6 bgs.; Havre, 48 pkgs.; Melbourne, 10 pkgs.; Montreal, 101 pkgs.; New York, 40 bgs.; Pt. Elizabeth, 5 cks.; Pto. Colombia, 2 bgs.; Shanghai, 70 tins; Sourabaya, 15 bgs.; Sydney, 20 bgs.; Tacoma, 50 bgs.

LITHARGE—
Famagusta, 3 cks.

MANGANESE CHLORIDE—
Sydney, 13 t.

PARAFFIN WAX—
Puerto Cabello, 160 bgs.
Sydney, 16 pkgs.

PHOSPHATE (BASIC)—
Petrograd, 16 bgs.

SALT—
Aalesund, 20 t.; Abonema, 14 t. Adelaide, 40 t.; Alexandria, 5 t.; Bergen, 129 t.; Buenos Aires, 52 t.; Cape Coast, 6 t.; Christiania, 200 t.; Colombo, 1 t.; Demerara, 40 t.; Durban, 25 t.; Gibraltar, 3 t.; Grand Bassam, 44 t.; Iddo, 20 t.; Lagos, 15 t.; Matadi, 67 t.; Melbourne, 31 t.; Montego Bay, 3 t.; Montreal, 339 t.; New York, 50 t.; Puerto Barrios, 50 t.; Quebec, 100 t.; Sassandra 20 t.; Sekondi, 73 t.; Sherbro, 20 t.; Sierra Leone, 68 t.; Stavanger, 7 t.; Sydney, 100 t.; Trondhjem, 52 t.

SOAP—
Abonema, 5 bxs.; Accra, 895 bxs.; Adelaide, 10 pkgs.; Algoa, 8 bxs.; Auckland, 245 pkgs.; Axim, 10 pkgs.; Bandjermassin, 390 pkgs.; Bangkok, 2,201 pkgs.; Barcelona, 3 cs.; Batavia, 3,450 pkgs.; Bathurst, 453 pkgs.; Belawan, 1,510 pkgs.; Beira, 316 pkgs.; Belize, 900 pkgs.; Beyrout, 4 cs.; Bluff, 34 cs.; Bolivar, 607 pkgs.; Bombay, 3,457 pkgs.; Brisbane, 1 cs.; Buenos Aires, 561 pkgs.; Calcutta, 874 pkgs.; Calicut, 152 pkgs.; Cape Palmas, 20 pkgs.; Cape Coast, 56 pkgs.; Ceuta, 125 pkgs.; Christiania, 2,107 bxs.; Cochin, 150 pkgs.; Coconada, 30 pkgs.; Colombo, 2,257 bxs.; Copenhagen, 1,615 pkgs.; Curacao, 450 pkgs.; Demerara, 987 pkgs.; Durban, 75 bxs.; Famagusta, 10 bxs.; Genoa, 20 pkgs.; Germany, 10 cs.; Gibraltar, 132 pkgs.

SOAP—
Gothenburg, 157 pkgs.; Grand Bassam, 35 pkgs.; Grenada, 50 pkgs.; Hong Kong, 320 pkgs.; Hastings, N.Z., 32 pkgs.; Iddo, 51 pkgs.; Kingston, Ja., 547 pkgs.; Karachi, 929 pkgs.; Las Palmas, 490 pkgs.; Lagos, 664 pkgs.; Larache, 21 pkgs.; Limassol, 10 bxs.; Limon, 12 pkgs.; Madras, 129 cs.; Malta, 161 pkgs.; Mangalore, 588 pkgs.; Melbourne, 20 bxs.; Monte Video, 100 bxs.; Mombasa, 1,125 bxs.; Monrovia, 53 bxs.; Napier, 84 pkgs.; Opobo, 260 cs.; Parnahyba, 2 bdls.; Penang, 2,250 bxs., 39 cs.; Pointe de Galetz, 250 bxs.; Pto. Barrios, 500 bxs.; Pt. Gentil, 6 cs.; Pt. Harcourt, 2,210 pkgs.; Pt. Said, 40 cs., 1 brl., 3 pkgs.; Pt. Sudan, 100 pkgs.; Pt. Swettenham, 1,275 bxs.; Rio Gallegos, 12 cs.; Rangoon, 2,962 pkgs.; Rio de Janeiro, 3 bxs.; Rotterdam, 255 pkgs.; Saltpond, 100 bxs.; Samarang, 206 pkgs.; Sandakan, 65 bxs.; Santander, 28 pkgs.; Sekondi, 325 pkgs.; Shanghai, 20 cs., 18 cks., 1,100 pkgs.; Sherbro, 29 pkgs.; Sierra Leone, 6 bxs.; Singapore, 6,692 pkgs.; Sourabaya, 690 cs.; Stavanger, 10 brls.; St. John's, N.F., 146 pkgs.; St. Kitts, 125 bxs.; Tangiers, 20 bxs.; Tandjong Balei, 350 bxs.; Teneriffe, 300 pkgs.; Trinidad, 1,100 bxs.; Truro, N.S., 1 ck.; Tuticorin, 13 pkgs.; Warri, 30 bxs.; Wellington, 38 pks.; Winnebah, £32 bxs. Zanzibar, 80 pks.

SODA ASH—
Barbados, 16 cks.; Berbice, 17 cks.; Bombay, 4,200 bgs.; Buenos Aires, 1,360 cks.; Calcutta, 10,890 bgs.; Dalny, 960 pkgs.; Delagoa Bay, 10 pkgs.; Durban, 500 cs., 140 pkgs.; Fremantle, 160 pkgs.; Geelong, 80 pkgs.; Gothenburg, 749 pkgs.; Maranham, 30 cks.; Guayaquil, 58 pkgs.; Hankow, 12,020 pkgs.; Monte Video, 150 cks.; Helsingborg, 400 pkgs.; Helsingfors, 200 pkgs.; Kobe, 9,113 pkgs.; Melbourne, 9 cks.; Moji, 3,462 bgs.; Monte Video, 225 cks.; Punta Arenas, 20 pkgs.; Rangoon, 1,000 bgs.; Rio de Janeiro, 413 cks.; Rosario 60 cks.; Stockholm, 600 bgs.; Sydney, 238 cks.; Tientsin, 2,240 bgs.; Yokkaichi, 3,624 bgs.; Yokohama, 5,248 bgs.; Zanzibar, 32 pkgs.

SODA CRYSTALS—
Barbados, 77 pkgs.; Demerara, 28 pkgs.; Jaffa, 21 bgs.; Limassol, 2 cks.; Madras, 100 kgs.; Malta, 10 bgs.; Pernambuco, 100 pkgs.; Pt. Said, 7 brls.; Punta Arenas, 15 pkgs.; Samarang, 25 cks.; Singapore, 11 cks.; Zanzibar, 10 brls.

SODIUM BICARBONATE—
Aalborg, 7 cks.; Aden, 40 pkgs. Alexandretta, 24 pkgs.; Antwerp 1,215 pkgs.; Bahia, 25 pkgs.; Bombay, 400 kgs.; Barbados, 50 pkgs.; Berbice, 50 kgs.; Calcutta, 1,000 bgs., 200 drms.; Copenhagen, 37 pkgs.; Demerara 35 pkgs.; Durban, 80 pkgs.; Fremantle, 250 pkgs.; Kobe, 6,785 pkgs.; Las Palmas, 7 pkgs.; Limassol, 5 kgs.; Leghorn, 10 pkgs.; Malmo, 20 bgs.; Melbourne, 187 pkgs.; Mombasa, 70 pkgs.; Montreal, 33 drms.; Para 20 pkgs.; Pt. Swettenham, 20 pkgs.; San Fernando, 20 kgs.; Shanghai, 424 pkgs.; Singapore, 480 pkgs.; Sourabayo, 20 kgs.; Stockholm, 40 kgs.; Sydney, 447 pkgs.; Zanzibar, 65 pkgs.

SODIUM BISULPHITE—
Colombo, 120 drms.
Pt. Swettenham, 25 drms.

SODIUM CHLORATE—
Gothenburg, 20 kgs.

SODIUM FLUORIDE—
Calcutta, 5 cs.
Lisbon, 1 ck.

SODIUM HYDROSULPHITE—
Dunkirk, 20 kgs.; Santos, 20 kgs.

SODIUM HYPOSULPHITE—
Gothenburg, 20 kgs.

SODIUM SILICATE—
Adelaide, 57 pkgs.; Alexandria, 78 cks.; Brisbane, 10 cks.; Cape Town, 22 cks.; Christiania, 75 pkgs.; Delagoa Bay, 85 pkgs.; Durban, 155 pkgs.; Fremantle, 57 pkgs.; Gothenburg, 18 pkgs.; Kobe, 144 pkgs.; Madras, 13 pkgs.; Maranham, 25 cks.; Melbourne, 171 bgs.; Montreal, 16 cks.; Para, 45 pkgs.; Pt. Said, 112 pkgs.; Perth, 10 pkgs.; Santos, 16 pkgs.; Singapore, 10 drms.; Townsville, 57 bgs.; Yokohama, 48 cks.; Zanzibar, 11 drms.

SODIUM SULPHIDE—
Gothenburg, 29 drms.
Punta Arenas, 300 drms.

SODIUM SULPHITE—
Sekondi, 61 drms.

STEARINE—
Bordeaux, 67 bgs.; Delagoa Bay, 299 bgs.; Gothenburg, 21 brls.; La Guaira, 14 pkgs.

TALLOW—
Demerara, 4 brls.
Sierra Leone, 20 cs.

TURPENTINE—
Rio Grande do Sul, 4 drms.

LONDON.

Week ending August 23.

ACETIC ACID—
Irish Free State (F.), 5 crbys., £15.

AMMONIA—
Accra, 3 cs., £5.; Barcelona, 28 drms., £275.; Bombay, 9 cs., £16.; Matadi, 3 cs., £6.; Rangoon, 6 cs., £14.

AMMONIA (ANHYDROUS)—
Boulogne, 2 cylds., £7.

AMMONIUM CARBONATE—
Wellington, 8 c., £19.

AMMONIUM NITRATE—
Harlingen, 65 t., £1,755.

AMMONIUM SULPHATE—
Yokohama, 100 t., £1,650.

ANTIMONY SULPHIDE—
Antwerp, 1 ck., £19.
Hamburg, 5 cks., £33.

BARIUM PEROXIDE—
Rotterdam, 40 drms., £456.

BONE FERTILISER—
Channel Islands, 1 t., £26.

BORAX—
Rotterdam (F.), 2 t., £52.
Switzerland, 5 c., £26.

BORIC ACID—
Santander, 2 c., £7.

CALCIUM CARBIDE—
Channel Islands (F.), 11 c., £14.
Sierra Leone, 20 drms., £15.

CARBON (RETORT)—
Antwerp, 32 cks., £44.

CHEMICALS (*otherwise undescribed*)
Accra, 3 cs., £6.; Antwerp, 50 pkgs., £148.; Auckland, 2 pkgs., £8.; Beira, 2 pkgs. (F.), £7.; Beira, 50 pkgs., £188.; Bombay, 10 cs., £123.; Brussels, 1 cs., £9.; Calcutta, 1 cs., £9.; Cochin, 3 cs., £7.; Colombo, 4 cs., £6.; Demerara, 2 pkgs., £6.; Dunedin, 17 pkgs., £123.; Durban, 2 cs., £6.; Durban, 1 cs. (F.), £7.; Gothenburg, 10 pkgs., £28.; Hamburg, 10 pkgs., £28.; Karachi, 20 cs., £200.; New York, 3 cs. (pt.), £23.; Otago, 6 pkgs., £7.; Paris, 1 cs. (F.), £11.; Vera Cruz, 110 cs., £413.; Wellington, 18 pkgs. (pt.), £29.; Zanzibar, 1 cs., £9.

CITRIC ACID—
Beira, 1 c., £9.; Brisbane, 3 c., £25.; Demerara, 1 c., £6.; Durban, 1 c. (F.), £7.; Rotterdam, 12 c., £110.; Timaru, 1 c., £10.; Trinidad, 1 c., £6.; Valparaiso, 3 c., £22.; Wellington, 8 c., £104.

COAL TAR PRODUCTS—
Creosote
New York, 1,000 bgs., £1,375.
Pitch
Bombay, 4 brls., £7.
Tar
Abo, 10 brls., £22.
Cape Town, 12 drms., £30.

COBALT OXIDE—
Rotterdam, 1 cs., £90.

COBALT SULPHATE—
Brussels, 5 cs., £75.

COPPER CHLORIDE—
Melbourne, 2 cs., £11.

COPPER SULPHATE—
Dunedin, 10 c., £13.

COPPERAS—
Brussels, 2 cks., £13.

CREAM OF TARTAR—
Durban (F.), 2 c., £15.

DISINFECTANTS (*otherwise undes.*)
Bombay, 2 t. 2 c., £56.; Cape Town, 1 t. 2 c., £185.; Christchurch, 4 t. 10 c., £172.; Kilindini, 17 c., £50.; Lome, 14 c., £39.; Lyttleton, 2 c., £24.; Penang, 1 t. 2 c., £30.; Rangoon, 1 t., £27.; Singapore, 2 t. 5 c., £60.; Teneriffe, 7 c., £17.; Westport, 5 c., £34.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Calcutta, 5 cs., £36.; Dunedin, 3 pkgs., £54.; Madras, 9 cs. (pt.), £35.; New York, 1 cs. (pt.), £7.

FERTILISERS (*otherwise undes.*)—
Boston, 1 t., £26.

GLYCERINE—
Hamburg (F.), 40 t. 17 c., £2,255.

IODINE—
Brussels, 3 cs., £310.

LEAD ARSENATE—
Beira, 2 drms., £12.

MAGNESIA—
Auckland, 1 cs., £5.
Dunedin, 6 cs., £14.
Wellington, 30 cs., £72.
Westport, 2 cs., £5.

MAGNESIUM CARBONATE—
Bombay, 2 cs., £9.
Wellington, 2 cs., £5.

MAGNESIUM CHLORIDE—
Sydney (F.), 6 drms., £10.

MAGNESIUM CITRATE—
Auckland, 1 cs., £7.
Barcelona, 3 cs., £31.

MAGNESIUM SULPHATE—
Accra, 6 c., £15.; Bluff, 1 t. 4 c., £27.; Dunedin, 1 t. 5 c., £29.; Durban, 6 c., £8.; Kilindini, 1 t. 7 c., £20.; Mombasa, 10 c., £13.; Timaru, 16 c., £20.; Wellington, 1 t. 9 c., £37.

POTASSIUM BICARBONATE—
Christchurch, 4 kgs., £11.

POTASSIUM IODIDE—
Accra, 6 cs., £96.; Lome, 2 cs., £18.; Opobo, 20 cs., £154.; Pt. Harcourt, 10 cs., £77.; Sekondi, 3 cs., £40.

SALAMMONIAC—
Dar-es-Salaam, 4 drms., £13.

SALICYLIC ACID—
Brisbane, 5 cs., £54.
Perth, 5 kgs., £54.

SALTPETRE—
Corina, 9 c., £18.

SILVER NITRATE—
Bombay, 4 cs. (pt.), £7.

SODA CRYSTALS—
Haifa, 10 c., £9.

SODIUM BICARBONATE—
Constantinople, 4 c., £27.
Durban, 17 c., £27.

SODIUM BISULPHITE—
Buenos Aires, 4 t. 18 c., £94.
Paris, 5 c., £9.

SODIUM SALICYLATE—
Alleppey, 5 cs., £28.

SODIUM SULPHITE—
Auckland, 1 t. 3 c., £29.

SPENT IRON OXIDE—
Amsterdam, 185 t., £446.

SULPHURIC ACID—
Fayal, 1 t. 12 c., £55.
Kilindini, 1 c., £6.

TARTARIC ACID—
Brisbane, 1 c., £8.; Durban, 3 c. (F.), £25.; Timaru, 4 c., £44.; Wellington, 1 c., £10.

TITANIUM POTASSIUM OXALATE
Genoa, 4 cks., £40.

Week ending August 25.

BEESWAX—
Dunedin, 2 c.; Wellington, 6 c.

FULLER'S EARTH—
Ghent, 10 t.; Rotterdam, 50 t.; Seville, 50 t.

GLUE, SIZE, AND GELATINE—
Alexandria, 7 t. 15 c.; Amsterdam, 1 t. 10 c.; Bombay, 3 t. 5 c.; Boulogne, 3 c.; Casablanca 5 t.; Colombo, 2 c.; Dar-es-Salaam, 3 c.; Dunedin, 1 c.; Durban, 1 t. 3 c.; East London, 2 c.; Hamburg, 10 c.; Kilindini, 2 c.; Malmo, 1 c.; Melbourne, 1 c.; Melilla, 1 t. 2 c.; New York 17 t.; Paris, 10 t.; Rotterdam, 14 t. 7 c.; Salonika, 1 t.; Sydney, 4 t. 9 c.; Tanga, 1 c.; Tangier, 18 c.; Trinidad, 2 c.

MINERAL WAX—
Brussels, 5 t.

PLUMBAGO—
Amsterdam, 6 c.; Antwerp, 10 c.; Barcelona, 8 c.; Malmo, 4 c.; Rotterdam, 30 lb.

QUININE—
Amoy, 1,000 oz.; Bombay, 7,908 oz.; Brussels, 256 oz.; Pt. Harcourt, 268 oz.

SALT—
Accra, 2 c.; Alexandria, 7 c.; Beira, 3 c.; Bombay, 1 t. 4 c.; Cochin, 4 c.; Dar-es-Salaam, 2 c.; Durban, 2 c.; Irish Free State, 1 c.; Jaffa, 2 t. 11 c.; Kilindini, 5 c.; Matadi, £5.; Mombasa, 2 c.

SOAP—
Accra, 2 c.; Adelaide, 4 c.; Aden, 15 c.; Ahwaz, 3 t.; Alexandria, 4 c.; Amsterdam, 1 t. 10 c.; Antwerp, 1 t. 9 c.; Bombay, 1 t. 3 c.; Boulogne, 3 c.; Brussels, 5 c.; Cape Town, 1 c.; Christchurch, 11 c.; Constantinople, 4 c.; Dar-es-Salaam, 1 c.; Delagao Bay, 2 c.; Dunedin, 1 c.; Durban, 1 c.; Haifa, 2 c.; Havre, 5 c.; Invercargill, 1 c.; Jamaica, 1 c.; Kilindini, 1 t. 6 c.; Melbourne, 1 c.; Mombasa, 7 c.; Piraeus, 2 c.; Pt. Said, 3 c.; Rangoon, 1 c.; Reval, 3 c.; Riga, 1 c.; Rotterdam, 2 c.; Singapore, 1 c.; Vera Cruz, 1 c.; Waipawa, 1 c.; Wellington, 18 c.; Wanganui 1 c.; Yokohama, 3 c.

TALLOW—
Danzig, 25 t. 5 c.
Pasages, 50 t. 5 c.

WAX (*otherwise undescribed*)—
Durban, 6 c.
Lisbon, 1 t. 8 c.
New York, £28.
Rangoon, £33.

WHITE LEAD—
Christchurch, £319.; Dunedin, £75.; Gisborne, £45.; Invercargill, £46.; Irish Free State, £30.; Lyttleton, £161.; Rotterdam, £27.; Sydney, £570.; Wellington, £515.

MANCHESTER.

Week ending August 25.

AMMONIUM CHLORIDE—
Basrah, 18 kgs.

AMMONIUM SALTS (*otherwise undescribed*)—
Holland, 5 cks., 20 kgs.

AMMONIUM SULPHATE—
Amsterdam, 508 bgs.

CARBON BLACK—
Germany, 1 cs.
Melbourne, 72 cs.

CHEMICALS (*otherwise undescribed*)
Belgium, 4 cks.
New York, 21 cks.

COAL TAR PRODUCTS—
Aniline Oil
Belgium, 50 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bombay, 4 drms.; Rouen, 3 cs., 18 cks.; Sydney, 25 kgs.

FERRO MANGANESE—
Baltimore, 1,350 t.; Germany, 50 t.; Hamburg, 50 t.

LITHOPONE—
Melbourne, 8 cs.

PHOSPHORUS SULPHIDE—
Ghent, 50 cs.

SALTCAKE—
Finland, 708 t.

SILICON CARBIDE—
Rouen, 1 bg.

SIZE—
India, 16 brls.
Reval, 3 cks.

SOAP—
Bombay, 25 cs.; Cairo, 23 cs.; Melbourne, 1 cs.; The Hague, 17 cs.

SULPHUR—
Sydney, 10 cks.

TANNIC ACID—
India, 4 kgs.

TANNING MATERIALS—
Unspecified
Brisbane, 4 cks., 32 bxs.; Melbourne, 33 cks.; Sydney, 32 bxs., 9 cks.

TARTAR EMETIC—
India, 1 kg.

NEWCASTLE-ON-TYNE

Week ending August 25.

AMMONIA—
Copenhagen, 10 brls.
Gandia, 1,541 bgs.

ANTIMONY—
Antwerp, 10 cks., 208 ktls.; Montreal, 10 t.; New York, 150 cks.

BARIUM SULPHATE (BLANC FIXE)—
New York, 75 cks.

BARYTES—
New York, 100 t.

BLEACHING POWDER—
Gothenburg, 29 cks., 44 drms.
Rotterdam, 5 t. 2 c.

CAUSTIC SODA—
Bremen, 69 drms.; Copenhagen, 150 drms.; Gothenburg, 143 drms.; Rotterdam, 173 drms.

CHEMICALS (*otherwise undescribed*)
Rotterdam, 21 cks.

COAL TAR PRODUCTS—
Pitch
Rotterdam, 20 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bergen, 1 cs.

GLUE—
Copenhagen, 20 bgs.
Gothenburg, 1 cs.

LITHARGE—
Bergen, 4 cks.; Gothenburg, 15 cks.; Rotterdam, 7 cks.

PHOSPHORUS—
Gothenburg, 100 cs.

RED LEAD—
Bergen, 4 cks.; Copenhagen, 57 cks.; Gothenburg, 16 cks.; Rotterdam, 38 cs., 38 cks.

SODIUM SULPHITE—
Copenhagen, 5 pkgs.
Rotterdam, 11 cks.

WHITE LEAD—
Copenhagen, 10 cks.; Gothenburg, 30 cks.; Rotterdam, 60 cks.

N. & S. SHIELDS.

Week ending August 25.

NIL.

PRICES CURRENT.

WEDNESDAY, AUG. 29, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23/6	&	47/-
Acetic, (Glacial, B.P.) in carboys	*ton	66	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	50	0	0
Citric	lb.	0	1	8½
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	9
Tartaric (crystals)	lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	1½
Creosote	*gallon	0	0	9
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	7	2	6
Pyridin	gallon	1	0	0
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	128	0	0
Alum, loose lump (delivered)	*ton	12	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	10	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	68	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	26	0	0
Formaldehyde, 40%	ton	78	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	0	0
Lead Acetate (brown)	ton	43	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	20	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	35	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	46	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	9¾
Potassium Prussiate (yellow)	lb.	0	1	1½
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	50/-	&	57/-
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	*ton	27	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8½d.	to	9d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	13	0	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	7	6
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	6¼
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	14	10	0
Sodium Sulphide Crystals (casks)	†ton	8	10	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	63	2	6
Lead (Chemical Sheet), delivered	cwt.	1	14	0
Lead (Foreign Pig)	ton	24	12	6
Nickel	ton	130	0	0
Silver	oz.	0	2	6⅞
Tin, English Ingots	ton	192	15	0
Zinc (Spelter)	ton	33	0	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	42	0	0
Linseed, Raw	*ton	43	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	38	0	0
Turpentine	cwt	3	10	9

* *Packages extra or returnable*; otherwise prices usually include (packages.

† Makers' prices for home consumption only

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
The British Association	271
An International Questionnaire on Fe tili ers	272
The Late Dr. Muspratt	272
Dye Troubles in America	272
The Chemical Share Market	272
Coconut Oil	273
America's Heavy Chemical Industry	275
Industrial Silica	276
The Month in Engineering	278
Death of Dr. E. K. Muspratt	279
The Olympia Engineering Exhibition	280
Legal Intelligence	281
Correspondence	281
Items of Interest	282
Coming Events	283
Stock and Share List	284
Cumberland Coking and By-product Industries	284
South Wales Notes	284
Fertiliser News	285
New Companies	285
Reports of Companies	286
Gazette News	286
Trade Inquiries	287
Thirty-five Years Ago	287
The Patent List:—	
Applications for British Letters Patent	287
Complete Specifications Accepted	287
Complete Specifications Open to Public Inspection before Acceptance	287
Abstracts of Latest Complete Specifications	288
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	289
Publications Received	289
Market Reports:	
London "Open Market" Report	289
London Metal Market	291
Manchester Chemical Market	291
Swansea Market Report	291
Liverpool Chemical Market	291
West of Scotland Chemicals	292
Imports of Chemical Products	292
Exports of Chemical Products	294
Prices Current	298

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CURRENT TOPICS.

THE BRITISH ASSOCIATION.

ON Wednesday next, at Liverpool, the British Association commences its ninety-first annual meeting. This is the fifth occasion that Liverpool has been chosen as the meeting place, the last being in 1896, when Sir Joseph Lister was president. A very interesting programme has been drawn up for each of the Sections, and, as usual, a number of valuable joint discussions have been arranged. The presidential chair is occupied this year by Sir Ernest Rutherford, whose address on "The Electrical Structure of Matter" promises to be of outstanding importance. With regard to the Chemistry Section, the president of which is Professor F. G. Donnan, and the vice-presidents Dr. E. F. Armstrong, Professor E. C. C. Baly, and Principal J. C. Irvine, the proceedings are to be mainly academic, none of the great problems of industrial chemistry being more than touched upon. A complete list of the papers to be read before the Chemistry Section is given on another page, and it will be seen that whereas the principal contributions and the joint discussions centre round modern physico-chemical theories; a number of what may be termed the minor contributions do deal with matters of more immediate practical importance. Thus, Professor H. E. Fierz will deal with the sulphonation and nitration of naphthalene; Mr. W. G. Palmer with catalytic actions in the presence of copper; Professor G. S. Whitby, the well-known Canadian rubber chemist, with the nature of Hevea rubber; and Dr. E. F. Armstrong with enzymes. The presidential address of Dr. C. Crowther to the Agricultural Section on "Science and the Agricultural Crisis" should not be without considerable importance to chemists. The arduous and enthusiastic work of the local Liverpool secretaries of the Association has been rewarded by a more than usual display of local interest in the proceedings, and there is every indication that the exhibition of scientific apparatus will be very well attended. The social side of the meeting has not been neglected, and a large number of visits have been arranged to local factories and other places of interest. The British Association makes a greater appeal to the popular imagination than does any other scientific body in the world, and whatever be the criticisms as to procedure that may be levelled against it, its value as a force in diffusing knowledge of modern scientific thought cannot be over emphasised.

AN INTERNATIONAL QUESTIONNAIRE ON FERTILISERS.

We have received from the International Institute of Agriculture at Rome a copy of a comprehensive questionnaire on fertilisers that the Institute is circulating to the Governments of all the adhering States and to that section of the Press especially informed on fertilisers. The step taken by the International Institute is the direct consequence of a resolution adopted at the last General Assembly, to the effect that the Permanent Committee should make an inquiry as to the most suitable measures to be taken to increase the production and use of fertilisers. It is unfortunately too true that at a time when increased agricultural production is a paramount necessity, the prevailing economic conditions have brought about a considerable diminution in the amount of nitrogenous and other fertilisers consumed in nearly all countries of the world. The suggestion of a practical method for increasing very appreciably the world consumption is, however, not an easy matter, but it cannot be disputed that a complete and accurate survey of the whole position both with regard to the actual and potential production and consumption of fertilisers is an essential preliminary. There is probably no other branch of the chemical industry concerning which statistics are more abundant and—with the exception of Chilean nitrate of soda—more conflicting, than the fertiliser branch, and this is particularly true of the Continental position. The questionnaire ranges over every aspect of the industry, technical, statistical, and commercial, and general instructive suggestions are also invited. It is desired by the Institute that replies be furnished by the European States before October 31 and by other States before December 31. The time allowed is certainly rather short for the compilation of statistics and information of the magnitude required, but it is to be remembered that the matter is urgent.

THE LATE DR. MUSPRATT.

By the death of Dr. Edward Knowles Muspratt, an outstanding figure has been removed from British chemical industry, and from the pioneers of British scientific and technical education, and one of the few remaining personal links with the early days of the alkali industry has been severed. Although Dr. Muspratt made no direct contribution to chemical technology, by his great administrative and commercial ability he extended greatly the growing industry established by his father, James Muspratt, and steered it successfully through periods of exceptional difficulty. As Dr. Conroy, the present chief chemist to the United Alkali Company points out on another page, Dr. Muspratt's early years in Germany, and his association with the great chemist Justus von Liebig, convinced him of the value of an efficient system of scientific and technical training to his own country, and he did not delay in translating his beliefs into action. Dr. Muspratt's interests were extraordinarily extensive. A keen student and critic of the arts, a great traveller and a politician of very definite views, he also took an active part in moulding public opinion on legislation directly or indirectly affecting the chemical industry. It is in his work as a whole-hearted and active supporter of scientific education and research however, that his chief title to remembrance depends.

DYE TROUBLES IN AMERICA.

An incident which aroused considerable interest in British colour-using circles some months ago, is recalled by a recent decision of the United States military authorities. It may be remembered that a contract for dyeing cotton uniforms was given by the U.S. Marine Corps to a British firm, and that the bids of American manufacturers were rejected. Rumours of a secret British dyeing process were circulated freely in the Press, but it appears that the method used was simply the application of the well-known mineral colours, work in which the British dyers have certainly had more experience than their American rivals. Before the war the distinctive olive drab cotton uniforms as worn by General Pershing's men were dyed with German vat colours, and the results were perfectly satisfactory. To-day a quite different state of affairs prevails. The American dyes used fade speedily under army conditions of wear and tear, and the average infantry company presents apparently quite a variegated colour effect. That the trouble is really serious may be gauged from the established fact that the wise American soldier, so soon as he receives a new uniform, at once sets to work upon it with bleaching powder lest he be mistaken for a raw recruit. The army authorities have now decided that this state of affairs is not to continue, and, not wishing to send their uniforms overseas to be dyed, have approached the American Chemical Society for assistance. As the result a joint committee has been formed, and a comprehensive series of tests on cotton uniforms dyed with American vat colours, mordant colours, mineral colours, and sulphur colours, is to be made. Neither the mineral nor the mordant dyestuffs are viewed with favour, and it is hoped to get satisfactory results with the sulphur colours, although, if necessary, the expensive American-made vat dyes will be used.

THE CHEMICAL SHARE MARKET.

With this issue we recommence the publication of our monthly stock and share list, which was discontinued temporarily during the war period. It is felt that such a list is of definite value, not only to our numerous overseas readers, but also to our home subscribers as a ready means of reference and a convenient permanent record of the fortunes of our leading chemical and allied enterprises. As to the exact form of the list it has been decided that the highest and lowest quotations on the London Stock Exchange afford the best means of indicating the actual transactions during the month. In the majority of cases the ordinary shares are quoted, but in some instances other classes of shares have been selected. Particulars as to the amount and date of the last dividend have also been incorporated.

COCONUT OIL.

A SURVEY OF THE PRESENT POSITION OF THE INDUSTRY.

By "Omega."

COCONUT OIL in temperate zones is a fat of a soft white consistency, varying in colour from white to a light yellow, and before refining possesses a characteristic odour and taste. In tropical countries it is an oil, hence the name coconut oil and not coconut fat. Coconut oil is obtained from the kernels of the fruit of the coconut palms, *cocos nucifera* and *cocos butyracea*. These two palms flourish in many tropical countries, but mainly on the Malabar Coast of India, Ceylon, the Malay Peninsula, Islands of the Indian Ocean, and South Seas, East Africa and South America. The best type of fruit is obtained at low altitudes and between the latitudes of 10° South and 18° North, where the fruit contains from 20/25 per cent. of oil. The oil is stored as a reserve food material in the fruit and contains an enzyme which functions in such a way as to resolve the oil into a soluble material for plant assimilation.

Commercial Grades and Prices.

The introduction of coconut oil into Europe on a commercial scale commenced in 1815, and the importation has since steadily progressed both in the form of oil and of copra. During recent years three grades of oil have been recognised:—viz., Cochin, Ceylon, and Copra oils. (I), *Cochin Oil*, is generally regarded as being of superior quality, and is obtained as the name designates, from the Cochin district of China, and also from the Philippines. The oil is extracted by macerating the copra in heated water vats and skimming away the oil. The superiority of the Cochin variety of oil lies in the fact that the palm is grown under more suitable climatic conditions, the copra is whiter, the oil is extracted in a more skilled and experienced manner and consequently realises higher prices. Cochin coconut oil contains a very low percentage of free fatty acids. The current price of Cochin Oil is £47. per ton (August, 1923). (II). *Ceylon Oil*, the name of which refers to its geographical origin is considered of second grade quality, mainly due to the crude methods of native cultivation of the palms, and also to the lesser skill in manipulating the drying of the copra and extracting the oils. Modern methods of forestry and oil extraction are now being introduced into Ceylon, and a higher grade of oil is being exported. The present price of Ceylon oil is £45. per ton. (III.) *Copra Oil* is the product produced by various modern methods of expression, from the imported dried copra, principally in European countries and America. The quality of this oil is dependent entirely on the quality of the copra used, and the price varies accordingly.

Production of Coconut Oil from Copra.

After removal of the outer fibrous portion of the coconut (which provides the coir of commerce, used for cordage, and as a filling and spinning material), the kernel is extracted, cut into pieces and dried. The dried coconut kernel is termed commercially copra and is either pressed locally or exported to European countries or America for expression of the oil. The copra production for 1922 is estimated at 600,000 tons. The following are the copra imports into the United Kingdom alone, which are quoted from the current issue of the Board of Trade Returns.

	Weight (tons)	Value (£)
1913	30,868	896,707
1919	71,531	3,779,301
1920	57,368	3,283,361

The principal importing countries for copra in 1913 were:

	Tons
Germany	196,449
France	123,360
Russia	66,690
Austria-Hungary	33,605
England	30,868
Belgium	19,552
U.S.A.	15,298
Australia	5,861

Since the war a large amount of the German oil trade has been transferred to England and the U.S.A. The copra exported from the Philippine Islands alone in 1919 amounted to 140,000 tons, and the Ceylon exports were as follows:

	1919. tons.	1920.	1921.
Desiccated Coconut	33,700	25,900	44,000
Copra	87,931	67,894	68,371
Coconut Oil	33,799	25,371	24,236

Copra has found some application in confectionery under the name of desiccated coconut. The fresh coconut is reduced to shreds and desiccated or dried in special ovens. It will keep fresh for a considerable period of time, and is used as a substitute for almonds. The desiccated coconut industry is conducted mainly in Ceylon.

The Drying and Sterilising of Copra.

The art of drying the copra has been developed to a considerable extent, particularly in Cochin China, and on the Malabar Coast. The presence of excessive moisture promotes hydrolysis and rancidity, with subsequent decomposition and loss of fat. Until recently it was accepted that rancidity was produced consequent on the rupture of the glycerides into free fatty acids. Lately it has been shown that more important factors are the presence of moisture, air, ferments, bacteria and enzymes, and that the deterioration takes place before the oil is expressed from the copra, the micro-organisms thriving on the albuminoids. The water which is present, promotes enzyme hydrolysis. Dry copra or dry coconut oil does not become rancid if air and light are excluded.

The drying of the copra offers a good means of preservation and also affords an economy in freights. The method adopted in drying the copra has an important bearing on the quality of the oil eventually obtained. The methods at present in use are, sun drying, kiln drying and vacuum or reduced pressure rotary drying. Formerly the sun dried copra gave a better coloured oil and a higher grade product generally, but latterly with the introduction of modern machinery, copra dried by means of vacuum rotary driers is competing successfully with the sun dried variety, giving both an equal product and a large economy in the time of drying, together with a lower percentage of water in the copra and a consequently higher fat content. By modern methods the copra is sufficiently dried in the course of two hours, a good quality material being obtained with a moisture content of about 3 per cent. In this state the copra is not attacked by micro-organisms, if it is preserved from access to air, light and moisture.

Investigations have been conducted upon the sterilising of copra by means of various gases and liquids, but up to the present no efficient agent which could be used without detriment to the copra from a commercial standpoint has been discovered. The table given below gives the oil content of copra dried by various methods:

	Oil content.
Sun dried copra	45-50 per cent.
Kiln dried	60-65 ,, ,,
Vacuum rotary dried	70-75 ,, ,,

Prior to the introduction of modern machinery, sun-dried copra in general gave a paler-coloured oil than that from the kiln-dried copra, and some markets are still prejudiced in favour of the sun-dried copra oil. A good quality copra should be perfectly white in colour, of a pleasant odour, free from extraneous matter and give a vitreous fracture. Insufficiently dried copra gives an inferior oil of high acidity. Copra is marketed under trade names designating its geographical origin, such as Manilla, Java, Malabar, Ceylon, Malay, and Seychelles copra The current prices (August, 1923), of Ceylon copra is £27. per ton, sun-dried Straits copra £25. per ton, Java copra £25. per ton.

Extraction and Refining of the Coconut Oil.

For the extraction of the oil from the copra the material is first crushed to a pulp or meal and then warmed or "cooked," so as to coagulate albuminous matter and also to allow the oil to be expressed more easily in the subsequent operation. The correct heating of the copra is an important factor in the production of a high-quality oil. The meal is pressed twice at a temperature of about 60° C., when about 60 per cent. of the oil is recovered, and is termed crude coconut oil, this oil containing from 2 to 9 per cent. of fatty acids. The residual cake meal, containing from 5-10 per cent. of oil, together with the major portion of the proteins, albuminoids, and carbohydrates, is used as a cattle food, the current price of the best quality coconut cake meal being £8. per ton (August, 1923).

Methods of pressing oil-bearing seeds and fruits have been known and employed from remote times. At the present time, the two modern systems are: (I.) The plate system for seeds requiring one pressing only, such as linseed; and (II.) the cage system for double pressing as for copra, which contains a high percentage of oil. The extracted oil is refined by various physical and chemical processes, so as to produce a colourless, odourless and tasteless material, and also for the extraction and exclusion of free fatty acids.

The refining of coconut oil for edible purposes is now an industry of considerable dimensions. The practice adopted differs in various countries, and depends on the use to which the oil is to be applied. The processes are being continually improved upon, as further experience of the oil is being gained, and also as the chemistry and composition of the oil, and its constituents are further studied. In practice the refining of coconut oil consists in the elimination of deleterious substances such as free fatty acids, mechanical impurities, inorganic substances and organic substances of the type of albuminoids, carbohydrates, gums, proteins and resins, ferments, enzymes, together with bleaching, the removal of odouriferous substances and the dispersion of any emulsions. A process which has found a wide application for the production of edible coconut oil, is by treatment with alcohol, and animal charcoal, when a white odourless product is obtained. Recently a patent has been granted for the bleaching of various vegetable oils, by exposing them in the form of thin films to ultra-violet rays. Pavlieck (*Seifensieder-Zeitung*, 1914, Vol. 41, p.566/568), proposes a method of refining coconut oil for manufacturing purposes, by treatment with 1 per cent. sulphuric acid, when the oil is bleached and impurities such as gelatine, albuminous matter, and alkaloids which cause the unpleasant taste are removed. This process is claimed to aid the subsequent deodourising operation, and also prevents rancidity. The reactions which take place are as follows.

$$C_{17}H_{33}COOH + H_2SO_4 = C_{17}H_{31}(OSO_2OH)COOH$$
$$C_{17}H_{34}(OSO_2OH)COOH + H_2O = C_{17}H_{31}(OH)COOH + H_2SO_4$$

Acid processes of refining coconut oil cannot be applied to oils which are to be used for edible purposes, as the first essential is that of flavour. Riley and Clark (*U.S. Pat.*, 1,320,094, 1919), have patented a method of refining coconut oil by adding a mixture of the coconut oil and a neutralising agent to a circulating solvent. The solvent containing the dissolved soap is removed from the dissolving zone, and the solvent recovered and used again for the treatment of a further quantity of oil.

Composition of Coconut Oil.

Coconut oil consists of a complex mixture of the glycerides of various fatty acids, the principal components being trilaurin, tri-myristin with lesser quantities of tri-stearin, tripalmitin, tri-olein, caprin and caproin. The results obtained by various authorities who have studied the composition of coconut oil are somewhat conflicting, but are in some measure accounted for, by the oil used being obtained from different sources and also expressed from the raw material at various stages of maturity. The following table gives the percentage composition as obtained by (I.) Ulzer, *Chem. Rev. Fett. und Harz Ind.*, 6, (II.) p.203-204; (III.) Elsdon, *Analyst*, 1913, Vol. 38, p.8-11; (III.) Lewkowitsch, Vol. 2, p.746:

	I.	II.	III.
Caproic Ester	2.5	2.0	0.25
Caprylic ,,	.5	9.0	0.25
Capric ,,	—	10.0	19.50
Lauric ,,	86.5	45.0	40.0
Myristic ,,	—	20.0	24.0
Palmitic ,,	—	7.0	10.6
Stearic ,,	—	5.0	—
Oleic ,,	10.5	2.0	5.4

Ulzer states that he failed to establish the presence of any tri-palmitin. Bömer (*Chem. Zeit.*, 1914, vol. 38, p.844), by distillation of coconut oil under high vacuum, found 75 per cent. caprylo-lauromyristin of M.P. 13°-15° C., some myristo-dilaurin of M.P.32° C., and a small amount of lauro-dimyristin of M.P.37-38° C. The non-volatile portion contained the glycerides of oleic and palmito-dimyristin of M.P.45° C., and some stearo-dipalmitin. Bomer found no glycerides of capric or caproic acids present.

The peculiar and complex chemical composition of coconut oil, renders it highly susceptible to rancidity on exposure to air, moisture, and light. The odiferous quality in coconut oil is due principally to the presence of traces of methyl-heptyl-ketone, methyl-nonyl-ketone, and methyl-undecyl-ketone, which are produced according to Lassieur by enzyme action on the copra (Lassieur, *Compt. rend.*, 1910, vol. 151, p. 697 and p. 1,013). The colour is due to the presence of traces of naturally occurring lipochromes, chlorophyll, and xanthophyll.

That coconut oil is easily saponified in the cold is remarkable in view of the fact that far the greater portion of fatty oils need considerable heat for saponification, and that coconut oil consists principally of the glycerides of the lower fatty acids is probably an important factor in many of its reactions.

Within recent years the hardening of coconut oil has attracted considerable attention. The hardening is attained by various processes of hydrogenation, with the aid of catalytic agents. Hardening raises the M.P. and the solidifying point, depresses the refractive index and the iodine value, leaving the saponification value unchanged. The following figures are typical of coconut oil before and after hardening (Leschly-Hansen (*Chem. Rev. Fett. Ind.*, 1912, vol. 19, p.218-221, 247-249).

	Before Hardening.	After Hardening.
Melting Point	25.6°	44.5°
Solidifying Point	20.4°	27.7°
Refrac. Index at 40° C.	37.4	35.9
Acid Value	0.3	0.4
Saponification Value	255.6	254.1
Iodine Value	11.8	1.0

The iodine value of coconut oil gives an indication of its unsaturated fatty acids content, and is reduced during the process of hydrogenation to about 1 per cent.

Properties of Coconut Oil.

At ordinary temperatures coconut oil is a white fat of bland taste. It is soluble in ether, alcohol and carbon bisulphide, and its physical constants are as follows:

Saponification Value	245/268
Iodine Value	8/9.5
Reichert-Meisel Value	6.5/8.4
Acetyl Value	9/13.2
Acid Value	5/50
Hehner Value	88/90
Polenske Value	18.0
Kirschner Value	1.8
Valenta Value	11.0
Melting Point	21/24° C.
Solidifying Point	22/14° C.
Specific Gravity at 15/15° C.	0.9250
Specific Gravity at 100/15° C.	0.8730
Refractive Index at 60° C.	1.442
Viscosity at 60° C.	63.9
Mean Molecular Equivalent	196/204
Butyro-Refractometer Value at 15° C.	49.1
Butyro-Refractometer Value at 40° C.	34.2

For 3ins. of oil:

Spectrum Visibility in the red ends at	43.28°
Spectrum Visibility in the blue ends at	47.3°

The physical constants of the fatty acids of coconut oil are as follows:

Neutralisation Value	260/266
Iodine Value of the Mixed Fatty Acids	8.4/9.5
Iodine Value of the Liquid Fatty Acids	36/37
Mean Molecular Weight	200/211
Refractive Index at 60° C.	1.4295
Melting Point	25/27° C.
Solidifying Point	20/16° C.
Titre Value	22.5/25.1° C.
Specific Gravity at 100° C.	0.8354

Coconut oil has the highest saponification value and the lowest iodine value of all known fats and oils. The values for typical vegetable oils are:

	Sap. Value.	Iodine Value.
Soya Bean Oil	190/193	110
Cotton Seed	193/195	122
Palm	196/205	55
Coconut	245/268	8.0

When distilled alone, coconut oil decomposes with the formation of acrolein and other degradation products. With

high pressure steam under vacuum, the oil partially saponifies with distillation of free fatty acids and glycerol. On heating with alkali hydroxides, coconut oil is saponified forming the soap and freeing the glycerol, with alkaline carbonates it is only saponified by heating in autoclaves under pressure. Treatment with superheated steam at a temp. of 200° C. (15/20 atmospheres pressure), promotes the hydrolysis of coconut oil into glycerol and free fatty acids. A compound consisting of sulpho-oleic acid with naphthalene readily hydrolyses hot coconut oil. During the last few years the hydrolysis or fat splitting of coconut oil by means of enzymes has attracted considerable attention, enzymes found in castor seed have been found to be most effective and have found some industrial application. Nicloux (*J.S.C.I.*, 1904, p.327) states that the enzymes contained in one kilo of castor seeds will decompose 100 kilos of oil in 24 hours at 20° C. The substance in castor seeds which exhibits lipolytic properties is the cytoplasma (Nicloux, *Compt. rend.*, 1904, p.1,175-1,177), and providing that the quantity of material used is sufficiently large to counteract any external conditions, Wilhelmy's general catalytic formula is applicable, where:

$$\frac{l}{t} \text{ Log } \frac{A}{A - x} = K.$$

A summary of Nicloux classical researches on lipolytic enzymes is to be found in "*Contribution a l'étude de la saponification des corps gras*, 1906."

Commercial Applications of the Oil.

The bulk of the coconut oil produced forms the raw material of soap and candle making, but the oil is used also for cooking and edible purposes. The commercial possibilities of coconut oil as a soap making material were recognised after the granting of a patent to Sturtevant (*Brit. Pat.*, 8,870, 1841), a patent which rapidly created a demand for the oil. Coconut oil soaps are very hard and combine with a large quantity of water without becoming soft. The soaps are also distinctive in the necessity for addition of a large proportion of salt to throw them out of solution. The manufacture of marine soaps from coconut oil is based on this fact. Its application as an edible oil is of comparatively recent date.

Coconut oil of high grade is now used in considerable quantities in the preparation of vegetable butters, cooking fats, margarine, and enters into the composition of cakes and biscuits. It appears under various trade names. On pressing low grade copras, the lower melting glycerides are used for soap making, the harder residue or stearin used for candle manufacture. The copra meal is rich in amino acids, which are of physiological value from a growth standpoint, and when mixed with green forage makes an excellent cattle food.

The Extent and Growth of the Trade.

The extent and growth of the coconut oil industry during late years, is seen from the following table from the Board of Trade Returns. It will be seen that there is a steady decrease in the importation of refined oil with a compensating increase in unrefined oil.

Imports of Coconut Oil.

	Weight (tons).			Value (£)		
	1913.	1919.	1920.	1913.	1919.	1920.
Refined	27,337	23,655	3,018	1,316,246	2,537,130	353,566
Unrefined..	31,140	52,617	63,059	1,342,400	4,354,319	5,804,393
Total	58,477	76,272	66,077	2,658,646	6,891,449	6,157,959

Exports of Coconut Oil.

Refined	2,946	441	2,111	141,777	44,312	228,457
Unrefined..	3,103	1,622	688	127,465	89,412	61,534
Total	6,049	2,063	2,799	269,242	33,724	289,991

The total imports of refined and unrefined coconut oil into the various countries during 1913 were as follows: England, 58,477 tons; U.S.A., 22,546 tons; France, 3,924 tons; Holland, 16,685 tons; Belgium, 1,285 tons; Russia, 397 tons; Austria-Hungary, 4,895 tons; and Germany, 594 tons.

Future Prospects.

The chemistry and technology of coconut oil has made vast strides during recent years. The results of the study of the physical and colloidal chemistry of the oil have found considerable application in several industrial processes. Solvent extraction of the copra has only been adopted in cases where the market price of the oil is sufficiently high, as in 1907, to discard the value of the meal cake as a feeding stuff for cattle. Prolonged studies have been made on the influence of physical factors, in various chemical operations, which are conducted on an industrial scale, where the use of coconut oil is involved. Much attention has been given to the question of deterioration consequent on rancidity, and also to the introduction of more economical methods for the expression of the oil, so as to render the refining operation less laborious, more easy of attainment and prevent losses due to enzyme activity.

The coconut oil industry offers a unique field for the application of scientific principles with marked advantage. Until recent years no method of cultivation of the coconut tree had been adopted, and the preparation of the copra and extraction of the oil were conducted in a very crude empirical manner. The future of the coconut oil industry lies in the placing of capital abroad so as to introduce modern methods of cultivation of the palms, and the general application of modern machinery and engineering.

AMERICA'S HEAVY CHEMICAL INDUSTRY.

EXPORTS DURING FIRST SIX MONTHS OF 1923.

THE exports of chemicals and allied products from the United States for the first six months of 1923 had an aggregate value of $75,125,022., an increase of 21 per cent. over the first six months of 1922, and equivalent to 67 per cent. of the total value of $112,836,432. for the entire year 1922. June, 1923, with exports totalling $14,120,320., was the record month, surpassing the previous high mark made in May by $754,748., and the figure for June, 1922, by $4,253,185.

Among the heavy chemicals which showed expansions in 1922, and which have continued to gain in 1923, are ammonia and ammonia compounds, aluminium sulphate, and dextrine. Acetate of lime and bleaching powder have each advanced in value, but declined in tonnage. On the other hand, during the first six months of 1923 large decreases were evident in the exports of calcium carbide, copper sulphate, and glycerine, all of which had recorded increases during the year 1922. The exports of heavy chemicals for the first half of 1923, as compared with the first half of 1922, are given in the following table:—

Exports of Heavy Chemicals from the United States.

Articles.	First Half of 1922.		First Half of 1923.	
	Pounds.	Value.	Pounds.	Value.
		$		$
Ammonia and ammonium compounds	2,287,454	510,171	3,415,170	541,100
Aluminium sulphate	12,066,218	185,722	17,308,240	264,085
Acetate of lime	16,510,592	332,820	15,501,117	538,938
Calcium carbide	8,919,285	371,101	3,292,775	141,232
Bleaching powder	17,203,797	284,675	16,792,974	287,248
Copper sulphate	4,132,793	191,258	1,417,374	80,131
Dextrine	7,717,670	244,141	8,803,293	327,372
Formaldehyde	1,041,632	114,497	690,070	112,167
Glycerine	1,871,167	272,972	697,261	135,618
Potassium bichromate	3,176,760	315,901	2,231,428	200,569
Potassium chlorate	303,451	25,920	131,585	13,921

No significant changes occurred in the foreign demand for sodas and sodium compounds as a group, 203,819,410 pounds, valued at $5,278,279., being shipped abroad from January to the end of June, 1923, as compared with 184,419,888 pounds, valued at $5,858,666., in the first six months of 1922, and 348,827,893 pounds, worth $10,222,634., in the entire year 1922. Advances were made in all the individual items under this group except in exports of caustic soda, which dropped one-third, from 89,607,806 pounds, valued at $3,302,943., in the first six months of 1922, to 58,703,050 pounds, worth $2,093,273., in the corresponding period of 1923. Exports of sodium cyanide rose from 1,642,113 pounds, with a value of $121,586., in the first half of 1922, to 2,685,678 pounds, worth $277,858., in the corresponding period of 1923; soda ash, from 14,121,207 pounds ($320,271.) to 14,350,720 pounds ($340,959.); sodium silicate, from 12,966,206 pounds ($136,494.) to 15,266,533 pounds ($143,195.); soda crystals, from 5,288,204 pounds ($87,327.) to 6,010,714 pounds ($87,589.); and sodium bicarbonate from 7,810,526 pounds ($173,772.) to 8,803,387 pounds ($203,378.).

INDUSTRIAL SILICA.*

CHARACTERISTICS SUITABLE FOR DIFFERENT USES.

SILICA, as used in the industries, is required in many different forms and grades, and each industry demands that the material comply with definite specifications. The classification to be adopted in the following article of the uses under the headings lump silica, silica sand, etc., is only a matter of convenience, for it will readily be seen that no definite line of demarcation can be drawn in commercial practice, since one industry may possibly use material from any one of these classes.

Lump silica, obtained from deposits of quartz, quartzite, or sandstone, has a number of uses. Some industries use the material just as it comes from the quarry, while others require a preliminary coarse crushing and screening to obtain material of a certain size. When employed in this form its commercial value is very small, and it is only when there is a large demand that it pays to operate a quarry for lump silica alone.

Use in the Manufacture of Ferro-Silicon.

Ferro-silicon is the most extensively used of the ferro-alloys produced in the electric furnace. It is made in two ways: (1) by the reduction of silica and iron ore with carbon; (2) by the reduction of silica with carbon, the iron content being obtained by the addition of iron turnings. The silica required for the manufacture of this alloy is obtained either from a pure grade of quartzite, or by using a highly siliceous, but otherwise pure iron ore. Chemical analysis gives a good indication of the suitability of a silica for this use. Material of the composition indicated below would be suitable:—

	Per cent.
Silica	97·00 to 98·25
Iron oxide and alumina	1·00 to 1·75
Calcium oxide	not to exceed 0·20
Magnesia	„ „ 0·20
Phosphorus and arsenic	Nil.

The iron oxide content does not greatly matter, except that it should be uniform. The objectionable impurities are calcium, phosphorus, and arsenic, as these are reduced in the electric furnace to calcium phosphide, and to calcium arsenide in the presence of carbon. These impurities remain in the ferro-silicon, and on coming in contact with water or moist air, give off phosphoretted hydrogen, or arseniuretted hydrogen, both gases being very poisonous. Apart from the danger from these gases, the ferro-silicon in which they occur shows a decided tendency to spontaneous disintegration, and on being stored for a few weeks crumbles and falls to powder, thus rendering the material useless.

The present requirements of the ferro-silicon industry, in the matter of silica, are, (1) a quartzite having approximately the above chemical composition, and (2) a compact and dense variety, broken to a size from 1 inch to 6 inches, according to practice.

Lump Silica as a Flux.

Silica is used as a flux in metallurgical operations, principally in the metallurgy of copper, where the original ore is basic. Whenever possible, the smelting companies endeavour to obtain a supply of ore which has a siliceous (free silica) gangue, to mix with the basic ore being smelted, otherwise it is necessary to use barren quartz, quartzite, or sandstone.

In true pyrite smelting, silica is used as a flux to remove the iron oxide formed, and produce a siliceous slag. The silica used for this purpose should not be in the form of a silicate, but should be free silica, such as quartz, quartzite, or sandstone, so that a strong acid is at once available to combine readily with the FeO as it forms. For this purpose the silica should be in lumps not less than one-half inch in diameter.

Silica is also used as a flux in the manufacture of phosphorus. For this purpose quartz is crushed to pass a 1¼-inch screen with as little fines as possible. A silica content of 99 per cent., or more, is required. Blocks of massive quartz and quartzite are used in the chemical industry as a filler for acid towers, and in some cases as linings for digesters in the pulp and paper industry. Flint or quartzite pebbles, well rounded, are used in ball or tube mills for fine grinding, the linings for the mills being composed of dressed blocks of quartzite, or else pebbles which are wedged in between steel ribs run longitudinally on the inside of the mill.

* Abstracted and rearranged from "Silica in Canada," a monograph compiled by L. Heber Cole for the Canadian Department of Mines.

Silica, in the form of sand, is an essential raw material in many industries. Its more important uses, and the requirements of each industry are briefly given.

The Raw Material for Silica Bricks.

Silica brick is now used extensively as a refractory material in the metallurgical industries. By far the largest part of the silica brick is manufactured from quartzites, since loose grained rocks—such as sandstones—are of little value for this purpose. One of the most striking differences between silica and clay firebricks is that the former expand when heated, while the latter contract. Hence, silica firebricks are chiefly used where great heat resistance combined with an absence of shrinkage is essential. On account of these properties they are used for the arches, crowns, and higher parts of furnaces and kilns, for the upper parts of glass furnaces, and all parts above the floor level in by-product coke ovens. The materials used in the manufacture of silica brick are quartzite, crushed to pass through an 8-mesh screen, and a bonding material to mix with it so that it can be moulded into shape. Some silica rocks, known as gannisters, contain sufficient bond, in the form of highly refractory clay, to render any addition unnecessary. The bond generally used is lime, about two per cent. being added to the crushed quartzite in the form of milk of lime. The quartzite and lime are milled thoroughly in wet pans, until a slightly cohesive mass is produced. The wet mass is moulded by hand, then partially dried, and afterwards re-pressed by machinery. When thoroughly dried, the pressed bricks are set in kilns which are fired to a finishing temperature of 1,500 degrees Centigrade.

The chemical requirements of a siliceous material suitable for a refractory brick vary; but the silica content should be as high as possible. A reliable chemical analysis is of very great importance therefore, since the refractoriness of the finished brick will depend on the silica content, and on the presence of such impurities as lime, alkalies, and iron, which tend to act as fluxes, and lower the melting point of the bricks.

The physical properties of the silica are of as much importance as the chemical composition. It has been found in testing a number of silica samples in the laboratories of the Mines Branch, that quartzites are preferable to sandstones or vein quartz, and that loose sand or gravel is altogether unsuitable, even though the chemical analysis is satisfactory. A quartzite, suitable for this industry, when ground, should have grains that are splintery, sharp, heterogeneous as to form and size, and slightly translucent. It should analyse approximately 97.5 per cent. SiO_2, 1 to 1½ per cent. Al_2O_3, and 0.75 per cent. other impurities; and when moulded into brick and fired, should expand and swell without perceptible cracking. The total fluxing materials in a silica brick should not exceed 3 per cent. In a gannister brick the clay content may run as high as 10 per cent.

Silica for the Glass Industry.

The silica used in the glass industry is generally in the form of sand. The greater part of the material used is obtained from natural sand deposits, or by crushing a friable or loosely bonded sandstone. It rarely pays to crush vein quartz or quartzite for glass manufacture, since the hardness of such materials greatly increases the cost of crushing, and there is also the danger of contaminating the sand with iron particles from the crushers. From long experience, the glass manufacturers have recognised certain properties which a sand should have to permit of its being classed as suitable for the manufacture of glass.

Impurities to be Avoided.

The sand should run as high in silica as possible. Objectionable impurities are metallic iron and compounds of iron, alumina, magnesia, lime, and alkalies. Iron oxide is the worst of the impurities found in glass sand, on account of its strong colouring power. The smallest percentage present in the sand tends to impart to the glass a green, yellow, or red colour, the intensity of which depends on the amount of iron oxide present. The following percentages seem to be the average limits allowable in common practice:

For optical glass, best grades:—

	Per cent. Fe_2O_3
Flint glass and soda lime glass	0·02 to 0·05
Plate glass	0·10 to 0·20
Bottles and window glass	0·20 to 0·35
Dark bottles	0·50 to 0·65 and higher.

When the iron oxide content is not above 0.20 per cent. the green colour can be neutralised by some decolouriser, such as manganese, selenium, cobalt, or nickel. Above 0.20

per cent. of iron oxide, the green colour is too intense to be entirely destroyed.

The presence of alumina in a sand, while it may be desirable for some purposes, tends, unfortunately, to decrease the transparency of the glass, and also makes the batch harder to melt. For the best grades of flint glass, therefore, the alumina should not be more than 0.10 per cent., while for plate glass or window glass it should not exceed 0.60 per cent., except in special cases. The form in which the alumina is present in the sand is of great importance, since if it is present as clay—a silicate of alumina with probably iron and magnesia—it is not readily soluble, while if it is in the form of feldspar it is soluble and not so harmful.

Sands containing lime are to be avoided, for, although lime is an important ingredient in many commercial glasses, the calcareous material in the sand is generally sporadic in its distribution, and unless daily analyses of the sand employed are made the lime content in the batch cannot be depended upon. It is preferable therefore to use a lime-free sand, and add raw limestone to the batch as required. Magnesia is generally present in glass sands in such small quantities that little trouble is caused by its presence. An excessive amount of magnesia (1 per cent. or higher) tends to raise the fusion point of the batch, and this is objectionable on account of the extra fuel required. The following analyses are of typical glass sands:—

—	1	2	3	4	5
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Silica	99·12	99·20	99·58	99·25	99·80
Iron oxide	0·07	0·17	0·02	0·04	0·006
Alumina	0·43	0·53	0·12	0·59	0·13
Lime	0·34	trace	0·13	0·11	trace
Magnesia	0·11	,,	trace	0·02	—
Alkalies	—	0·10	—	—	—
Loss on ignition	0·22	—	0·17	0·25	0·18

1. Belgian sand (Dominion Glass Co., Montreal).
2. St. Paul, Minn., U.S.A. (Bulletin on British Sand Resources, by Boswell).
3. Wedron Silica Co., Ottawa, Ill. (Bulletin on British Sand Resources, by Boswell).
4. Lynn Sand, England. (Sands Suitable for Glass Making, by Boswell).
5. Fontainebleau sand, France. (Sands suitable for Glass Making, by Boswell).

A general specification for the texture of a glass sand might be that all material should pass a 14-mesh screen, and 90 per cent. be retained on the 100-mesh, with 65 per cent. between the 20-mesh and the 65-mesh.

For use in carborundum manufacture the silica must be a sand of fairly uniform texture, and graded between the 20 and 100 mesh screens. The sand should test 99.5 per cent. SiO_2, and must not be lower than 99.25 per cent. While it is stated that alumina in small quantities is not injurious, lime, phosphorus, and magnesia should be entirely absent.

Steel Foundry Sand and Furnace Linings.

Silica finds one of its largest markets in steel foundries. In this industry it is used in the form of sand for making moulds for steel castings. Some sands are found in nature suitable for this purpose, but the greater number of castings are made in moulds consisting largely of a high silica sand, to which some artificial bonding material has been added. This bonding material consists of highly plastic fireclay, flour, molasses or other suitable material. A sand suitable for use in steel casting must have three essential properties—namely, good bonding power, high permeability, and great refractoriness. A tentative specification for a steel foundry sand for average castings might call for one in which the silica content was 97 per cent. or more, consisting of well-rounded grains, graded between the 20 and the 100 mesh, having an average fineness of from 35 to 48.

Silica is employed for lining certain types of metallurgical furnaces, notably Bessemer converters, matte smelting reverberatory furnaces, and electric furnaces for the melting of scrap iron.

In Bessemer converters the lining is usually composed of a highly refractory siliceous material, such as a crushed quartzite or silica sand. Silica, containing small proportions of a plastic refractory clay, either present naturally in the rock or added to the crushed material in the form of a plastic fireclay, is best suited for this purpose. The bottoms are made by ramming in this crushed silica, slightly dampened, together with a small amount of coke breeze. For making the hearth of matte smelting reverberatory furnaces silica sand is employed. Material required for this purpose should exceed 95 per cent. SiO_2, and should be of even grade. The size of grain in general use should be from 0.1 to 0,35 mm.

Sand for Fused-Silica Ware.

The production of apparatus made of pure silica, for use in chemical laboratories and manufacturing industries, has been made commercially possible by the adaptation of the electric furnace. Silica for use in this industry is required in the form of sand having similar texture and composition to the sand used in glass manufacture.

Other minor uses of silica sand are numerous. Quartz, crushed and graded to various sizes, is used to a small extent in making sandpaper and sand belts. For this purpose, quartz or massive quartzite is preferable to sandstone, since the grains resulting from the crushing of the sandstone have less angularity and do not cut as well as the sharper quartz fragments. Silica sand is also used in stone and plate glass grinding, as an abrasive with stone cutting saws, for frosting glass with the sand blast apparatus, and for many other industrial purposes.

Powdered Silica in the Pottery Industry.

Powdered silica is used in a number of industries. Silica in this form may be prepared from flint, quartz, quartzite, or sandstone. The more important industries using silica in the powdered form are briefly described.

The mining and preparation of siliceous rocks for use in potteries is one of the principal branches of the silica industry. The various kinds of pottery in which silica is used are table ware, sanitary ware, electrical porcelain, chemical porcelain, and white floor and wall tiles. About 35 per cent. of finely-ground quartz is used in the composition of the bodies from which these wares are made, the remainder of the body being clay and feldspar.

For this industry, it is necessary to have a silica that will burn to a dead white heat. Hence a high grade material, free from iron, if possible, is desirable. The iron content should not exceed 0.32 per cent. The material should all pass through the 120 mesh, and 90 per cent., preferably, through the 150 mesh. In the metal enamelling industry, silica is used as a partial substitute for feldspar in some of the cheaper grades of enamel. For this use it has been found, from practical observation, that the silica employed is better when not too finely divided. The material used should contain over 97 per cent. SiO_2, and less than 0.35 per cent. iron oxide.

Silica in the Manufacture of Paint.

The introduction of silica into paint manufacture dates back many years, and the modern floated silica is now classed as a standard pigment. Pure silica, in the form of an impalpable powder, is one of the most stable pigments known, being highly refractory, and practically insoluble in water and in all acids except hydrofluoric. It is, however, never used as a base paint, but may be added to some pigments—with the exception of siliceous ochres—up to 25 per cent., also to others, such as lamp black, the better grades of iron oxide pigments, and pure chrome green, up to as high as 50 per cent., without detracting materially from their value as a body paint.

Paints containing silica are the best for use on green lumber or material containing moisture, as the silica is said to allow the moisture to pass through the pores of the paint film, and at the same time is impervous to external dampness. It is also said to increase the durability of a paint.

For paint purposes, silica with a tooth is preferred, and, as a rule, clear, glassy quartz will yield a sharper grain than opaque massive varieties, no matter how fine the silica may be ground. The material should be well over 95 per cent. SiO_2, and free from iron or other colouring impurities. The essential quality for its employment in the paint industry is its colour, which should be perfectly white. The finer the material is ground the better suited it is for paint manufacture, and as employed, it is generally in the form of water, or air floated silica, or else bolted.

For the manufacture of sodium silicate the silica is preferred in the form of a pure diatomaceous earth, or as a finely powdered flint, quartz, etc., and should be as pure as possible.

Numerous uses of silica in the powdered form are found in many industrial processes. It is used extensively as a filler and scouring substance in hand soaps, for dusting moulds in foundries, in roofing papers to keep the rolled sheets of tar paper from sticking, in dental work as a detergent, in numerous chemical operations, and as a filler in paper and rubber goods. It also enters into the composition of match heads, and is used as an abrasive for polishing pearl and bone buttons, and for the making of metal polishes.

THE MONTH IN ENGINEERING.

[Specially Contributed.]

A New Multiple Retort Stoker.—In the domain of the mechanical firing of steam boilers, especially in the case of the larger types of water-tube boiler, the struggle for supremacy to-day is between the improved travelling grate compartmented air-supply type of stokers and the multiple retort type. There is considerable difference of opinion as to the advantages and disadvantages of these respective designs, and it is very difficult to give a general opinion, as so much depends on the individual conditions. In brief, however, the chief advantage of the multiple retort stoker is that no firebrick arches are required, thus allowing the radiant heat to pass directly into the boiler tubes, whilst eliminating at the same time the cost of upkeep and repair of these arches. In addition, the combustion is very slow and gradual, with thick white hot fires. The disadvantages are the high air pressure required—often as much as 4-5 inches water gauge—to force the air through the fire, this type of stoker being worked entirely with mechanical forced draught. Also, in the case of coals with a low melting point ash, fusion takes place easily, and this forms a very serious obstacle to the passage of the air, reducing both the efficiency and the output.

The improved travelling grate stoker has the advantages that the coal rests quiet on the bars for the whole length of the travel, and that the fires are much thinner, whilst the air supply is under perfect control at every stage, the chief disadvantage being perhaps the use of firebrick arches. Broadly speaking, the travelling grate stoker is better for inferior coals, and particularly those that have a tendency to form clinker and are highly coking, whilst the multiple-retort stoker is more adapted for good-quality coal with mild coking or non-coking properties. The Underfeed Stoker Company, Ltd., who are well known for a great variety of mechanical stokers, particularly of the travelling grate type, have placed on the market recently a much improved multiple retort stoker, known as the "Underfeed Type F" stoker. This is on the latest principles, with a series of stationary retorts side by side, and having at the bottom very slowly reciprocating rams, which cause the deep mass of coal to travel downwards through the retort as it is being burned. The forced-draught air supply is through tuyère grate blocks in the sides of the retort as usual, whilst a special feature is that the brickwork nearest the top of the retort, and also that of the ash discharge at the bottom, are hollow and air-cooled, so as to reduce wear and tear. Both the supply of coal from the hopper by means of the slow-moving rams and the air supply are as usual under easy control. Another characteristic is the efficient nature of the ash dumping grates at the end, which allow a deep layer of ash and clinker to accumulate at the bottom so as finally to complete the combustion whilst at the same time to prevent any excess air passing at this point. The installation can also be provided with an electrically driven reciprocating ash and clinker crusher which delivers continuously and automatically the crushed clinker taken from the thick mass on the dumping grates. Altogether this apparatus is a decided addition to the range of multiple retort types of stoker on the British market.

The Economical Working of Refrigerator Plant.—Increasing attention is being given in every direction to the possibilities of economical working in industry, and one section of this work which is attracting considerable notice in the United States is in connection with the improved running of refrigerator plants, which seems to be an unusually fruitful field for money saving. It is pointed out in the first place, that most refrigerator plants are being worked at a much lower pressure in the coils than is really necessary. The correct practice in most cases is about 20lb. gauge in the coils, at which pressure the liquid ammonia boils at 6° F., corresponding to a temperature being maintained in the cold storage room of 19-20° F. (It is usual to allow approximately 12° F. difference between the temperature of the cold storage rooms and that at which the ammonia evaporates in the coils, assuming that the latter are a reasonable distance from the rooms. In most cases, however, at the standard cold storage temperature of 20° F. the ammonia coil pressure has to be much below 20lb., which means loss in various directions. This may be due to many reasons, one of which is that the cold storage rooms are too big for the plant. Another trouble, however, is carelessness in opening the doors, so that a considerable amount of warm air gets into the rooms and causes an excessive deposit of ice on the coils, so reducing the efficiency. The moisture content has also to be carefully watched. Another difficulty is that the coils such as used, for instance, in the compressors, are allowed to become dirty with oil. This lowers the efficiency because of the high resistance of the oil film to the transmission of heat. Then, again, the liquid ammonia is often not "purged" sufficiently from the air contained in it, and a further source of trouble is due either to lack of sufficient cooling water for the whole installation, or the fact that the condensers are kept in a very dirty condition, with scale deposit inside and dirt and vegetable growths on the outside.

Measuring the Velocity of Water by Means of Salt.—An interesting method which is being more and more adopted for measuring bulk supplies of water is that of the use of salt solution. The solution is injected in a known quantity into the flow of the water, and the alteration in the electrical properties of the water at two or more known points is noted. The time between the entry at one end and the arrival of the salt at various points, gives the rate of flow of the water in cubic feet per second or any other convenient unit. The salt solution is injected into the water flow by means of compressed air through a special discharge pipe system designed to give uniform distribution of the solution in the water, and the time of travel of the salt is determined as a rule by means of a special stop-watch or recording seconds watch, combined with the use of some convenient recording electrical instrument, such as an ammeter or voltmeter. The presence of the salt gives, of course, an immediate alteration in the electrical conductivity, and forms a very accurate test. The very elaborate experiments carried out in America in comparison with "V"-notch, "Weir," and "Venturi" meters have proved that this method is extremely accurate, not only for large but even for small volumes of water. It may perhaps not be generally known that this same principle has been used for a number of years in testing the accuracy of steam meters. In this method carbon dioxide gas is used, a known amount of which is injected into the steam pipe from a weighed bomb of the liquefied gas, the reduction in the weight of the bomb showing the amount of CO_2 that has been added. The CO_2 in the steam is then determined chemically lower down the pipe circuit, and it is possible in this way to obtain a most accurate record of the amount of steam passing, irrespective of the ordinary difficulties with steam meters, such as fluctuations in the pressure, temperature, and superheat.

The Trade Position.—The situation is depressing in the extreme, an ominous sign being the growth in unemployment in almost every centre. Buyers continue to purchase from hand to mouth, and stocks continue to accumulate, and at the present rate many blast-furnace and steelworks plant will not be able to hold out much longer. In July, for example, the number of furnaces closed down was 16, and others followed suit this month, whilst a significant event is the total stoppage of work at Hodbarrow Iron Ore Mines at Millom. It may be noted also that the July steel production (624,300 tons) was the lowest for this year. The political situation and the position on the Ruhr has become more uncertain than ever, and much speculation exists as to what will happen when the coke stocks are exhausted. At present the Germans have clased down the coke ovens, and the French are at the moment taking the stocks. How long these will last is a matter of opinion. Another disquieting aspect of the continued depression, not realised by the general public, is that we are continuously losing by emigration to the United States great numbers of highly-skilled mechanics and tradesmen of every description, who find work without much difficulty in spite of the bad trade in America.

The position in shipbuilding, one of the chief customers for steel in normal times, is particularly deplorable, and firms cannot carry on indefinitely working with no profit at all, or even a dead loss, merely to keep the yards partially employed. The recent report as to the affairs of the well-known Belfast firm of shipbuilders, Messrs. Workman, Clark and Co., has intensified the gloom. So far as it helps to relieve the position, the reduction in railway rates is practically useless, as it still leaves the average rate about 50 per cent. above pre-war as compared with 60 per cent. The coal trade continues much as usual, and, in general, matters are satisfactory in view of the holiday season and the fact that the boom due to the Ruhr is coming to an end.

DEATH OF DR. E. K. MUSPRATT.

A PIONEER OF SCIENTIFIC EDUCATION.

IT is with deep regret that we record the death on Saturday last of Dr. Edmund Knowles Muspratt, father of Sir Max Muspratt, the present chairman of the United Alkali Company, and son of Mr. James Muspratt, the founder of the British alkali industry. Born in 1833, the late Dr. Muspratt was for over half a century one of the leading figures not only in our heavy chemical industry but in the public life of Liverpool and West Lancashire. Notwithstanding his great age and his affliction of almost complete blindness during the last few years, his active interest in the affairs of the company of which he was Honorary President, and in all local and municipal matters was maintained to the last.

With his death the list of those of the original directors of the United Alkali Company still living is still further depleted. The late Dr. Muspratt was a personal link with the old Leblanc days of the alkali industry, and probably no one appreciated more than he the great nature of the achievement represented by the centenary celebrations recently held by the United Alkali Company. In 1850 Dr. Muspratt went to Giessen to study chemistry under Justus von Liebig, and later he worked with the same teacher at Munich. On his return home as manager of his father's works at Liverpool and Widnes he studied metallurgy at Owen's College, Manchester, but finding his knowledge prove so valuable in business, Dr. Muspratt gave up all idea of following chemistry as a profession.

He realised very strongly, however, the value of a scientific education and the urgent necessity of combining scientific research with its industrial application. He believed that education was the secret of individual and natural development. To the enthusiasm and financial aid of Muspratt a great deal of the credit for the foundation of University College, Liverpool, must be given, and to him alone must be accorded the credit for the foundation of the Physical Chemistry Laboratory at Liverpool University. Dr. Muspratt was one of the two first pro-Chancellors of the University, and was elected first president of the Council. In 1907 the University conferred upon him the honorary degree of LL.D.

Dr. Muspratt was a man of wide tastes and accomplishments. As a politician he was a thorough Liberal and Free Trader, keenly anxious to secure reform and economy in public finance. He possessed a cultured appreciation of literature, art and drama, had travelled widely in Europe and America, and in 1916 published an interesting autobiography entitled "My Life and Work."

Besides his position as Honorary President of the United Alkali Company, Dr. Muspratt remained until the last chairman of the *Liverpool Daily Post* and *Echo* Company and of British Insulated and Helsby Cables, Ltd. His death removes a great personality from the British chemical industry and from British public life, and the utmost sympathy in their bereavement will be extended to Sir Max and the other members of the Muspratt family.

A PERSONAL APPRECIATION.

(The following appreciative article on the late Dr. Muspratt's career has been specially written for the *Chemical Trade Journal and Chemical Engineer* by Dr. J. T. Conroy, chief chemist to the United Alkali Company. Dr. Conroy's long association with Dr. Muspratt renders him eminently qualified to perform such a task.)

The death of Dr. E. K. Muspratt is a source of genuine sorrow to all associated with chemical industry and with the furtherance of chemical and scientific education. To those engaged in chemical industry at home, and to consumers of chemical products throughout the world, his name carries a world of meaning, for he was a son of the James Muspratt who founded the alkali industry in this country. Dr. Edmund Knowles Muspratt was a man of many interests, and each interest had its origin in something real.

His second name, Knowles, was derived from that of his godfather, Sheridan Knowles, the dramatist, who was one of a happy party of those associated with the literary and dramatic arts, and frequently visited the parental home during Dr. Muspratt's early years. These early associations left an impression which remained throughout his life. The names of all the best of their period float across the pages of his early life, and the exceptional opportunities fortunately touched the scientific as well as the artistic side.

Dr. Muspratt's Years in Germany.

His early and adventurous career had created a wide sympathy in James Muspratt, and when the British Association met in Liverpool in 1837 a very firm friendship was established with Justus von Liebig—a friendship which was to mean much in the later years. For in these later years Dr. Muspratt, after an education in this country which comprised the then rare experience of theoretical and practical chemistry, proceeded to Giessen and studied chemistry under a man sufficiently remarkable in history, at the same time acquiring the best available teaching in the two sister sciences, physics and mathematics. Before his student days were over he turned for a period to medicine, but later resumed his study of purely chemical problems. The choice of his life's work occasioned considerable thought and anxiety. Fortunately, conditions at home largely coincided with his own inclinations, and opportunity was afforded of applying his special knowledge to industrial requirements in the Muspratt works at Widnes and Liverpool. This work was seriously undertaken, and there are many alive to-day who owe their positions either in the scientific or commercial branch to the supervision and control—not always easy—of Dr. Muspratt.

His training in Germany and the friendships it engendered introduced to this country German chemists of wide reputation, and, although these were not uniformly successful, their work and ideas proved a stimulus to others who had received the best education available at home.

His Work for Chemical Manufacture in General.

With a scientific education unusual for the period, an intense love of the arts, Dr. Muspratt was not able to contain himself within the limits which would satisfy the majority of men. He played more than an ordinary part in Parliamentary and civic affairs, and due recognition must be accorded to his valuable work with regard to chemical manufacture in general and such aspects as were best dealt with through an important Chamber of Commerce. In the record of his life we find references to problems of his period—such as escape of noxious fumes, river pollution, smoke prevention and patent laws. To all of these Dr. Muspratt made valuable contributions, and a comparison of the old difficulties and the remedies proposed and effected would prove of help in present discussions. His work towards the founding of the Society of Chemical Industry, of which he was one of the earlier presidents, is well known and need only be referred to here.

His Practical Encouragement of Scientific Education.

The writer of this memoir and many associated with him are the products of a later generation—a generation whose modern scientific training has been rendered possible by the donations of Dr. Muspratt and others to the promotion of local University education. His munificence to chemistry played no small share in insuring to this country a sufficient knowledge materially to assist in combatting an enemy to whom, scientifically, we owe much. It may be said here that the change in the character of the German people as evidenced by its official representatives was one of the surprises and the sorrows of Dr. Muspratt's later years.

His help to science can be gathered from addresses by the Professors of the Liverpool University, from Professor Dale its Principal, and from Professor Donnan, successor to Sir William Ramsay, who first occupied the Muspratt Chair of Physical Chemistry.

The Muspratt works in Liverpool, Widnes, and Flint were all-important in their day, and after their absorption in the United Alkali Company Limited Dr. Muspratt, as Chairman of the General Management Committee and later a Honorary President of the Company, was able to emphasise the lines of progress in no uncertain voice.

His tradition is ably maintained in the present and third generation, and in Sir Max Muspratt, Bart., the Chairman of the United Alkali Company Limited, and Mr. Horace Muspratt, one of the Directors, our industry possesses men of wide experience and sympathies who may be trusted to continue in the future the wise example set in the past by a giant of his day.

THE OLYMPIA ENGINEERING EXHIBITION.

CHEMICAL ENGINEERING EXHIBITS.

THERE are a good number of exhibits of chemical engineering and allied interest at the Shipping, Engineering, and Machinery Exhibition which opened at Olympia, London, on August 31, and will continue for three weeks.

Welding and Cutting Plant.

Mention may first be made of the wide range of exhibits concerning the welding and cutting of metals. The sizes of welding plants shown range from small portable sets to large plants for permanent installations. Among the improvements in acetylene welding apparatus is one embodying the automatic generation of acetylene only as it is required and in exact proportion to the consumption. In connection with these exhibits may be mentioned the Thorn and Hoddle Acetylene Co., Ltd. (London); Carbic, Ltd. (London); Allen-Liversidge, Ltd. (London); and the British Oxygen Co., Ltd. (London). The latter company now has factories in all important industrial centres of Great Britain capable of producing 4,000,000 cubic feet of oxygen per day. Recently, large engineering works have been equipped at Edmonton, on the outskirts of London, where plants for the production of oxygen, nitrogen, hydrogen, carbonic acid, argon, and others gases are manufactured. The company's extensive business in oxygen metal cutters, blow pipes, regulators, and high-pressure gas apparatus has also been transferred to the Edmonton works, but the research works are at Wembley. The development that has taken place in electric welding is testified to by the large number of exhibits (9). The Alloy Welding Processes, Ltd. (London), show a specially-designed engine-driven arc-welding plant in operation, in which the open circuit voltage of 70 drops to the pressure required across the welding arc immediately the operation commences, the available output of the machine being variable by hand from 50 to 200 amperes. Multiple welding plant is shown by the Premier Electric Welding Co., Ltd. (Proprietors: Nobel Industries, Ltd.), and a number of items on this stand are exhibited for the first time. Coated electrodes are shown by the Auto Welding and Engineering Co., Ltd. (London), and the Kjellberg system of electric arc welding is shown by the Anglo-Swedish Electric Welding Co. Other firms showing electric welding plants and apparatus are the Scholey Construction Co. (London), and Buckley, Saunders and Co., Ltd. (London). The latter specialise in electrically welding non-ferrous as well as ferrous metals, the former an admittedly more difficult problem. Several interesting specimens of electric welding work are also shown by the British Arc Welding Co., Ltd. (London), and the Quasi Arc Co., Ltd. (London). There is also the Wilson (G. D. Peters and Co., Ltd.) (London) plastic arc system of electric welding, which embodies the principle of an automatically controlled and regulated current ensuring constant voltage and a uniform heat at the weld.

Refrigerating Machinery.

Refrigerating and ice-making machinery necessarily form an important part in an exhibition mainly devoted to shipping, and thus we find CO_2 machines and ammonia compressors on several stands. Among the firms exhibiting this type of apparatus may be mentioned L. Sterne and Co., Ltd. (Glasgow); the J. D. Insulating and Refrigerating Co., Ltd. (Liverpool), who show a complete cold store insulated on the J. D. patent unit system of insulation; John Kirkaldy, Ltd. (London) and Ernest West and Benyon, Ltd. (London).

Messrs. Thomas and Bishop (London) show examples of Permac jointing material in test tubes containing sulphuric acid, naphtha, benzol, ammonia, hydrochloric acid and caustic soda to prove that no disintegration takes place when Permac is used as a jointing material on plant where any of these acids or chemicals are used.

Boiler Apparatus and Measuring Instruments.

Boiler apparatus and measuring instruments are quite numerous. The Lea Recorder Co., Ltd. (Manchester) have many of their well known instruments including boiler feed measuring apparatus, having a capacity of 30,000 gallons per hour, arranged in a self-contained manner with combined V-notch measuring tank and hot well. The Cambridge and Paul Instrument Co., Ltd. (London) have a range of their universally-known instruments for boiler-house purposes, including electrical CO_2 recorders and indicators, draught and pressure gauges and apparatus for the measurement and control of temperature. George Kent, Ltd. (London) show in operation an interesting piece of apparatus in the form of two Venturi meter tubes and two recording instruments, one of them being the 1922 type specially designed to measure condensate and feed water of a pulsating nature in a closed circuit. Another interesting apparatus on this stand is an audible water level recorder. Indicating and recording instruments for works and boiler-house control are exhibited by Messrs. Walker, Crossweller and Co. (London). Of particular interest are their gas analysis recorders.

Water-softening and Purification Exhibits.

Interest attaches also to the water-softening and purification exhibits. W. Boby and Son (London) have introduced recently a type of water softener termed the "Azed." This is an artificial-zeolite machine which is claimed to achieve an appreciable economy in salt as compared with the older forms of zeolite machines. There are also examples of this firm's lime and soda plants, one form embodying devices for varying the proportions of reagents whilst the machine is in operation, whilst in a second type the reagents are distributed to the water in the form of powder, and the plant is thus specially suited for smaller requirements and intermittent working. A representative exhibit of Lassen-Hjort and Permutit water-softening and purifying plant is to be seen on the stand of United Water Softeners, Ltd. (London). The former plant, shown in operation on London water supply, softens the water from an initial hardness of 22 degrees Clark to 2 degrees, with a residual alkalinity of under 1½ grains per gallon, expressed as carbonate of lime. This plant embodies a recently designed measuring and mixing apparatus, fitted with patent locking gear and positive chemical discharge valve, ensuring the delivery of any required dose of chemicals to a measured quantity of water. The whole process, from the mixing of the chemicals to the delivery of softened and filtered water is open to inspection at the Exhibition. The Permutit system of water softening is well known, and the Wallace-Tiernan automatic chlorinator for adding chlorine gas in minutely measured and absolutely controlled amount to water supplies or sewage effluents is shown in two types.

Improvements in the Hele-Shaw Stream Line Filter.

There is a whole series of filters and separators on view, probably the most interesting, by reason of its ingenuity and novelty being the Hele-Shaw stream line filter. This apparatus has already been described briefly in the *Chemical Trade Journal and Chemical Engineer* on the occasion of the lecture by Dr. Hele-Shaw before the Society of Chemical Industry last session. The filter is now being marketed in its more commercial forms. There are some laboratory types of the filter on view, others of a small commercial type representing a capacity of 200 gallons an hour and one larger filter capable of dealing with 50 tons of water an hour. Since the filter was described before the Society of Chemical Industry an entirely new device by which the difficult problem of automatically clearing out the solid residues deposited in the filter without opening the filter has been solved. In each of the larger tunnels formed by the holes in the compressed paper sheets is a free floating piston, which normally lies in a pocket in the end covers. When it becomes advisable, owing to a falling off in the flow, to remove the residuum from the filter, the liquid prefilt under pressure is admitted behind the piston, which then traverses the length of the pack of compressed papers and drives the solid matter choking the holes, before it. This simple method provides a practically continuously acting filter; for the cleaning cycle takes only a few seconds.

Centrifugal Separators and Extractors.

British Separators Ltd., show separators manufactured by Messrs. Vickers, Ltd., designed for three main purposes—viz., the continuous separation of two liquids of different specific gravities; the continuous separation of two liquids of different specific gravities together with the simultaneous removal of fine solids; and the removal of fine solids from a single liquid. There are obviously many applications for this type of apparatus in chemical works generally. These machines are British and have been designed specially to compete with the imported article. The process is centrifugal. The actual separating effect however, depends not only on the accentuation of gravity by the speed of rotation, but also on the internal arrangements of the bowl. It is in this latter respect that special features are claimed for their separators,

it being possible to arrange the bowl as a purifier and as a super-clarifier. These machines go by the name of the Vickeen, and many applications of them can readily be imagined.

There is also the new Auto-Klean system of straining for fuel oils, lubricating oils, water, etc., in which all the disadvantages of gauze and perforated metal are eliminated. This is exhibited by Auto-Klean Strainers, Ltd. (London) and is claimed to be an entirely new departure in straining appliances.

Messrs. R. C. Knight and Dunford Smith (London) have on view the Condrup patent oil separator. This is an apparatus which has been designed to meet the requirements of the Oil in Navigable Waters Act and so operates that the oil in bilge water, for instance, is pumped through the separator by existing pumps, the oil being recovered and the water led overboard. In the same category comes the comprehensive exhibit of Industrial Waste Eliminators, Ltd. (London), which includes the "Iwel" steam turbine centrifugal separators and extractors for the recovery of oil, grease, fat, wax, etc., from innumerable classes of material. In this case, of course, the material dealt with is of a solid character, and to that extent the apparatus is different from those previously mentioned.

Miscellaneous Exhibits.

There are a few exhibits of various types of paints, varnishes, and anti-corrosive compounds, among which may be mentioned the following:—Cuirass Products, Ltd. (London), exhibitors of anti-corrosive paints; the Midland Fan Co., Ltd. (Birmingham), plants for spraying paints; Dodgson, White, Ltd. (London), "Service" black paint for use in the tropics and at home, and claimed to be acid proof, alkali proof, and a complete insulator; Arthur Hotchkiss and Co., Ltd. (London), "steel" paint and compositions. Nobel Industries, Ltd., have a comprehensive display of numerous products made at their different factories, including explosives such as are used for mining, blasting work, and civil engineering. The special display of Necol Plastic Wood, which has already made many friends amongst engineers, patternmakers, and others who require a quick and reliable method of filling holes and making fillets on woodwork, is a feature of the Nobel Stand, while the new Collodion Glossy Enamels for spraying metal and woodwork are an interesting development and likely to go a long way.

The Chemical Engineering Co., Ltd. (Manchester), are exhibiting the "Kek" automatic crusher and worm feeder, magnetic separators, and the "Kek" patent centrifugal grinding and blending mill. The Porter water softener is also shown by this firm, a mixture of milk of lime and soda ash being used as the reagent.

An interesting electro-metallurgical process is that shown by Metallisation, Ltd., which consists in the melting and atomising of the coating metal or alloy, which is in wire form, and impinging it as a fine spray on the surface to be coated. The spraying is done by a "pistol," which weighs less than 3¼lb., and is connected to suitable gas and air supplies. The metal is automatically drawn from a reel into the pistol case, and fed uniformly and continuously, according to its melting rate, into the nozzle, where, entering a continuous reducing flame zone, it is melted and blown at a very high velocity in the form of a fine spray or mist, on to the work to be coated.

LEGAL INTELLIGENCE.

A CASEIN COMPANY'S FAILURE.

British Casein Company (1911), Ltd.

The statutory meeting of creditors was held on Wednesday, under the liquidation of this company of 24, Great Dover Street, S.E. The winding-up order was made on May 15 last on the petition of Mander Bros., paint and varnish manufacturers, of Wolverhampton. The company was incorporated in February, 1911, with a nominal capital of £2,100, to acquire and carry on the business previously carried on by the British Casein Co., Ltd., manufacturers of and dealers in casein and milk products. The new company was principally engaged as merchants in placing casein and milk products on the market, and to some extent they bought the raw material and treated it by a chemical process. At first the business was profitable and dividends were paid until 1917. Since the end of 1918 a Mr. Nacouwehand had been the sole director, and although no profits were earned in 1919 and 1920, he said that the business gradually decreased owing to lack of working capital. The deficiency account showed a gross profit on trading from January 1, 1921, to the date of the winding-up order of £2,038., but that was insufficient to meet the overhead charges which amounted to £4,200. The nett loss on trading during that period was £2,017. The statement of affairs showed liabilities of £1,817, of which £1,509. was due to trade creditors. The assets were returned at £945. The Official Receiver stated that he had received a letter from a gentleman intimating that the company was indebted to him for £992. That claim was put into the statement of affairs as a contingent liability and not expected to rank against the estate for dividend, but evidently it would have to be added to the unsecured debts. The claim was in respect of 417 boxes of casein delivered after the winding-up order was made and sold by a firm of agents on behalf of the company.

Eventually the matter was left with the Official Receiver as liquidator.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

UNEMPLOYMENT AMONG CHEMISTS.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—While it is true that at present there is considerable unemployment in the profession of chemists, it is also true that there is as large, if not a larger, percentage of unemployment in the other professions; in fact, in every sphere of life. In the profession of chemistry, like all other professions, there is plenty of room—at the top. The first question for the embryo chemist to consider is, Does he like chemistry? And the second, Has he an aptitude for it? If the answers to both these questions are in the affirmative, let him, for preference, enter for an honours course in chemistry in one of our Universities. If either of them is answered in the negative, then let him do something else.

It is also true that the ranks of the profession have been largely augmented during the last few years. This, however, is an aftermath of the war, and is now at an end, ex-Service men having chosen to enter the profession in such large numbers that it taxed the schools of chemistry to their utmost. And in spite of the general depression in trade, it is remarkable that so many of these men have secured satisfactory appointments. In this department alone 15 men took the Degree of B.Sc. in Colour Chemistry in 1921, and 31 did likewise in 1922. All of these men are in satisfactory positions. Of this year's graduates it is too soon to speak, but several of them have already secured posts. These are hard facts. I am sure the other chemical departments in this and other Universities have similar reports to make. These figures lead to but one conclusion—namely, that there are a great many more openings for chemists now than there were in pre-war days. From personal knowledge I could mention several firms who, before the war, employed perhaps one or two chemists, but who now have their own research, technical, and analytical staffs.—Yours, etc.,

Colour Chemistry Department, R. B. Forster.
Leeds University. September 4, 1923.

CHEMICAL WORKERS' STRIKE.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—With reference to the paragraph in your issue of August 31, page 254, re the chemical workers' strike at Falkirk, I should like to make it clear that although we are the only Union known definitely as the "Chemical Workers' Union," the workers in dispute are not members of this Union, and neither are our officials conducting negotiations.—Yours, etc.,

Arthur Barrett.
(London District Secretary, National Drug and Chemical Union).

September 1, 1923.

ITEMS OF INTEREST.

Chromium Electro-Plating.—It is announced that R. Grah Successors, Ltd., of Sheffield, have perfected the process of plating with pure chromium. The resulting surface is claimed to be absolutely rustless and untarnishable.

Nickel Ore in Spitzbergen.—The expedition to Spitzbergen, organised by the Northern Exploration Company, reports the discovery of nickel ore—the first find of its kind—on Spitzbergen.

Zinc Production in Tasmania.—The Hobart zinc works continue to make good progress. Statistics for the March quarter show that the production for the period was 8,163 tons, valued at £244,890., an increase on the corresponding quarter last year of 5,278 tons and £167,762.

Mint to Make More Coppers.—As a result of extensive alterations planned to be carried out at the Royal Mint, the output of copper coins will be increased. New furnaces and stamping machinery are to be installed in the bronze coin department.

Aluminium Propaganda in Germany.—In order to encourage the use of vessels and plant made of aluminium in Germany, the Metallwirtschaftsbund with the approval of the Government has opened an Information Bureau at 12, Victoriastrasse, Berlin, W. 10. The functions of this Bureau will be purely advisory.

New Internal-Combustion Engine Device.—The development of a satisfactory mechanical device for automatically starting and stopping internal-combustion engines has been announced by Mr. E. Campbell Maccormac, of Daniel Adamson and Co., Ltd., Dukinfield, near Manchester. Further details of this interesting invention will be published at a later date.

New Waterproof Glue.—A highly water-resistant blood albumen glue which can be applied without the use of a hot press has been invented by A. C. Lindauer of the Forest Products Laboratory, U.S. Forest Service. The development of this glue is the latest and most promising advance made as a result of the long-continued search by the Government laboratory for a satisfactory waterproof glue for wood.

Time Recorders and Costing Systems.—At the Olympia Engineering Exhibition, the firm of Gledhill-Brook Time Recorders, Ltd., of Huddersfield, are exhibiting a complete range of time recorders and job-costing systems. These systems work in the simplest possible manner in actual practice. Particularly interesting amongst this firm's exhibits are two new models of portable time recorders not shown hitherto.

British Association.—In connection with the forthcoming meeting to be held in Liverpool, it has been decided by the University of Liverpool to confer the honorary degree of doctor of science upon Sir Ernest Rutherford, president of the Association; Mr E H Griffiths, treasurer; Professor J. C. McLennan; Professor Niels Bohr; Professor G. N. Lewis; and Dr. Johannes Schmidt. The ceremony will take place at 2.15 p.m. on Monday, September 17, at the University.

Business Notice.—Messrs. Robinson Brothers, Ltd., have, after a period of close association with Messrs. Lewis Demuth and Co., Ltd., effected an amalgamation of their respective tar-distilling interests in the Midlands, under the name of "The Midland Tar Distillers, Ltd." All the directors of Robinson Brothers, Ltd., join the board of the Midland Tar Distillers, Ltd., and the business of what will henceforth be known as the Robinson Brothers Branch will be carried on as hitherto.

Japanese Camphor Trade.—Exports of camphor from Japan advanced from 10,000 piculs in 1920 to 14,000 in 1921, 36,000 in 1922, and 14,000 for the first three months of 1923. America is by far the biggest purchaser from Japan, but both India and Germany have re-entered the market as buyers on a large scale. In Formosa, business during 1922 showed a vast improvement. Exports of camphor oil and camphor combined totalled 10,208,390lb., while those of camphor alone amounted to 5,089,817lb., of which nearly one-half went to the U.S.A., one-third to Japan, and the remainder to the United Kingdom and France. The total export in 1921 only amounted to a trifle over one million pounds.

British Coal Output.—The output of coal at the mines of Great Britain for the week ending August 25 was 5,163,800 tons, as against 5,124,000 tons in the previous week, and 5,148,000 tons in the corresponding week of last year.

Coal Strike in United States.—A Reuter message from New York, dated September 2, states that 158,000 anthracite miners have ceased work, although the negotiations endeavouring to bring about agreement in the wages and other disputes are still continuing.

Japanese Employees of Brunner, Mond's.—It is reported that the European staff of Brunner, Mond and Co., Ltd.'s Yokohama office in Japan—W. R. Devin and R. H. Chalinor, —with their wives and families, are safe. It is feared, however, that the native staff have perished.

Ether Explosion in Edinburgh.—An explosion took place in the ether making plant of Duncan, Flockhart and Co., manufacturing chemists, Holyrood Road, Edinburgh, on Friday last week. Two men, William Walker, and Craig Ferguson, were engaged cleaning the plant, when, owing, it is believed, to the fusing of an electric wire and the emission of a spark, the explosion occurred. Part of the plant was destroyed.

Birmingham Technical Schools.—The evening classes at the Birmingham Municipal Technical Schools include this session special classes in paint, varnish, and rubber technology, and gas supply and gas-engineering chemistry. Examinations for the National Certificate of the Institute of Chemistry and the Institute of Gas Engineers have been instituted by the Board of Education in conjunction with the respective Institutes. In the Metallurgical Department there is a special course of lectures dealing with fuel and refractories.

Borax Prices Reduced.—As from September 1, prices of "twenty mule team" brand borax and boric acid are reduced by £2. per ton, and borax glass by £4. per ton. Borax Consolidated, Ltd., state that prices, c.i.f. foreign ports, will be quoted on application.—C. Christopherson and Co., agents for "Three Elephant" brand borax, state that prices have been reduced by £2. per ton as from September 1. Prices of imported material, therefore, are still £1. per ton lower than the British-produced borax.

Suggested Hall Mark for Platinum.—There is a demand among manufacturers for a hall mark for platinum in this country. This already obtains in France and Switzerland. It is pointed out that in this country there is a hall mark for gold which costs £3. 10s. per ounce; while platinum, which costs £25. 10s. per ounce, bears no guarantee mark beyond the word "platinum," many articles bearing this which sometimes contain less than 75 per cent. of platinum. A hall mark, it is suggested, is necessary for the protection of the public.

Salford Technical College Chemical Society.—It is stated that the Chemical Society of the Salford Technical College was instituted in the year 1909, and is open to all persons interested. During the war period, however, the activities of the Society were interrupted until, in September, 1922, one or two members of the staff of the chemistry department of the College renewed them with excellent results. It has now been decided to open up the membership to all who desire to join. An excellent syllabus has been arranged for 1923-24. The Society meets on the last Friday evening in each month at 7.15 p.m. in the College.

Nitric Acid Formation in Carbon-Dioxide Manufacture.—In manufacturing carbon dioxide by combustion of coke with subsequent absorption of the evolved gases in potassium carbonate solution from which the carbon dioxide is obtained by heating the bi-carbonate so formed, it was observed, state L. Hackspill and A. Couder (*Comptes rend.*, 1923, 176, 1811), that the lower part of a condenser which collected a small quantity of escaping water vapour was subject to rapid corrosion. Investigation showed that iron nitrate was present in the corroded material, moreover a quantity of potassium nitrite was found in the potassium carbonate solution. This was traced to oxidation of the nitrogen of the coke on combustion, from 0.55 to 4.1 milligrammes of nitrite being produced per g. of coke consumed. A part of the nitrous acid was liberated by the action of carbonic acid and underwent further oxidation in the presence of air and moisture to nitric acid, the latter substance being the cause of injury to the plant.—*J.S.C.I.*

Australian Mineral Deposits.—A valuable find of silver and lead ore has been discovered 26 miles north of Chillagoe. Mr. Godard, general manager of Chillagoe State Smelting Works, asserts that it promises to be the most important silver and lead find in Australia. Ten samples average 50 to 70 ounces of silver per ton, and 50 per cent. of lead with pure galena. Three private leases have been granted, and the Government has also secured an area.

Saar Coal Production.—Figures have been published showing the production of the mines of the Saar basin under French exploitation. Since French control began, on January 18, 1920, the net production has been 9,198,714 tons in 1920; 9,336,493 tons in 1921; and 10,943,311 tons in 1922. The total net production in 1913 was 12,875,140 tons, and in 1919, the last year of German control, the total was 8,758,356 tons. The daily output in 1922 was 37,058 tons, as compared with 42,803 tons in 1913 and 30,306 tons in 1919.

Tariff Notes.—The removal is announced of the Customs duty on the importation of methylated spirits into Southern Rhodesia.—Duties on the following articles imported into New Caledonia and Dependencies are modified as from August 5: castor oil, cottonseed oil, resin, tar, turpentine, calcium carbide, oxygenated water, sulphuric acid, gas mantles, and dynamite.—The former duties on perfumery and toilet articles imported into San Salvador are reduced to 40 centavos (gold) per kilog.

Petrol-Water Mixtures.—Professor A. M. Low, writing in the current issue of the *Motor*, states that he has prepared stable emulsions of petrol and water, containing about 7.5 per cent. of water, which have proved very serviceable fuels for internal-combustion engines. The permanence of the emulsion is secured by the addition of small amounts of a protective colloid. The emulsion is translucent, causes no trouble with carburation, and the water content prevents carbon deposit, reduces knocking, and increases the efficiency of the engine.

Tasmanian Carbide.—Owing to the dumping of foreign carbide, the Tasmanian carbide works have been closed for many months, and the directors of the company have continued their endeavours to get the Federal Government to reimpose the embargo. The company was regaining its feet after experiencing an almost unprecedented series of difficulties when the embargo was lifted, and was again compelled to close the works, throwing 300 hands out of employment. The Federal Government has since notified that the embargo on importations will not be reimposed, but the Industries Preservation Act will be applied. With this assurance production has been resumed.

Canada's Mineral Production.—The High Commissioner for Canada in London has just received from the Dominion Bureau of Statistics at Ottawa, revised statistics dated July 30, on the production of zinc, lead, and asbestos in Canada. The production of zinc in the refined state during 1922 amounted to 28,145 tons, valued at 3,217,536 dollars. In 1921 the production was 26,544.6 tons, valued at 2,471,310 dollars. The production of lead during 1922 amounted to 46,653.58 tons, which was valued at 5,817,702 dollars, as against 33,339.8 tons, valued at 3,828,742 dollars in 1921. The total quantity of asbestos rock mined during 1922 amounted to 2,562,933 tons. Of this, 2,166,385 tons, or 84.5 per cent., was milled, and 158,023 tons of asbestos was recovered in a marketable state. The sales for the year amounted to 163,706 tons, for which the producers received 5,552,723 dollars.

U.S. Cement Position.—While the stocks of Portland cement in America have shown a steady decline during recent months, the production, on the other hand, continues well above the level of the previous year. According to statistics recently compiled by the United States Geological Survey, stocks on hand at the end of July amounted to 8,076,000 barrels, showing a decrease of no less than 1,092,000 barrels in comparison with the previous month's total. The output of cement in July totalled 12,620,000 barrels, which, compared with the previous month, shows an increase of 238,000 barrels. For the first seven months of 1923 the output reached a level of 74,940,000 barrels, comparing with only 58,475,000 barrels for the corresponding period of last year. As regards shipments, there were about 13,712,000 barrels exported in July, which compares with the record of 14,257,000 barrels in May and 13,850,000 barrels in July, 1922. Shipments since January 1 to date show a gain of nearly 14,100,000 barrels, the total being 75,938,000 barrels.

Manchester's New Metallurgical Laboratories. — The formal opening by Sir George T. Beilby of the new bay of the Department of Metallurgy of the University of Manchester will take place on Tuesday, September 11. In a brief account of the history and development of the Department, which has just been issued, it is stated that the new buildings will provide accommodation for advanced teaching and research for thirty to thirty-five students and some eight or ten research men. A Departmental library has been started, to which Sir Christopher Needham has made a valuable contribution, but further gifts are urgently needed.

Aluminium Paint and Heat Radiation.—The aluminium or bronze paint generally applied to radiators greatly reduces their effectiveness, and makes it necessary to have a larger surface for the same heating effect, according to experiments performed by Dr. W. W. Coblentz of the U.S. Bureau of Standards. Dr. Coblentz finds that the heat radiated from an aluminium painted radiator surface is less than a third of that emitted by a radiator of the same size painted with a non-metallic paint, enamelled, or simply allowed to rust. On the other hand, he finds that aluminium paint is a very effective means of reducing the amount of heat transmitted through a thin material.

Lead Azide in Explosives.—Lead azide, nitride, or hydronitride has been used for a comparatively short time as an initiating agent in the manufacture of explosives, and has replaced mercury fulminate to some extent, according to C. A. Taylor and William H. Rinkenbach, explosives chemists of the Department of the Interior, who have made a study of the subject at the Pittsburgh experiment station of the U.S. Bureau of Mines. Many accidents in manufacture have, however, been attributed to its use. Lead azide is comparatively safe in a state of fine division, but its large crystals are extremely dangerous. It contains more nitrogen than fulminate, and is a better initiator, though it is less sensitive to blows and percussion.—*Colliery Guardian.*

COMING EVENTS.

Institute of Metals. — Annual meeting, **September 10-13,** at Manchester. Second annual autumn lecture: "The Use of Non-ferrous Metals in Engineering," by Lieut.-Col. Sir Henry Fowler, **September 10,** at **8 p.m.,** in the Milton Hall, Deansgate.

British Association. — Annual meeting, **September 12-19,** at Liverpool. Presidential address, "The Electrical Structure of Matter," by Sir E. Rutherford. In Section B. (Chemistry) the following papers are to be read: "The Formation of Precipitates," by S. Oden; "The Nature and Significance of the Resin of Hevea Rubber," by G. S. Whitby; "The Physical Chemistry of Interfaces," by Professor F. G. Donnan, F.R.S.; "The Quantum Theory in Chemistry," by Professor G. N. Lewis; "The Bohr Atom and the Periodic Law," by Dr. N. V. Sidgwick, F.R.S.; "On High Frequency Spectra and the Theory of Atomic Structure," by Dr. D. Coster; "The Activation of Hydrogen in Organic Compounds," by Miss E. H. Usherwood; "Membrane Potentials considered as Diffusion Potentials," by Dr. E. B. R. Prideaux; "Enzymes," by Dr. E. F. Armstrong, F.R.S. "The Relation of Certain Enzyme Actions to Tissue Differentiation and Tumour Growth," by Dr. K. G. Falk; "Catalytic Actions in the System Copper, Copper-Oxide, Oxygen, and Gaseous Reducing Agent," by W. G. Palmer; "Alumosilicates," by W. Vernadsky; "The Chemistry of Hafnium," by Dr. G. Hevesy; "The Utilisation of Volcanic Steam," by Senatore Prince Ginori Conti; "The Biochemical Effect of Polarised Light," by Miss E. S. Semmens; "Cotton Wax," by Dr. R. G. Fargher; "The Absorption of Methylene Blue by Cotton," by D. A. Glibbens; "The Sulphonation and Nitration of Naphthalene," by Professor H. E. Fierz. There is also to be a discussion with the Mathematics and Engineering Sections on "Cohesion and Molecular Force."

Institution of the Rubber Industry.—Meeting, **Monday, September 17,** at **8 p.m.,** at the Engineers' Club, Coventry Street, London, W. Paper: "Rubber Floors and Rubber Roadways," by E. J. Edwards.

Iron and Steel Institute.—Autumn meeting, **Monday** and **Tuesday, September 17** and **18,** at Milan.

STOCK AND SHARE LIST.

QUOTATIONS DURING AUGUST.

Div. or Int.	Paid	Name of Company.	Sh're Val.	August 2—29. Highest	Lowest
1/–	7/7/23	Allen Liversidge	£1	20/9	20/9
7%†	17/6/22	Aluminium Corp., Pref. Stk. (7% Cum.)	100	65	65
1/–	16/4/23	Ass. Port. Cement	1	23/9	22/–
1/2	24/5/21	Benzol and By-products, 10% Cum. Conv. Pref.	1	9/11¼	9/9
3/–	23/6/23	Bleachers' Assn.	1	49/9	46/3
5/–	2/7/23	Boake, Roberts, 5% Cum. Pf.	10	*6⅜	6
1/6	17/2/23	Borax Consolidated Def.	1	39/6	38/3
1/–	3/9/23	Bradford Dyers	1	55/6	53/1½
–/6	3/4/23	British Aluminium	1	18/6	17/6
—	—	British Cellulose, 7½% Cum. Ptg. Pref.	1	15/3	13/6
–/9	31/5/23	British Cotton and Wool Dyers	5/–	8/9	7/7½
1/–	16/12/20	British Cyanides	1	25/6	22/6
—	—	British Dyestuffs, Def.	1	2/3¼	1/9
—	—	British Glues and Chemls.	1	*7/9	5/–
1/–	3/9/23	British Oil and Cake	1	28/–	26/3
1/9	12/7/23	British Oxygen	1	43/9	41/3
1/–	31/3/23	British Portland Cement	1	28/9	25/7½
1/5⅝	12/6/23	Brunner, Mond	1	40/–	38/–
1/7½	15/5/23	Bryant and May	1	45/–	43/6
2/6	3/4/23	Bush (W. J.) and Co., 5% Cum. Pf.	5	67/6	62/6
1/6	30/9/22	Calico Printers	1	30/6	27/–
4½%	1/8/23	Castner-Kellner, 4½% 1st Mt. Deb. Sk.	100	*85	82½
2/–	22/3/23	Cerebos	1	29/–	29/–
1/6	11/1/22	Champion and Slee	1	13/9	10/6
–/9⅜	2/7/23	Cory (Horace) and Co.	1	*16/9	10/–
1/9	3/8/23	Courtaulds	1	63/6	57/3
–/7½	2/7/23	Crosfield (J.), Cum. 6% Pref.	1	20/6	20/–
3/6	8/1/23	Egypt. Salt and Soda (Bearer)	1	24/–	21/6
–/7½	18/8/23	English Velvet Dyers	1	27/4½	27/4½
1/–	10/7/20	Evans, Sons, Lescher and Webb	1	*8/9	5/–
1/3	3/7/23	Field (J. C. and J.)	10/–	*18/1½	13/6
–/7½	2/7/23	Gossage (Wm.), 6½% Cum. Pf.	1	20/4½	19/9
2/6	1/8/23	Knight (J.), 25% Cum. Pref. Ord.	1	61/3	57/6
1/6	18/9/20	Lawes' Chem. Manure	1	*4/6	3/6
–/8⅜	2/7/23	Lever Bros., 7% Cum. Pref.	1	22/3	21/6
—	—	Magadi Soda	1	2/2½	1/9
1/6	3/8/23	Mond Nickel	1	36/10½	35/7½
–/7½	2/7/23	New Transvaal Chemi. A. Pref (8% Cum.)	1	23/1½	22/–
1/4⅘	2/7/23	Nobel Industries	1	20/3	18/6
5%	2/7/23	Pears (A. and F.), 5% Deb. Stk.	100	*96	91
1/2⅝	8/9/23	Pinchin, Johnson	1	36/–	34/6
10.16d	23/10/23	Sadler (14⅜/– paid up)	1	*15/3	15/3
2/–	14/4/23	Salt Union	1	21/6	18/–
–/10⅘	1/6/23	"Sanitas," 9% Cum. Pref.	1	*24/6	21/6
–/7½	2/7/23	Stevenson and Howell, 6¼% Cum. Pref.	1	*19/6	18/1½
–/9⅜	1/9/23	United Alkali	1	31/3	30/–
–/5	1/9/23	United Indigo and Chem.	3/4	6/–	5/9
1/–	28/3/23	United Premier Oil and Cake	1	10/11¼	10/–
–/9⅜	30/6/23	Wall Paper Manfrs.	1	22/10⅜	21/9
1/6	20/7/23	Welsbach Light	1	13/6	12/–
2/6	2/7/23	Wheen (R.), 5% Cum. Pf.	5	*55/–	51/3
2/–	27/6/23	White, Tomkins and Courage	1	23/1½	22/9
3/4½	20/6/23	Yorkshire Dyeware and Chem.	15/–	*29/9	21/3
52/– p.c.†	1/9/23	Gas Light and Coke (4% Stand.)	100	97¼	96
5%	3/9/23	South Metropolitan Gas, Ord. Stk.	100	98¾	96¾
2/6	2/5/23	Aguas Blancas Nitrate	5/–	30/–	29/–
1/–	21/6/23	London Nitrate	1	47/6	46/3
4/–	4/5/23	Salar del Carmen Nitrate	1	61/10½	60/–
7/6	26/4/23	Mason and Barry (Bearer)	1	50/–	43/9
20/–	1/5/23	Rio Tinto (Bearer)	5	36⅜	33⅞
5/–	10/5/23	Tharsis Sulphur	2	72/6	71/3

All ordinary shares except where otherwise specified.
* January 2 to August 1, 1923 † Actual.

Ceylon Imports of Calcium Carbide.—Total Ceylon imports of calcium carbide for the year 1922 amounted to 946 cwt., valued at 17,956 rupees Norway leads the list with more than half—561 hundredweight, valued at 10,795 rupees Switzerland, Sweden, Belgium, Austria, and Denmark are the only other mentioned suppliers of this product, the quantity and value of imports from these countries being as follows: Switzerland, 100cwt., valued at 1,864 rupees; Sweden, 78cwt. at 1,483 rupees; Belgium, 40cwt. at 720 rupees; Austria, 20cwt. at 343 rupees; Denmark, 20cwt. at 375 rupees; and other countries, 127cwt. at 2,341 rupees.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The trade barometer is still set at change, with a tendency to unsettled conditions. A rather less hopeful view is taken this week of the aspects of affairs in the hematite pig-iron trade, and since it is the furnaces in West Cumberland and the Furness district that mostly use the local coke, the course of events must necessarily be watched with some anxiety. If business is no fuller than it has been this week, the number of furnaces in operation cannot be maintained, and unless some improvement takes place, the iron trade here will not be able to absorb as large a part of the make of coke as it is doing at the moment. What is a very important consideration to coke makers and indeed to coal owners is the fact that no headway is being made in the steel trade. One week's work out of four at the steelworks at Workington is the utmost than can be hoped for in the present circumstances, and Barrow, it is to be noted, is rolling a smaller tonnage of steel than was the case a few months ago. If these steelworks were only partially engaged coke makers would have a fair guarantee that their ovens would be kept in full swing. The depressed condition of the iron and steel industries is not of course without its adverse influence on the coal trade, and it would appear that the demand for coal may fall to a lower ebb directly the settlement of the Whitehaven dispute, which is due any day now, may give an upward lift to production in the coalfield. It is taking the collieries all their time even now to market their round coal. It is only the smalls that can command a good market. All that there is to record is that the make of coke is being fully absorbed, the furnaces here taking the greater part of it at 29s. to 33s. per ton according to carbon content, while what remains is quickly sold to Continental consumers at 33s. to 37s. per ton, f.o.b. No falling-off in Continental demand is apprehended, and it is stated that deliveries may be larger towards the end of the year. Residuals are a fairly satisfactory trade. The make of crude benzol and sulphate of ammonia is being absorbed. Most of the chemical products are in fair demand. Creosote is a sharp trade. Road tar, however, is dull. East Coast coke supplies are 8,200 tons this week.

SOUTH WALES NOTES.

[Specially Contributed.]

Good business is being transacted in tinplates, chiefly for immediate wants. Merchants are more inclined to place orders for extended periods, and some of the factories have sufficient orders on the books to last until close of the year. The patent fuel trade is slightly better, for although foreign orders have slackened somewhat, the home requirements have increased. The exports for last month exceeded 50,000 tons from the South Wales ports. The chief markets at present are Brazil, French West Africa, Algeria and France. The coke ovens are fully operating and exports of cokes are increasing. Some 12,000 tons left the Welsh ports during the last four weeks, mostly to Germany and Spain. By-products are in good call, with the exception of sulphate of ammonia, which keeps rather neglected. There is only a moderate demand and supplies are plentiful. Basic slag is in fair request and there is no difficulty in executing orders; but trade in fertilisers generally is not very good. Some trouble with the spelter workers is reported, but it is hoped that any serious dispute will be averted. The steel smelters have, on their own initiative and without the consent of their Union officials, decided to give 28 days notice to cease work if a settlement is not arrived at.

Among the week's imports were 706cwt. phosphorus from Montreal, and 41 tons ferro silicon from Antwerp to Newport; 9,741 tons zinc concentrates from Port Pirie, 265 tons copper ore from Besra, 38 tons precipitate of copper, and 70 tons calcium carbide from Hamburg to Swansea; 21 barrels red arsenic, and 43 barrels white arsenic from Antwerp, 4,150 tons iron ore from Mantella, 200 tons cement to Cardiff. The exports included 4 tons sheep dip, 7 tons pitch and tar, 11 tons painters' colours from Newport to Buenos Ayres.

FERTILISER NEWS.

Nitrate of Soda.—Examination of the preliminary statistics of the nitrate industry for August shows that production appears to be falling off. Since the beginning of the year a number of oficinas have reopened, until at the present time upwards of 70 plants are in operation. Production, which in January amounted to about 132,000 tons, steadily increased until in June the figure reached about 166,000 tons. The rectified total for July was 157,000 tons, and now the output for last month is estimated at 148,000 tons only. Subsequent information may lead to this figure being considerably modified; yet, even so, it is evident that the tendency is downward. This is a serious matter, and should engage the attention of those optimistic writers in the daily Press whose expressions of opinion during the past few days have been rather more numerous than of late. The comparatively large figure of European imports, and the continued reduction of stocks on the West Coast of Chile, have generally been taken to mean that the industry is at last on its feet, and that the patient nitrate investor is at last to be rewarded Unfortunately, there is much which contradicts, or at any rate modifies, this view. Apart from the slowing-down of production, sales by the Producers' Association have continued woefully small at 12,000 tons for the whole of August. The cheapest official nitrate now available is at the 20s. 7d. per quintal rate, delivery over second half of November. It is true that Continental conditions are very unfavourable in so far as estimating probable consumption over next season is concerned, and it is probable that many importers regret their hasty orders given at the time of the publication of the new prices. Already a fair amount of resale nitrate has been bought at slightly below the Association's price, which indicates a certain uneasiness on the part of importers. The large import figure, given at 126,500 tons for Europe and Egypt, compares with 22,600 tons for August last year, and 15,700 tons in 1921. Deliveries from ports amount to 53,000 tons, leaving European stocks at about 144,500 tons on August 31, against 71,000 tons on the 1st of the month. Owing to the reduction in freight charges, values of present arrivals have fallen to the level of £11. 6s. per ton, c.i.f. This being the case, it would seem that some reduction in the present prices in this country, which range about £13. 7s. 6d. per ton, would be not only desirable, but a necessity.

Sulphate of Ammonia.—The outlook for this fertiliser presents some interesting features, one of the most novel being the decision of the German manufacturers to cease quoting on a mark basis. In endeavouring to keep pace with the constantly depreciating currency, unit values in sulphate of ammonia were finally quoted at ridiculous figures, entirely useless outside Germany, and of very little value in that country itself. It is therefore of great significance that this fact has at last been realised, and prices are now based on the value of a food product, rye, in the proportion of 100kilogs. of sulphate of ammonia to 140kilogs. of rye. The strike of anthracite miners in the United States appears to have commenced—some 150,000 men are reported to have ceased work,—but negotiations are still proceeding, and it is hoped that even yet a settlement may be arrived at. It will be remembered that prominent fertiliser manufacturers have attributed the sulphate shortage in that country not to the great coal strike, but to the dislocation of transport caused by the railway stoppage, and it is therefore possible that, should the anthracite miners' strike assume large proportions, the sulphate industry will again be adversely affected. Prices remain very high, with no export trade beyond the contracts fixed by the great steel corporation, which markets its own product. Merchants consequently are only able to do business in the domestic market, foreign importers being unwilling to pay the figure demanded when they can obtain the British product at a much lower figure. It is stated that English sulphate is selling in Cuba, hitherto supplied almost entirely by the States. With the slowing-down in the British iron and steel industry, however, and the reduction in the number of blast furnaces operating, it is very probable that the output of sulphate in this country will decline during the coming months. It has been said that one result of the great earthquake disaster in Japan will be a heavy call in this country for steel products, but such a demand could undoubtedly be met from stocks. In view of the promise of shorter supplies for the coming season, it would appear to be the best policy for dealers and consumers to make every effort to estimate requirements and place their orders with the least possible delay. Prices over September, as fixed by the Sulphate of Ammonia Federation, are for the neutral quality showing 25¾ per cent., £14. 10s. per ton for 4-ton lots, delivered. Limited supplies of ordinary quality of 25¼ per cent. ammonia are available at 23s. per ton less than this figure. These prices are for home consumption only, and the Federation's penalty clause for infringement of this provision still holds good.

Russian Phosphate Deposits.—According to Professor Pranishnikov, of the University of Moscow, it is estimated that European Russia has 5,563 million tons of phosphate reserves, of which 141 million tons show a phosphate content of over 24 per cent. The possibility of exploiting these deposits has been discussed by the professor while in Berlin recently, but the lack of capital and technical experience in Russia has prevented any such action up to the present time. Representations have therefore been made to Germany to assist in the formation of a superphosphate industry in Russia, by erecting chemical plants near the deposits to be operated by the Germans themselves. It is pointed out that although Germany has developed a considerable nitrogen industry, and is favourably situated with regard to potash supplies, it is suffering and has suffered since the outbreak of the war, from an acute shortage of phosphates. The former import trade with Tunis, Algeria, Florida and the South Sea Islands is at present seriously hindered on account of the present economic conditions, and inability to purchase in high-exchange currency. In Russia also, despite the possession of enormous phosphate deposits, there is a shortage of the material for agricultural application. The most promising deposit is situated in the province of Viatka, along the upper stretches of the river Kama, a tributary of the Volga. The raw material has been found to contain from 26 to 29 per cent. of phosphorus, while the average yield of the deposits is from 400 to 500 kilogrammes per square metre. The Government, it is stated, have already built a dock on the Kama in view of the possible exploitation. Sulphuric acid to be used in the manufacture of the fertiliser is to be obtained from the pyrites mines in the Ural. The Professor therefore thinks that the best method of dealing with the matter would be for Germany to procure a concession in the Kama district, and there manufacture superphosphate and other phosphoric products. This, he states, would be a step forward in correcting the phosphate shortage from which both Germany and Russia are now suffering

American Cyanamid Company's Report. — The report of the American Cyanamid Company, which is the largest producer of cyanamid and cyanide in the United States, shows that remarkably good results were obtained for the year to June 30 last, due to the recovery of the fertiliser and mining industries in that country. Total income, including profits from subsidiaries, was 2,010,000 dollars, after providing for depreciation and taxation, which compares with 198,000 dollars and 344,100 dollars for each of the two preceding years respectively. Dividends on the preferred shares absorb 335,800 dollars, and a sum of 950,000 dollars has been set aside to provide for contingencies arising out of suits brought by the United States Government for taxes, and other suits pending against the company. Moreover, goodwill, which a year ago stood at 2,216,800 dollars, has been written off, but this reduces the surplus at credit of profit-and-loss from 3,143,300 dollars to 1,496,400 dollars

NEW COMPANIES.

Reids Ovalba, Ltd.—Private company. Capital £2,000. Manufacturers of and dealers in boot dressings and cleaning preparations. Office: 6, New Compton Street, London, W. 1.

United Fertiliser Company, Ltd.—Private company. Capital £2,100., in 2,000 ordinary shares of £1. and 2,000 founders' shares of 1s. Manufacturers of, dealers in, and importers and exporters of fertilisers, etc. Director: C. H. Cook, Little Stone Stile, Selling, near Faversham.

LIMITED PARTNERSHIP.

Self-lighting Gas Mantle Company.—Importers and manufacturers of self-lighting gas mantles and materials for treating the some, 14, New Bridge Street, London, E.C. Partnership for ten years from July 17, 1923. General partners: C. Fenton and E. T. Smith. Limited partner: J. S. Holland, contributing £500. in cash.

REPORTS OF COMPANIES.

American Cyanamid Company.

Accounts for year to June 30 last show net sales, $8,582,678; operating charges, $6,380,462; net profit, $2,201,616; miscellaneous income (less miscellaneous charges), $171,597; total, $2,373,213. Reserved for income-taxes, $261,149; patents and licences, proportion written off, $233,975—$495,124; net income of American Cyanamid Co., $1,878,089); net profits of subsidiaries, $131,867; net combined income, $2,009,956. Report adds that during year goodwill, amounting to $2,216,804, which had been carried as an asset on company's books, was written off out of surplus. Claim of Government for additional taxes, referred to in last year's report, remains undetermined. In addition to this there are other claims pending against company growing out of contracts made by Amalgamated Phosphate Co. Without admitting any liability whatever for any of these claims, directors felt that as a matter of business prudence there should be transferred from surplus as a credit to "reserve for contingencies" the sum of $950,000, and this has accordingly been done.

Peachey Leather Products, Ltd.

The statutory report states that total number of shares allotted is 125,000, of which 35,814 are fully paid, 100 are 16s. paid, 79,110 are 15s. paid, 9,166 are 10s. paid, 802 are 4s. 8d. paid, 1 is 2s. 6d. paid, and 7 nil. Total amount of cash received in respect of shares issued wholly for cash is £99,997. Payments were: Preliminary expenses, £7,799.; underwriting commission and brokerage, £6,517; expenses prior to formation of company, £990; interest on calls paid in advance, £85.; plant, machinery, furniture, etc., £4,469.; on account of laboratory, etc., £592., £50,000. 5 per cent. War Loan, 1929-47 £50,479. revenue suspense account £2,043. cash at bank and in hand at August 22 £27,019. Preliminary expenses were estimated at £6,000.

Hampden Cloncurry Copper Mines, Ltd.

A loss of £8,779 was sustained for the half-year ended February 28 (against £4,512. for the corresponding half-year). By adding £8,109. provided for depreciation, the total to the debit of the profit-and-loss account is £16,889. This has been adjusted by the transfer of a similar amount from equalisation reserve. The ore reserves are estimated at 135,000 tons, containing 7,110 tons of copper; but of this 93,000 tons, estimated to contain 2,890 tons of copper, is low-grade material which could not be profitably treated under present conditions; and 42,000 tons, estimated to contain 4,220 tons of copper, will, it is expected, be profitably treated when a resumption of smelting on the field is again warranted. The above total estimate includes 15,454 tons lying on the surface.

F. Steiner and Co., Ltd.

The report states that after adjustment of excess profits duty, etc., and deducting £190,212. for repairs and depreciation, the profit for the period of three years to July 31 last is £241,495., which, with £35,287. brought forward, makes a total of £276,783. After paying debenture interest and preference dividend for the three years and 5 per cent. on the ordinary shares for the years 1921 and 1922, the available balance is £107,783., out of which the directors have placed £30,000. to general reserve and recommend a dividend of 7½ per cent. for the past year on ordinary shares, leaving a balance of £42,158. to be carried forward.

Dominion Tar and Chemical Company, Ltd.

The accounts for the half-year ended June 30 show a net profit of £49,321. (against £29,955. in the corresponding half-year of 1922). It is proposed to place £20,800. (against nil) to depreciation account, and to pay a final dividend for the half-year of 2½ per cent., free of tax, making a total distribution of 5 per cent. for the half-year (against 7½ per cent). The sum of £10,000. (against £8,130.) is carried to general reserve, and £6,021. is carried forward.

Broken Hill Proprietary Block 14 Co., Ltd.

The report for the half-year ended March 31 states that financial arrangements have been made with the Associated Smelters whereby active operations have again been made possible after a cessation of production practically extending over a period of four years. The accounts show that the credit balance as at September 30 last was £4,292. The loss for the half-year under review was £5,769., which after deducting the above credit balance is reduced to £1,477.

DIVIDENDS.

Burt, Boulton and Haywood, Ltd.—Dividend of 4 per cent., payable, free of tax, on the ordinary shares for the half year ended June 30, making 8 per cent., free of tax, for the year. For the preceding year the dividend was 7½ per cent., free of tax.

Pinchin, Johnson and Co., Ltd.—For the half-year ending June 30, it is resolved to declare an interim dividend of 6 per cent., actual, on the ordinary shares, compared with 5 per cent.

Benzol and By-Products, Ltd.—The reduction of capital from £700,000. to £573,690. was confirmed by the High Court of Justice (Chancery Division) on July 31, and registered by the Registrar of Joint Stock Companies on August 22.

Home Grown Sugar, Ltd.—The reduction of capital from £50,000. to £30,000. was confirmed by the High Court of Justice (Chancery Division) on July 25, and registered by the Registrar of Joint Stock Companies on August 8.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Clement and Johnson, Ltd., London, W.C., chemists.—Registered August 17, £500., £300., £100., £100., £100., £500., and £200. debs., part of £60,000.

Cowley Celluloid, Ltd., Cowley (Middlesex).—Registered August 13, £500. deb., to C. C. Robinson, 4, Glebe House, Cross Lanes, Guildford; general charge.

Pickles, Ayland and Co., Ltd., Ossett (Yorks.), chemists.—Registered August 14, £2,000. deb., to A. Kilbank, The Screeds, Ashby, works manager; general charge.

Thames Chemical Company, Ltd., Watford.—Registered August 4, £3,000. debs.

Wilkinson (L. G.), Ltd., London, E.C., French polish manufacturers.—Registered August 14, charge, to London Joint City and Midland Bank, Ltd., securing all moneys due or to become due to the bank.

SATISFACTIONS.

Nobel Industries, Ltd., London, S.W.—Satisfaction registered August 20, £3,000,000., registered January 4, 1921.

Standard Match Company, Ltd. (old company), Hempsted.—Satisfactions registered August 21, £5,100., registered January 26, 1922; £2,000. registered September 16, 1922; and all moneys (two morts.), registered March 23, 1923.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Holywell Soap Company, Ltd., Liverpool.—Resolved July 20, confirmed August 10: That the company be voluntarily wound up. C. Bradburn, Bank Chambers, 3, Cook Street, Liverpool, liquidator.

Waverley Oils, Ltd., London, E.C.—G. W. Spencer ceased to act as receiver, August 20.

COUNTY COURT JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Smith, Fredk. Geo., 4, York Gardens, Clifton, Bristol (trading as Yorkshire Reno Metal and Floor Polish Manufacturing Company); £16. 7s. 1d. July 13.

Pomerantz, Harry, 85, Roman Road, Bow, drug merchant; £13. 9s. 4d. July 5.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Canada.

A manufacturers' agent in Montreal, with an established connection, who already represents a British manufacturer of a non-competitive line, desires to secure the representation of a British producer of china clay. (Ref. No. 245.)

H.M. Trade Commissioner at Winnipeg reports an inquiry for the supply of 135,000 fire bricks of standard size and quality. (Ref. D.O.T. 11,947/E.D./M.C./2.)

Norway.

A firm of commission agents in Christiania desire to secure the representation for Norway of British exporters of salt and soda. (Ref. No. 252.)

Poland.

A commission agent in Warsaw desires to secure the representation for Poland of British manufacturers of chemicals. (Ref. No. 254.)

Switzerland.

An agent in Lausanne is desirous of obtaining the representation of British firms for the sale of drugs, etc., in Switzerland. (Ref. No. 256.)

United States.

A firm of importers in San Francisco wish to communicate with British producers and exporters of ferro alloys (ferro-silicon 50 per cent. and ferro-manganese 78—82 per cent.), china clay, and fuller's earth, with a view to obtaining agencies for the State of California. They are prepared to work on a commission basis or would purchase on own account. (Ref. No. 264.)

A firm of manufacturers' agents in San Francisco wish to communicate with British exporters of sulphate of ammonia, Portland cement, fish oils, fishmeal, and whale guano, with a view to obtaining agencies, on a commission basis, for the Pacific Coast of the United States. (Ref. No. 265.)

South Africa.

H.M. Trade Commissioner in South Africa reports a call for tenders for the supply of 1,800 tons of tar or tar substitute. (Ref. No. 11,996/E.D./C.C.(2).)

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," September 8, 1888.)

The Aluminium Boom.—Once upon a time, M. Pechiney, of Salindres, was the only maker of metallic aluminium in the world. Many had worked at the problem, and in the course of time found the manufacture unprofitable, or perchance their carefully devised reactions oft-times failed to take place, or even the coveted metal was not disposable after it had been secured, so that finally M. Pechiney was left alone, the aluminium king, monarch of all he surveyed. In another column of this week's issue may be found an account of the recent meeting of the shareholders of the Alliance Aluminium Company, Ltd., at which one of the directors of the company announced his opinion that the shareholders had got hold of a good thing; no doubt they have, but we would be inclined to think that the promoters had got hold of a better, as good things do not always pay from a £. s. d. point of view. It is only a few weeks since we had to chronicle the visit of a number of savants to the aluminium works at Oldbury, and later one of our friends called upon us and exhibited a bar of the pure (?) metal said to have been made at this works. When we say a bar, we would like to qualify the impression as to the size thereof—one inch by one-half an inch by quarter of an inch is certainly a bar, even if it be a small one. The question is, now, "What will they do with it?" There is no doubt a large demand for samples will spring up; but after that is satisfied, it is not yet certain where the makers of the metal will have to look for an outlet amongst the arts of peace.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

August 20 to 25 (inclusive).

Separating Substances from Solutions. Aktiebolaget Separator. 21,378.
Crystallisation Processes. Appareils et Evaporateurs Kestner. 21,503.
Cement. Blachorovitch, I. A. S. 21,401.
Emulsions. Brettell, F. G. (*Symons*). 21,230.
Asphalt. Building Accessories and Flooring Co., Ltd.; Smith, H.; and Goodwin, H. 21,143.
Printing-inks. Burns, W. A. 21,353.
Viscous Products. Chemische Fabrik auf Actien vorm. E. Schering. 21,412.
Sodium Carbonate. Cocksedge, H. E. 21,186.
Water Gas. Dvorkovitz, P. 21,082.
Removing Free Moisture from Substances. Elmore, G. H. (*Comley*). 21,137.
Fire-resisting Compositions. Hocking, C. M.; and King, P. H. 21,540.
Formic Acid. Johnson, J. Y. (*Badische Anilin- und Soda-Fabrik.*) 21,072.
Oxygenated Organic Compounds. Johnson, J. Y. (*Badische Anilin- und Soda-Fabrik*). 21,386 and 21,388.
Synthetic Manufacture of Methanol. Johnson, J. Y. (*Badische Anilin und Soda-Fabrik*). 21,387.
Chemical Heating-appliance. Lancaster, R. C.; and Shields, A. McLellan. 21,160.
New Salts of C.C. Disubstituted Barbituric Acids. Layraud, E. 21,181.
Valuable Hydrocarbons from Inferior Material. Linnmann, G. 21,458.
Promoting Circulation of Liquids in Tanks. McClelland, N. E. 21,267.
Purifying-apparatus for Industrial Oil. Mertz, F. 21,517.
Obtaining Nitrogen from the Air. Nelson, W. A. 21,103.
Compounds Containing Active Oxygen. Noll, F. 21,099.
Continuous Analysis of Mixed Gases. Piccard, A. 21,289.
Dispersions. Plauson's (Parent Co.), Ltd. (*Plauson*). 21,204
Recovery of Metallic Substances from Flue Gases. Procter, H. A. 21,039.
Clarification and Decolourisation of Sugar. Ragg, J. J. 21,565.
Drying Apparatus. Schmidt, O. 21,074.
Producing Fast Tints on Fibres. Soc. of Chemical Industry in Basle 21,078.
Treatment of Fatty Residues. Vosters, H. F. A. 21,485.
Recovery of Soda from Solutions. Wallace, W. M. 21,089.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.

1922.

Vulcanising Rubber. Cadwell, S. M. 4,518. **177,493**
Dry Distillation of Bituminous or Cellulose-containing Material. Moscicki, I. 4,629. **202,333**
Treatment of Fumes Produced in the Manufacture of Fish Guano. Daniels, G. W.; Heathcote, B.; and Spencer, C. 12,677. **202,368**
Retorts. Fairweather, H. G. C. (*Air Reduction Co., Inc.*). 13,622. **202,382**
Alkali Cyanides. Fairweather, H. G. C. (*Air Reduction Co., Inc.*). 13,623. **202,383**
Water-soluble Oil. Hutton, H. W. 13,999. **202,401**
Cements Impervious to Water. British Thomson-Houston Co., Ltd. (*General Electric Co.*). 14,031. **202,404**
Refining Hydrocarbons. Plauson's (Parent Co.), Ltd. (*Plauson, Dr. H.*). 14,337. **202,422**
Enriching Gas Mixtures. Goldschmidt Akt.-Ges., T. 16,087. **181,376**
Employment of the Residues Resulting from the Decomposition of Calcium Cyanamide by Acid. Soc. d'Etudes Chimiques pour l'Industrie. 17,544. **182,134**
Pure Antimony. Germot, A. 24,361. **202,532**
Indigoid Dyestuffs. Soc. pour l'Industrie Chimique à Bâle. 22,433. **189,782**
Production of Solid Substances in a Finely Divided State by Volatilisation. Goldschmidt Akt.-Ges., T.; Schertel, L.; and Luty, W. 33,365. **190,157**

1923.

Laboratory Apparatus for Filtering, Straining, or Transferring Liquids. Ashton, J. C. 82. **202,578**
Vulcanising Rubber. Cadwell, S. M. 169. **191,085**
Resistant Glass. Horak, V. 3,439. **192,713**
Ferric Hydroxide. Waterloo Chemical Works, Ltd. 7,407. **195,077**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Colloidal Sulphur. Vogel, Dr. H. 10,883. **202,613**
Rotary Drying-apparatus. Gross, A.; and Soc. Installations Thermiques. 14,515. **202,615**
Sulphuric Acid. Gaillard, E. A. 20,385. **202,629**
Products for Dyeing or Printing Textile Fibres. Durand and Huguenin Akt.-Ges. 20,401. **202,630**

Mercury Derivatives of Hydroxybenzene Sulphonic Acids and Their Homologues. Chemosan Akt.-Ges. 20,425. **202,631**

Products for Dyeing or Printing Textile Fibres. Durand and Huguenin Akt.-Ges. 20,488. **202,632**

Increasing the Porosity of Decolourising Charcoal. Adler, Dr. R. 20,769. **202,639**

Mixing Cement Mixture. Dorr Co., Inc. 20,787. **202,642**

Products from Urea and Formic Aldehyde. Neuss, O. 20,949. **202,651**

Purifying and Sterilising Liquids and Gases. Sauer, J. N. A. 21,018. **202,654**

New Salts of C.C. Disubstituted Barbituric Acids. Layraud, E. 21,181. **202,660**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Reduction of Water-Insoluble Organic Compounds. W. G. Adams, N. E. Siderfin, D. G. Murdoch, and W. L. Galbraith, Gas Light and Coke Company, London. British Patent, **200,167**, of 1922.

The reduction of water-insoluble organic compounds, particularly aromatic nitro compounds, by means of an alkali-metal or like amalgam, is effected by bringing an intimate mixture of the substance with an aqueous reagent into contact with the amalgam; the mixture may be in the form of an emulsion prepared with or without the aid of emulsifying agents. The reaction is preferably carried out so that the used amalgam is continuously removed after contact with the mixture; thus the amalgam may be passed in a subdivided form through the agitated mixture, or the latter may flow in a thin layer over the amalgam, which also may be in motion; the mixture and amalgam may be brought repeatedly into contact, the former being re-emulsified if necessary between successive contacts. When the reduction product is insoluble in alkali, the latter may be recovered, the process being thus

FIG. 1.

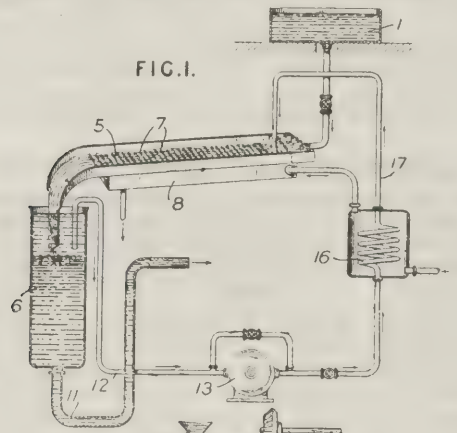
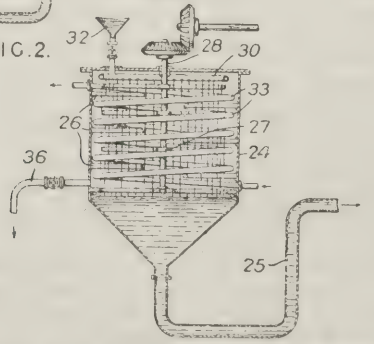


FIG. 2.



cyclically combined with the electrolytic decomposition of brine in a mercury-cathode cell. High concentration of nitro compounds in the emulsion favours the production of azo and hydrazo compounds, while low concentration favours amine formation. With the apparatus shown in Fig. 1, a sloping trough 5 provided with ridges 7 on its bed and a heating-jacket 8 is supplied with amalgam from a container 1, and with an emulsion of nitro compound and water by pipe 17; the mixture discharges into a separator 6, the mercury flowing off by pipe 11 back to the electrolytic cell, while the aqueous mixture is drawn off and emulsified by pipe 12 and pump 13 and recirculated through the heater 16 and pipe 17 to the trough. The apparatus shown in Fig. 2 comprises a container 24 provided with staggered baffles 26, a rotary shaft 28 with blades 27, and a heating-coil 33. The lower part of the container is filled with mercury, the mixture of nitro compound and water is added, and the stirrer and heater set in operation; amalgam is then fed in from a hopper 32 and is distributed through the charge from a perforated coil 30; the mercury flows away by pipe 25 back to the cell, and the aqueous mixture, when sufficiently heated, is run off by pipe 36. The reduction of nitro benzene to a mixture of hydrazo benzene, azo benzene, and aniline, and of *o*-nitroanisol to *o*-anisidine, azoanisol, and hydrazoanisol, is described. Specification 3090/96 is referred to.

Electrolytic Cells. L. Casale, Rome. British Patent, **200,376**, of 1922.

In a cell for the generation of oxygen and hydrogen, each electrode comprises a column of sheet-iron strips 5, Fig. 2, bent into rectangular frames with sloping sides. Each column is surmounted by a hood 6 projecting above the liquid. The strips 5 are connected together by vertical strips supported by rods passing through insulating glands in the roof. Gaps 17 are provided in the bottom members of the columns. The cell is divided by partitions 12 into anode and

FIG. 2.

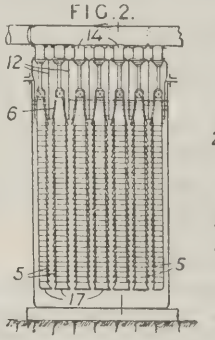
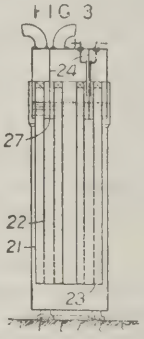


FIG 3



cathode compartments, from which the gas is withdrawn by pipes 14 connected to headers. A circulation of electrolyte up through the electrodes and down between them is set up, promoting separation of the gases without the use of a diaphragm. In a modification, the cathode consists of a cylindrical sheet 22, Fig. 3, provided with sloping gaps and an unperforated sheet 21 connected to it at the bottom by an annular plate 23. The anode is mounted within the cathode and consists of an outer cylinder with sloping gaps and an inner unperforated sheet.

Aluminium-silicate Detergents. F. H. Guernsey, and Electric Smelting and Aluminium Company, New York, U.S.A. British Patent, **200,175**, of 1922.

A crystalline detergent compound which is solid at ordinary temperatures, and having the formula $Al_2O_3(SiO_2)\ x\ (Na_2O)\ x\text{-}1\ (H_2O)y$, where x represents any number greater than seven, is made by boiling together a mixture of aluminium silicate, sodium silicate, and caustic lye. The boiled mixture is preferably chilled to a semi-plastic condition, and allowed to solidify. When x has the value 75, the compound is completely soluble and has a melting-point of 126° F. To enhance the water-softening properties of the compound, alkali metal salts of weak acids such as sodium or potassium carbonates, or other carbonates, or phosphates or borates, may be mixed with it. An emulsifying agent such as sulphonated or saponified oils or fats may also be added, preferably in amounts of about 5 per cent. To provide for loss of alkali oxide during cleansing operations, a further amount of oxide, up to 2 molecules for each molecule of detergent, may be mixed with the compound.

Synthetic Thymols. Howards and Sons, Ltd., Ilford, Essex; and J. W. Blagden, London. British Patent, **200,151**, of 1922.

M-cresol and isopropyl alcohol are condensed by the aid of phosphoric acid. If the condensation is effected at 70–80° C. thymol is the chief product, while with a temperature of about 150° C. a condensation product melting at 114° C. is obtained. Examples are given showing the procedure in each case. The resulting mixture is distilled with steam. With the high-temperature condensation the oil obtained from the steam distillation is dissolved in alkali, the insoluble portion separated, and the solution acidified to reproduce the oil, which is allowed to crystallise. The remaining liquor is again distilled and allowed to crystallise. The product of melting-point 114° C. has antiseptic properties.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Perylene Vat Dyestuffs. H. Pereira. Vienna. British Patents, **199,721, 199,722,** and **199,720.** Convention dates, June 20, 1922.

Aminoperylene quinones and their derivatives are obtained by the reduction of the corresponding nitro compounds. According to the examples, a suspension of mono- or dinitroperylene quinone or of bromodinitroperylene quinone in caustic soda solution is heated with sodium bisulphite and a current of air then blown through the hot liquid to precipitate the amino compound, which is recrystallised from hot aniline or nitrobenzene. Diaminoperylene quinone and its bromo derivative dye cotton violet from the vat.

Acyl derivatives of aminoperylene quinones or their substitution compounds are obtained by heating the aminoquinones with acids or acid derivatives. According to the examples, (1) a solution of diaminoperylene quinone in nitrobenzene is heated with benzoyl chloride; the dibenzoyldiaminoperylene quinone which is precipitated by the addition of alcohol, dyes cotton salmon red from a violet red vat; (2) a solution of diaminoperylene quinone in nitrobenzene is heated with anhydrous acetic acid; the acetyl derivative which separates on cooling dyes cotton a brown violet from a red violet bath; (3) bromodiaminoperylene quinone is heated with benzoyl chloride; cooling or the addition of equal parts of alcohol and ether precipitates the benzoyl derivative which dyes cotton a copper bronze from a cherry red vat. Dinitroperylene quinone is produced by the nitration of perylene quinone or mononitroperylene quinone. According to the example, a mixture of perylene quinone with glacial acetic acid and concentrated nitric acid is heated to boiling, mononitroperylene quinone separates out at first but becomes further nitrated on continuing the boiling. The product dyes cotton violet from a brownish violet vat.

Acetylene Polymerisation Products. Elektrizitätswerk Lonza, Basle, Switzerland. British Patent, **200,087.** Convention date, June 30, 1922.

In the production of solid polymerisation products of acetylene, such as "cuprene," by bringing acetylene into contact with a catalyst—for instance, copper,—at a raised temperature, losses due to coking are reduced by adding a percentage—for example, 5-15 per cent.—of nitrogen to the acetylene.

PUBLICATIONS RECEIVED.

Practical Chemistry for High Schools.—By H. B. Dunnicliff, M.A., B.Sc., A.I.C. (Professor of Chemistry, Government College, Lahore). 1923: London: Macmillan and Co., Ltd.; price 5s.

Rotary Air Compressors and Exhausters.—Rolling drum type. The latest pamphlet (No. 100A) of Reavell and Co., Ltd., Ranelagh Works, Ipswich. A great range of sizes are now manufactured, and many improvements have been embodied in the design of the machine, the principle of which, however, remains unaltered. Copies may be had by readers on application to the firm.

American Electro-Chemical Society.—We have received a synopsis of the autumn meetings to be held by the American Electro-Chemical Society in Dayton, Ohio, U.S.A., on September 27, 28, and 29. A very interesting programme has been drawn up, and includes papers on "The Development and Future of Electro-Deposition," "Organic Electrochemistry," and the "Utilisation of Chlorine." There will also be a symposium on "The Electro-chemistry of the Gaseous Condition."

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—The most important alteration in this market is a further considerable cut in prices made by the British makers of borax products, followed immediately by a similar reduction in the prices of imported material. Other items are showing little change, with business still mostly small and slow. **Acetic Acid,** 80% technical, £47.; 80% pure, £51.; 98% glacial, £60. in casks and about £73. in glass demijohns, ex wharf London; inquiry is still good for the limited supplies available, with the market holding quite firm. **Acetone,** British Government specification, £125. to £127. per ton, in drums; it seems almost certain that this market is likely to hold firm for some time, and higher rates are expected, owing to continued shortage of supplies. **Alum,** lump, in casks, £10. per ton; dealers are offering Continental material at about this figure, but business remains slow. **Arsenic,** Cornish white powdered, about £70. per ton; easier prices are being quoted, with little doing; foreign material is offering cheaply. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; this market appears to have been inactive during the past week; quoted rates are unchanged. **Barium Chloride,** 98—100%, about £15. per ton; at this level the spot position seems fairly steady. **Bleaching Powder,** 35—37%, about £10. per ton; dealers offering Continental material at about this figure; British makers quoting at £11. 5s., for home trade only. **Borax,** commercial, granulated £24. 10s., crystals £25., powdered £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to station in Great Britain; British makers notify a reduction of £2. per ton on all grades to the above figures. Dealers have also reduced their prices to: Commercial, granulated £23. 10s., powdered £25. per ton, for home trade, under similar conditions to makers as to delivery and packages. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers have reduced their prices by £4. per ton to the above figures, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid in Great Britain. British makers notify a reduction of £2. per ton on all grades to the above figures; dealers are offering some grades at competitive rates. **Cream of Tartar,** 99—100%, about 88s. to 90s. per cwt., less 2½%; these prices are being quoted on spot for good quantities, and the market seems fairly firm, with moderate business doing. **Citric Acid,** B.P., crystals, about 1s. 6d. per lb., less 5%; the position on spot remains unsatisfactory, with little doing; stocks available. **Epsom Salts,** commercial quality, about £5. per ton, in bags; dealers find little demand for spot parcels on the market. **Formaldehyde,** 40%, on spot, about £95. per ton; interest is being shown in material to arrive, which is offering in the region of £75. per ton. **Glauber's Salt,** commercial quality, £3. 15s. to £4. per ton, in bags; this market remains flat, with quoted rates unchanged. **Lead Acetate,** brown, about £40. to £41.; white, about £42. per ton; at these levels the market seems fairly steady, but business is quiet. **Litharge,** about £35. 10s. to £36.; dealers' prices hold well at about these figures, and some limited business has been done. **Lithopone,** 30% Continental red seal, £22. to £22. 10s. per ton; this is a very healthy market, and quite a fair business is being done; some of the best brands are fetching higher rates. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; spot stocks are available; business is small; prices steady. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers state that their prices are unchanged at these rates. **Oxalic Acid,** about 6d. per lb.; the dull tone of this market recently commented upon is still very evident, and quoted rates are unchanged. **Carbonate of Potash,** 90—92%, about £26. 10s. to £27., 96—98%, £30. to £31. per ton; last week's cheaper prices hold fairly well, but the market remains quiet. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; the market seems easy at this figure, with business

restricted. **Caustic Potash,** 88—92%, on spot, about £30. per ton; easier prices were mentioned last week, and at these lower levels the market is not at all healthy. **Permanganate of Potash,** commercial quality, about 9½d. per lb.; the market keeps up to this rate fairly well, and business is sustained. **Prussiate of Potash,** yellow, about 1s. 1d. per lb.; after the further reduction in price recorded last week this market seems steadier, but business is still restricted in volume. **Sulphate of Potash,** 96%, £11. 10s. per ton, ex ship; there is no change in values to record. **Mercury,** about £9. per bottle of 75—76lb., net; this market has been decidedly quiet of late, and prices are weaker. **Red Lead,** imported, about £35. 10s. to £36. per ton; dealers are finding some limited business at about these figures. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49.; medium, £43. to £44.; fine white crystals, £25. to £26. per ton; importers continue to quote at about these prices, but there is nothing much doing; spot stocks are available. **Saltcake,** ground and unground, home trade, about £4. per ton; export, about £4. 10s. to £5. per ton; makers' prices are at about these figures, with inquiry good. **Acetate of Soda,** about £25. per ton; inquiry seems small, but quoted rates are fairly steady. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags, carriage paid in Great Britain; British makers quote at this unaltered rate, for home trade only. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers have reduced their prices to the above figures. British makers' prices stand at the reduced rates stated last week: 70—72%, £16. 17s. 6d.; 76—77%, £18. 7s. 6d. per ton, in drums, carriage paid to destination, for home trade only. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination, British makers quote at this rate for home trade only; mineral water quality, £9. per ton. **Bichromate of Soda,** home trade, about 4½d. per lb.; export, slightly more; British makers quote at these prices. **Cyanide of Soda,** 98—100%, export, 8½d. to 9d. per lb.; home trade, about 10d. per lb.; British makers' prices given. **Nitrate of Soda,** 96%, £13. 7s. 6d. per ton, f.o.r. or f.o.b.; prices quoted are unchanged on the week. **Nitrite of Soda,** 100%, about £26. 10s. per ton; this market is on the firm side, with inquiry good, and stocks restricted. **Prussiate of Soda,** about 6d. per lb.; this rate is being quoted, but business is not at all good; the market seems fairly steady. **Hyposulphite of Soda,** pea crystals, about £13. 10s. to £14. per ton, in 1cwt. kegs; commercial quality, about £9. per ton, in casks, on spot; prices are easier this week, with demand poor. **Sodium Sulphide,** 60—62%, solid, £14.; ditto, broken, about £15. per ton, in drums; 60—65%, concentrated, in casks, about £14. 10s. per ton; business is still quiet in these products, with prices unsteady. **Sulphate of Copper,** £26. per ton; British makers state that this is their present quotation; dealers are offering imported material at cheaper rates. **Tin Crystals,** 1s. 4d. per lb.; this market is unchanged on the week. **Tartaric Acid,** B.P., crystals, about 1s. 2d. per lb., less 5%; the spot position is about the same, with plenty of material on offer, but only a small demand; the market is far from steady. **White Lead,** imported, about £43. per ton; importers are quoting at about this figure, with some business passing. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers report that they are now quoting at these higher rates on account of the state of the spelter market.

Pharmaceutical Chemicals.—Very little change has taken place in this market during the past week. Business remains restricted to small quantities, with dealers holding their prices up fairly well. **Acetanilid,** crystals and powder, about 1s. 6d. per lb., the demand remains slow and limited; larger quantities are at cheaper prices. **Acetyl-Salicylic Acid,** B.P., about 3s. to 3s. 1d. per lb.; dealers holding stocks of good brands are quoting at these figures, with business limited. **Benzoic Acid,** B.P., about 2s. 6d. per lb.; this market seems of no interest; values nominal. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. per lb.; dealers' prices hold at about this figure, but business is quiet. **Salicylic Acid,** B.P., about 2s. 3d. per lb.; this market seems rather irregular on quotation, but the tendency seems to a firmer basis. **Tannic Acid,** leviss, about 3s. 2d. to 3s. 4d. per lb.; slightly easier rates are being quoted here for good quantities; market dull. **Amidopyrin,** about 14s. per lb.; this market shows little sign of life, though quotations on spot are varying. **Ammonium Bromide,** about 7d. per lb.; the demand is still unsatisfactory, but prices seem a little steadier on spot. **Benzonaphthol,** about 5s. per lb.; this market remains dull, with quoted rates unchanged. **Benzaldehyde 03,** 3s. per lb.; a quiet week of business, with quoted rates level. **Betanaphthol,** resublimed, about 1s. 10d. per lb.; this market is a shade easier, and remains quiet. **Calcium Lactate,** about 1s. 9d. per lb.; dealers' prices show no further fall, and seem steady; business small. **Chloral Hydrate,** duty paid, about 4s. per lb.; some spot goods might be picked up at slightly easier rates. **Creosote,** B.P., 2s. 5d. to 2s. 6d. per lb.; business remains small; quoted rates unchanged. **Creosote Carbonate,** about 8s. 6d. per lb.; this market has been almost inactive. **Guaiacol Carbonate,** about 8s. 3d. per lb.; the position is unchanged on the week. **Hexamine,** about 3s. 9d. per lb.; offerings on spot are round about this figure, but there is no great amount of business about. **Hydroquinone,** about 3s. 6d. per lb.; this market seems to be weakening, and some slightly cheaper offers are being made. **Methyl Salicylate,** about 2s. 4d. to 2s. 6d. per lb.; at these slightly easier rates the market is still dull. **Methyl Sulphonal,** about 15s. per lb.; this price is quoted, but there seems to be little interest in this article. **Paraformaldehyde,** about 3s. 6d. per lb.; at this unchanged value the market keeps steady, but is still rather quiet. **Paraldehyde,** 1s. 5d. to 1s. 7d. per lb., according to quantity; spot offers are on the market, with not much business passing. **Phenacetin,** about 6s. to 6s. 3d. per lb.; this market holds up very well, with some small orders being placed. **Phenazone,** about 7s. 3d. to 7s. 6d. per lb.; a slight reduction in quoted values is recorded, with the market quiet. **Phenolphthalein,** about 6s. 6d. per lb.; quoted values are very irregular, with some as high as 7s. per lb. **Potassium Bromide,** B.P., crystals and granular, 6d. to 6¾d. per lb., according to quantity; this market is still a weak feature, with little business about. **Potassium Permanganate,** B.P., about 10d per lb.; at this level the spot position seems quite healthy, and business fairly good. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; nominal; no business or inquiry reported. **Sodium Benzoate,** 2s. 4d. to 2s. 6d. per lb., nominal; the market remains idle. **Sodium Bromide,** B.P., crystals and granular, 7d. to 7½d. per lb.; supplies are offered on spot, with not much demand; market weak. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; prices quoted are unchanged, but business is lacking badly. **Sodium Salicylate,** powder, about 2s. 5d.; crystals, about 2s. 8d. per lb.; this market keeps up very well, and there is inquiry about, with spot stocks rather low. **Sulphonal,** about 14s. to 14s. 6d. per lb.; some cheaper offers are being made, but business is small. **Terpin Hydrate,** about 1s. 9d. per lb.; this market holds up well, although there is not much doing. **Thymol,** about 15s. per lb.; the market is easy at this figure.

Coal-tar Products, Intermediates, Etc.—One or two changes are recorded. Carbolic acid crystals are firmer. Pitch is somewhat easier. Other products are about the same on a dull market. **Aniline Oil** is a better market, with the prices fully maintained at 9d. to 9½d. per lb., drums free. **Aniline Salt** remains dull as quoted at 9½d. to 10d. per lb., casks free. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; some little inquiry is on the market. **Benzol,** 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; quoted prices are unchanged, with the market dull. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; at these rates the market seems fairly firm. **Xylol,** pure, 2s. 3d.; commercial, 1s 9d per gallon, drums extra; unchanged rates are on the market, which is still dull. **Naphtha,** about 1s. 4d. per gallon; this market is still showing little life, but quoted rates are maintained. **Solvent Naphtha,** 90/160, 1s. 5d. per gallon, drums extra; at this quoted rate the market is weak and dull. **Heavy Solvent Naphtha,** 90/190, about 1s. 4d. per gallon, drums extra; the market is weakening, with very little doing. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; the market is quiet, with values unaltered. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; dealers' prices are at the old rates, with business quiet. **Creosote Oil,** about 9½d. per gallon, f.o.b.; last week's reduced price is maintained, with the market now steady. **Carbolic Acid,** crystals, 1s. 2d. per lb., f.o.b.; this market has recovered a little, and is now much firmer. **Naphthalene,** about £20. per ton; rather weaker, and quiet; crude, £7. to £13.; powder, £17.; crystals, £23.; balls, £24.; tablets, £28.; candles, £28. per ton, packages free.

Disinfectants, 3s. 9d. per gallon, barrels free; the market quotation keeps steady at this rate. **Pyridine,** 20s. per gallon; owing to shortage of supplies, the spot position keeps quite firm. **Hexamethylene,** about 3s. 9d. per gallon; no further fall in values is recorded; market quiet. **Pure Methyl Alcohol,** £100. per ton, ex wharf London; this price is well maintained, with some business about. **Pitch,** about 135s. per ton, East Coast; quoted rates are somewhat easier at this lower level, and the market is quiet. **Sulphate of Ammonia,** home trade, 25¾%, £14. 10s. per ton, ex works, September.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £64. 5s. to £64. 7s. 6d., cash; £65. to £65. 2s. 6d., three months; electrolytic, £69. 5s. to £69. 15s. **Tin**: Standard, £198. to £198. 2s. 6d., cash; £199. to £199. 2s. 6d., three months; Straits, £202.; English, £198. 10s. **Lead,** soft foreign, £25. 17s. 6d., prompt; English, £27.; chemical sheet, 34s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 15s.; hard, £28. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £8. 15s. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. 6d. to 12s. 9d. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45.

MANCHESTER CHEMICAL MARKET. Wednesday.

There has been a slight improvement in demand for heavy chemicals during the past week, but values as a whole show no improvement, and quotations generally are in buyers' favour. In the alkali trade, prices are steady at the recent reductions, and makers are fairly well engaged with orders. **Bleaching Powder,** softwoods, quiet at £11. 5s. per ton on rails, but foreign supplies are offered at much lower prices. **Bichromates** and **Chlorates,** unchanged at recent rates, with only small business reported. Roasted **Saltcake** continues in good demand for export, but quiet for home trade at £4. 10s. to £4. 15s., carriage paid. Imported American **Sulphur** is firm at £5. 5s., free on rails. **Copper Sulphate** continues slow of sale, and quotations nominal at £25. 10s. to £26., f.o.b. **Phosphate** and **Commercial Hyposulphite of Soda** only selling in small lots, and prices are easy. **Nitrite of Soda,** firm at £26. 10s., ex store. **Concentrated Sodium Sulphide,** £15. per ton. **Nitrate of Soda,** easier at £13. 5s., f.o.r. Liverpool. White powdered **Arsenic** is only in small request, and price is maintained at £68. for Cornish make, carriage paid North of England. Yellow **Prussiates** are again lower: **Potash** 1s. 1d., and **Soda** 6d. per lb., carriage paid. **Carbonate** and **Caustic Potash** are well maintained at recent quotations, and there is fairly good inquiry. Brown **Acetate of Lime,** unchanged at £11. 10s. per ton; grey firmer at £21. **Acetate of Soda** and **Acetic Acid** are unaltered. **Miscible Wood Naphtha,** firm at 6s. 6d. per gallon. **Acetone,** scarce and dearer at £130. per ton. **Lead Salts** are dull: White **Acetate** £41., brown £43.; and **Nitrate,** £42., delivered. **Barium Chloride,** steady at £14. 10s. to £15. per ton. **Oxalic Acid,** weak at 6d. per lb., with only small inquiry. **Permanganate of Potash,** steady at 9¾d. to 10d. per lb., carriage paid.

SWANSEA MARKET REPORT. Wednesday.

Inquiries for **Tinplates** were more numerous, and prices were on the basis of £1. 3s. 1½d. per standard box. **Galvanised Sheets,** steady at £18. 7s. 6d. per ton. **Copper** easier, with prompt at £63. 2s. 6d. per ton, and three months £64. 2s. 6d. **Tin** dearer; prompt £192. 7s. 6d. per ton, and three months £193 7s. 6d. **Lead** steady, and firm at £25. 2s. 6d. per ton cash, and £24. 17s. 6d. forward; English, £26. 5s. **Spelter** firm, but business rather dull at £32. 17s. 6d. per ton prompt, and £32. 12s. 6d. forward. **Zinc Sheets** in good demand at £39. 7s. 6d. per ton, f.o.r. at works. **Sulphate of Copper,** dull at £26. 2s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda** met with better sale at £13. 12s. 6d. per ton, in bags at docks. **Bone Meal** dull; prompt, £9. 2s. 6d. per ton, f.o.b., with Indian for shipment at £8. 12s. 6d. **Rape Oil** slow, with best refined at £2. 3s. 3d. per cwt. **Cod Oil** quiet, with Newfoundland £1. 19s. 6d. per cwt. **Seed Oils** firm; raw **Linseed,** £2. 3s. 1½d. per cwt., and boiled £2. 5s. 3d., in barrels; and **Coconut Oil,** £2. 3s. 3d. per cwt. **Cottonseed Oil,** common edible £2. 2s. 3d. per cwt., and deodorised £2. 5s. 3d. **Palm Oil** firm, and in better demand, with Lagos at £35. 7s. 6d.; softs, £34. 13s. 6d. prompt, and £34. 12s. 6d. forward; mediums, £35. 7s. 6d.; and hards, £35. 12s. 6d. per ton. **Benzol,** on small supplies at 1s. 4d. to 1s. 6d. per gallon. **Turpentine** quiet, with prompt American at £3. 13s. 9d. per cwt. **Oxalic Acid,** dull at 6¼d. per lb., f.o.r. **Copperas,** in bulk, four tons and over at £2. per ton, delivered. **Sulphuric Acid,** fair demand at late rates. **Pitch,** quiet at £6. 12s. 6d. per ton. **Arsenic,** in better call, and slightly easier; white powdered, £68. 2s. 6d. per ton. An optimistic feeling was manifest in **Coal** circles: Best Admiralty smokeless £1. 9s., seconds £1. 8s., ordinaries £1. 7s.; Monmouthshire black veins, £1. 8s. 6d., all per ton, f.o.b. **Anthracite** prices very firm: Best large £2. 10s., seconds £2.; French nuts, £3. per ton, f.o.b. **Patent Fuel,** in quiet demand at £1. 10s. to £1. 13s. 6d. per ton, f.o.b. **Cokes,** in stronger demand; export, £2. 7s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, on rails at ovens.

LIVERPOOL CHEMICAL MARKET. Wednesday.

A fair demand for chemicals of the heavier class for use in the United Kingdom can be recorded, consumption appearing to have settled down on a scale commensurate with requirements. In the export branch of the trade there has been a slightly freer inquiry, and shipments on the whole have been well maintained. **Bleaching Powder** has been rather more inquired for, the lower price for use in the home trade appearing to have stimulated business somewhat; for the home trade, £10. 5s. to £10. 17s. 6d. per ton is quoted; and for export, £11. 5s. to £11. 17s. 6d. per ton. **Chloride of Calcium** continues in moderate demand, and is £5. 12s. 6d. per ton. **Caustic Soda** has had a moderate inquiry from the home trade, and has again had a fairly active shipment on export account; it is £19. to £20. per ton for 76%, carriage paid in the United Kingdom. **Bicarbonate of Soda** has again been in very fair demand for use by the home trades, and has been shipped freely to distant ports; the price is £10. 10s. per ton, carriage paid, for use in the United Kingdom. **Soda Crystals** have been rather more in request on home-trade account; they are £5. 5s. per ton, carriage paid, for use in the United Kingdom. **Nitrate of Soda** has been but little in request, and is £13. 5s. to £13. 10s. per ton. **Borax** prices have been reduced all round; £25. per ton for commercial crystals, and £26. for powdered; higher grade crystals are £29. per ton, powdered £30., and superfine £31. per ton. **Saltcake** has been steadily called for on home-trade account; it is £4. 10s. to £5. per ton for use in the United Kingdom, and £5. to £6. per ton for export. **Bichromate of Soda** has had a moderate inquiry, and is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has been in very fair demand for home-trade uses, and is £7. 12s 6d. per ton for use in the United Kingdom, and £8. per ton for export, varying according to destination. **Hyposulphite of Soda** has been steadily called for, and is £10. to £10. 10s. per ton, in 2cwt. bags, for commercial; and £15. to £16. per ton, in 1cwt. kegs, for photographic. **Sulphide of Soda** has moved but slowly; solid is £14. 10s. to £15. per ton, and crystals £8. 10s. to £9. per ton. **Chlorate of Soda** continues lethargic, and is 3d. to 3¾d. per lb. **Phosphate of Soda** has been inactive, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been quiet, and is 6¼d. per lb. **Yellow Prussiate of Potash** has been more in request; the price has been reduced, and is 1s. 1d. to 1s. 2d. per lb. **Red Prussiate** has been very quiet, and is 3s. per lb. **Carbonate of Potash** has been in moderate demand, and is £25. to £33. per ton, according to quality. **Nitrate of Potash** has again been in fair request, and is £33. to £35. per ton for refined. **Chlorate of Potash** has been neglected, and is 3½d. to 4d. per lb. **Caustic Potash** has been in fair request, and the price has been reduced; it is £31. to £32. per ton. **Permanganate of Potash** has had a steady inquiry, and is 9¾d. to 10d. per lb. **Bichromate of Potash** has been in slightly better request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in quietly steady demand; first quality is £63. per ton, second quality

is £60., and third £57. **Sulphate of Ammonia** has had a limited sale on home-trade account, but has had a fair shipment for export; it is £14. 10s. per ton for neutral of 25¾%, and £13. 7s. for ordinary of 25¼%, for use in the United Kingdom. **Carbonate of Ammonia** has been steadily called for, and is 4d. per lb. **Muriate of Ammonia** has been quiet, and is £32. to £33. per ton. **Magnesia** has been in very fair demand: **Carbonate** is £2. 5s. per cwt., and **Sulphate** £5. to £6. per ton. **Alum** has again had a quietly steady sale; it is £12. per ton for home-trade uses, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been but little in demand, and is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been rather more in request; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s., and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has been quieter, and is 1s. 2d. to 1s. 2½d. per lb. **Cream of Tartar** has had a very fair sale, and is £4. 10s. to £4. 15s. per cwt. **Boric Acid** prices have been reduced by home makers, and now stand at £48. per ton for commercial crystals, for home trade only; powdered, £50. per ton, bags free. **Citric Acid** has been quiet, and is 1s. 8d. to 1s. 8½d. per lb. **Oxalic Acid** has moved but slowly, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** has had a very limited inquiry, and is £42. to £43. per ton. **Sulphate of Copper** continues quiet for home-trade uses, and has had a small shipment for export; it is £25. 15s. to £26. per ton, in casks, less 5%, f.o.b. at Liverpool. **Arsenic** has had a moderate inquiry; white powdered is £68. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

There has been a rather better demand for chemicals on home-trade account during the week, though inquiries for export are scarce. On the whole, prices generally continue steady at about previous figures. Cream of tartar and tartaric acid are easier. British manufacturers of borax products announce a reduction of £2. per ton on boric acid and borax; imported qualities have also been reduced to a little below these figures. Quotations, at Glasgow, are as follows:—**Alum**, quiet, and in small demand; prices steady at £12. 5s. for lump, and ground £12. 5s. per ton. **Arsenic** continues in short request, and supplies are still very scarce; the quotation stands steady at £74. per ton, net, on spot. **Barium Chloride** remains very quiet, despite the recent reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation is maintained at £11. 7s. 6d. **Boric Acid** and **Borax Crystals** are little sought for though prices have been reduced, and for the former stand at £48. per ton, and £25. per ton for the latter. **Borax**, granulated, is on offer at £24. 10s. per ton, net, in 2cwt. bags. **Calcium Chloride**, 70—75%, solid, £5. 12s. 6d. per ton. **Citric Acid** is a quieter market, with the price steady at 1s. 7d. per lb., less 5%. **Copper Sulphate** is but little in request at last week's figure at £27. 10s. per ton, less 5%, at Liverpool. **Cream of Tartar** quieter, with smaller inquiry at £4. 5s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in fair request; brown rather better at £41. 10s. per ton, net; and white steady at £41. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. for spot. **Oxalic Acid** is 6¼d. per lb. **Paraffin Wax** experiences a quietly steady trade at 2½d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at 1s. 3¼d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 9s. per cwt., but business is nominal at this reduced figure. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb. **Chlorate** is quieter at 3¾d., while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic**, 43—44%, rather easier, and inclined to be dull at 1s. 1d. per lb. **Tartaric Acid** still shows a quiet tendency at 1s. 2¼d. per lb., less 5%, Glasgow.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending September 1.

AMMONIA (ANHYDROUS)—
Hamburg, 20 cylds.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 24 pkgs., 15 cks.

BARYTES—
Antwerp, 1 brl.; Bremen, 76 cs.; Hamburg, 548 pkgs.

BLEACHING POWDER—
Hamburg, 2 cks.

CALCIUM CARBIDE—
Hamburg, 200 drms.

CAUSTIC POTASH—
Hamburg, 37 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 26 drms.

CREAM OF TARTAR—
Marseilles, 100 cks.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 350 bxs.

GLUE—
Antwerp, 60 pkgs., 12 bls.

LEAD ACETATE—
Bremen, 45 cks.

LITHARGE—
Genoa, 44 cks.

LITHOPONE—
Antwerp, 20 cks.

MAGNESIUM CHLORIDE—
Hamburg, 107 drms.

MINERAL WAX—
New York, 55 bgs.

OCHRE—
Norfolk (Va.), 127 brls.

POTASH ALUM—
Hamburg, 15 cks.

SALAMMONIAC—
Hamburg, 74 cks.

SALT—
Bremen, 2,300 bgs.
Hamburg, 600 bgs.

SILICON (METAL)—
Baltimore, 50 kgs.

SOAP—
New York, 500 cs.
Philadelphia, 600 bxs.

SODIUM ACETATE—
Hamburg, 8 cks.

SODIUM SULPHATE—
Hamburg, 200 bgs.

SODIUM SULPHIDE—
Antwerp, 26 drms.
Hamburg, 5 drms.

STEARINE—
Montreal, 87 tres.
New York, 110 brls.

SULPHURIC ACID—
Hamburg, 5 pkgs.

WHITE LEAD—
Bremen, 78 cks.; Genoa, 51 cks.; Hamburg, 39 brls.

GOOLE.

Week ending September 1.

FORMIC ACID—
Hamburg, 80 crbys.

MAGNESITE—
Amsterdam, 50 bgs.

GRANGEMOUTH.

Week ending September 1.

CALCIUM CARBIDE—
Bergen, Trondhjem, and Aalesund, 1,200 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp and Ghent, 28 brls.

FERRO MANGANESE—
Antwerp, 100 cs.

SOAP—
Antwerp and Ghent, 1 cs.

GRIMSBY.

Week ending September 1.

CHEMICALS (*otherwise undescribed*)
Antwerp, 1 brl.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 14 pkgs.

SOAP—
Hamburg, 8 cs.

HULL.

Week ending September 1.

CALCIUM CARBIDE—
Christiania, 17 t. 10 c.
Gothenburg, 20 t.

CAUSTIC POTASH—
Hamburg, 20 t. 6 c.

CHEMICALS (*otherwise undescribed*)
Antwerp, 2 t.; Copenhagen, 18 galls.; Gothenburg, 2 c.; Hamburg, 5 t.; Rotterdam, 4 t. 10 c.; Stockholm, 5 t.

COAL TAR PRODUCTS—
Tar Oil
Helsingfors, 2 t. 4 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 6,820 lb.

FERRO CHROME—
Dunkirk, 30 t.
Gothenburg, 50 t.

FERRO SILICON—
Christiania, 5 t.

FERTILISERS (*otherwise undes.*)—
Christiania, 4 t.

FULLER'S EARTH—
Bremen, 14 t. 15 c.

RESIN—
Christiania, 10 t.
Valencia, 150 t.

TALLOW—
Christiania, 22 t.

TANNING MATERIALS—
Wattle Bark
Durban, 171 t. 2 c.

LEITH.

Week ending September 1.

ACETIC ACID—
Rotterdam, 7 cks.

ALBUMEN—
Rotterdam, 24 cs.

BARYTES—
Hamburg, 100 dble. bgs.

CALCIUM CARBIDE—
Rotterdam, 60 drms.

CASEIN—
Bordeaux, 10 bgs.

LITHOPONE—
Amsterdam, 74 cks.
Rotterdam, 20 cks.

MAGNESITE—
Rotterdam, 25 bgs.

OXALIC ACID—
Rotterdam, 7 cks.

POTASSIUM PRUSSIATE—
Rotterdam, 6 cks.

ROSIN—
Bordeaux, 50 cks.

SALT—
Hamburg, 600 bgs.

SOAP—
Antwerp and Ghent, 7 cs.
Copenhagen, 20 cs.

SODA CRYSTALS—
Antwerp and Ghent, 120 bgs.

STEARINE—
Montreal, 87 trcs.

TAR (WOOD)—
Gothenburg, 6 brls.

WHITE LEAD—
Amsterdam, 30 cks.

ZINC OXIDE—
Antwerp and Ghent, 20 brls.

LIVERPOOL.

Week ending September 1.

ACETIC ACID—
Holland, 6 cks.

ARGOLS—
France, 653 bgs.
Genoa, 160 bgs.
Leghorn, 120 bgs.
Spain, 99 sks.

BARYTES—
Germany, 164 cks.

BEESWAX—
Germany, 70 bgs.
W.C. Africa, 614 blks.

BISMUTH—
Arica, 160 bgs.

BONE FERTILISER—
Egypt, 32 bgs.; India, 5,691 bgs.; Nantes, 900 bgs.

BORAX—
U.S.A., 500 bgs.

BORIC ACID—
Leghorn, 97 brls.

CALCIUM CARBIDE—
Holland, 200 drms.

CARBON BLACK—
Nantes, 256 bgs.; U.S.A., 220 cs.

CARBONATE OF LIME—
Hamburg, 12 cks.

CARNAUBA WAX—
Brazil, 109 bgs.

CAUSTIC POTASH—
Czecho-Slovakia, 40 drms.
Germany, 47 drms.
Hamburg, 40 drms., 17 cks.

CHEMICALS (*otherwise undescribed*)
Danzig, 6 pkgs.; Huelva, 3,140 t.; Valencia, 5 cs.

CHROME ORE—
Karachi, 265 t.

COAL TAR PRODUCTS—
Anthracene
France, 6 cs.

COPPER PRECIPITATE—
Huelva, 190 bgs.

CREAM OF TARTAR
Barcelona, 120 brls.; Bordeaux, 1 bg., 30 cks.; Germany, 80 kgs.; Marseilles, 56 cs.; Pasages, 99 bgs.; Spain, 40 kgs.

CRYOLITE—
Denmark, 250 bgs.

CYANAMIDE OF LIME—
U.S.A., 784 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
France, 7 kgs.

DYESTUFFS (NATURAL)—
Fustic
France, 5 cks.
Logwood
France, 40 cks., 129 cs.
Jamaica, 32 cks.
New York, 194 brls.
Turmeric
Bombay, 63 bgs.

FORMIC ACID—
Hamburg, 221 crbys.

GELATINE—
Germany, £66.; Hamburg, 10 cs.

GLUE—
Antwerp, 243 bgs.
France, 100 bgs.
Havre, 20 cs.

GLYCERINE—
France, 384 drms.

IODINE—
Chili, 50 brls.

IRON OXIDE—
Spain, 63 brls., 1,000 bgs., 10 cks.

KIESELGUHR—
Algiers, 104 bgs.
Bordeaux, 645 bgs.

LACTOSE—
Germany, 10 cs.

LEAD ORE—
Mollendo, 1,388 pkgs.

LITHOPONE—
Rotterdam, 60 cks.

MAGNESIA—
Amsterdam, 50 bgs.

MAGNESITE (CALCINED)—
Amsterdam, 50 bgs.

MANGANESE ORE—
Calcutta, 2,000 t.; India, 1,000 t.
W.C. Africa, 1,053 t.

METHYL ALCOHOL—
Germany, 12 drms.

OXIDE (*otherwise undescribed*)—
Spain, 4 brls.

PARAFFIN SCALE—
U.S.A., 250 brls.

PARAFFIN WAX—
Burma, 400 bgs.
Poland, 300 bgs.

POTASH—
Hamburg, 30 drms.

ROSIN—
Bordeaux, 2 cks.
Portugal, 64 cks.

SOAP—
Bombay, 14 cs.; France, £631.; Marseilles, 150 cs.; Montreal, 167 cs.

SODIUM CHLORATE—
Spain, 100 brls.

SODIUM NITRATE—
Chile, 45 bgs.
Mejillones, 5,458 bgs.

STEARINE—
Argentine, 5 brls.; Belgium, 26 bgs.; Holland, 2 bgs.; Uruguaya, 258 pkgs.

SULPHUR—
Italy, 150 bgs.

SULPHUR OIL—
Leghorn, 60 brls.

TALLOW—
Argentine, 22 pps., 9 cks.
New York, 1 trc.
U.S.A., 500 pkgs.

TANNING MATERIALS—
Chestnut
France, 356 cks., 502 bgs.
Genoa, 200 cks.
Gambier
Dutch Borneo, 60 cs.

TANNING MATERIALS—
Mimosa
South Africa, 1,690 bgs.
Myrabolans
Bombay, 6,824 pkts., 4,000 bgs.
India, 4,288 pkts.
Quebracho
Argentine, 1,966 bgs.
Sumac
Palermo, 570 bgs.
Valonia
Smyrna, 371 bgs.
Wattle
S. Africa, 5,808 bgs., 1,126 bls.

TAR (WOOD)—
U.S.A., 100 drms.

TARTARIC ACID—
Holland, 60 kgs.; Italy, 50 kgs.

TIN ORE—
Lisbon, 300 bgs.

ULTRAMARINE BLUE—
France, 4 cks.

WAX (*otherwise undescribed*)—
Hamburg, 70 bgs.

WHITE LEAD—
Germany, 31 cks.
Holland, 20 cks.

ZINC ASHES—
U.S.A., 128 t. 10 c.

ZINC OXIDE—
Holland, 25 cks.
U.S.A., 250 brls.

ZINC WHITE—
Holland, 60 cks.

LONDON.

OFFICIAL AMENDMENT.

To Return for week ending Aug. 17.

FUSEL OIL—
Holland, 1,300 cks.

Should read.

FUSEL OIL—
Holland, £1,300.

To Return for week ending July 6.

MAGNESIUM OXIDE—
Germany, £335.

Should read.

MAGNESITE—
Germany, £225.

Week ending September 1.

ACETIC ACID—

Germany,	5 pkgs.	
,,	65	V. Blagden

ACETONE—

Germany,	9 t. 14 c.	V. Blagden

ALUM—

Spain,	500 pkgs.	Greeff

ALUMINIUM SULPHATE—

El Cargado,	300 pkgs.	
France,	700	J. Bailey

ARGOLS—

France,	886 pkgs.	
Spain,	1,048	

ARSENIC—

Japan,	4 c.	

ARSENIOUS ACID—

Japan,	141 pkgs.	W. & S. Bowditch
N.S.W.,	140	E. Swan
U.S.A.,	800	W. & S. Bowditch

BARIUM CHLORIDE—

Germany,	£169.	B. & F. Dispatch

BARIUM PEROXIDE—

France,	£476.	

BARYTES—

Belgium,	378 cks.	Felton & Crepin
Germany,	39	H. W. Winter
,,	100	Beck & Pollitzer
,,	83	Pallister, Luck
,,	114	Harrison
,,	100	A. Hughes
,,	300	H. Smart

BEESWAX—

France,	92 bgs.	A. C. E. Garnham
Pacific Fr. Poss.,	92	C. M. Courtus
Spain,	17 bgs.	Weber, Smith, & Hoare

BLEACHING POWDER—

Germany,	15 t.	J. M. Steel

BONE BLACK—

U.S.A.,	200 pkgs.	Taylor

BORATE OF LIME—

Chile,	5,234 bgs.	Borax Consol.
,,	725 t.	

CALCIUM CARBIDE—

Holland,	10 c.	
Jugo-Slavia,	210 t.	
Switzerland,	314, 9 c.	

CALCIUM CARBONATE

France,	£14.	Symons

CAMPHOR

Japan,	400 cs.	R. Warner
,,	25	Weber Smith & Hoare

CANDELILLA WAX—

U.S.A.,	30 bgs.	Van Oppen

CARBON BISULPHIDE—

Germany,	£137.	J. Schnurmann

CARBON BLACK—

U.S.A.,	410 cs.	
,,	236	W. Hausher
,,	100	Cornbrook Chem.
,,	125	H. W. Peabody
,,	100	Pollexfen
,,	148	Hughes & Hughes

CASEIN—

Belgium,	£357.	
France,	£1,500.	
N.Z.,	£650.	J. Nathan
,,	£180.	
,,	£2,100.	Ray

CAUSTIC POTASH—

Germany,	21 pkgs.	Petri
,,	66 drms.	J. M. Steel
Spain,	18 pkgs.	Beck & Pollitzer

CHEMICALS (*otherwise undescribed*)

Brit. India,	£15.	A. Howden
Denmark,	£48.	A. Griffiths
France,	£34.	A. J. Malicet
Germany,	£90.	
,,	£51.	Petri
,,	£32.	J. Schnurmann
Holland,	£10.	Burton, Smart & Orford

CHEMICALS (*otherwise undes.*)—
£1,680.

COAL TAR PRODUCTS—
Anthracene Oil

France,	£735.	Sender

Creosote Oil

France,	£935.	Sender

Naphthalene

Belgium,	£75.	H. H. Poole
,,	£20.	Jessop
,,	£220.	Burt, Boulton & Haywood

CREAM OF TARTAR—

France,	50 cks.	
,,	100 brls.	W. Taylor
Spain,	40 pkgs.	

DEXTRINE—

Germany,	84 t. 15 c.	
,,	9 17	K. J. Mulder
Holland,	1	Pronk Davis & Rushby

DYESTUFFS (ARTIFICIAL)—
Unspecified

Germany,	£779.	
,,	1 brl.	
Holland,	3 pkgs.	
Switzerland,	£60.	

DYESTUFFS (NATURAL)
Cutch

Burmah,	100 pkgs.	Leach

Logwood

U.S.A.,	5 brls.	E. A. Kimpton

Turmeric

Brit. India,	140 pkgs.	

FERTILISERS (*otherwise undes.*)—

Belgium,	48 t.	H. H. Poole
,,	40	C. Page
Brit. India,	50	,,
Holland,	67	

FORMALDEHYDE—

Sweden,	51 pkgs.	

FUSEL OIL

Holland,	12 drms.	

* Entered under the Safeguarding of Industries Act.

GELATINE—
Belgium, £1,765. Duche
France, £141.
Germany, £121. W. A. J. Tilleray
,, £181. H. Smart
,, £46. A. C. Berens

GLUE—
Belgium, £3,110. Cazaly Mills
,, £350.
,, £175. Duche
Czecho-Slovakia, £350. H. Smart
France, £170. Greathead & Humbert
,, £370.
,, £5. A. J. Malicet
,, £12. C. Vairon
,, £96. Symons
Hungary, £307. P. Ingenlath
Holland, £17. H. W. Winter
U.S.A., £4. Gerhard & Hey

IODINE—
Chile, £4,752.

IRON PERCHLORIDE—
Germany, £160. Rousheim, Moore

ISINGLASS—
Japan, 20 bls. W. M. Smith
,, 20

KIESELGUHR—
France, 10 t. 8 c.
U.S.A., 8 19 Martineaus

LEAD ACETATE—
Germany, £105.

LITHOPONE—
Germany, 2 cks. W. Hall
Holland, 80 F. T. H. Nye
,, 60 M. Ashby
Spain, 20 Greeff
,, 200 Japp, Hatch

MAGNESITE—
Brit. India, £44. Paul & Preston
Holland, £150. Scheuer
,, £48.
,, £160. Cazaly, Mills

METHYL SALICYLATE—*
——— £159.

MINERAL COLOURS (*otherwise undescribed*)—
France, 4 pkgs. Symons
Spain, 40 Lavington

OCHRE—
France, 28 cks. L. Le Personne
,, 20 Taylor

PARAFFIN WAX—
Germany, 25 t. Gerhard & Hey
U.S.A., 38 t. 12 c. H. Hill
,, 233 3 Prices Pat. Candle

PARAFORMALDEHYDE—*
——— £250.

PHENOLPHTHALEIN—*
——— £938.

PITCH (*otherwise undescribed*)—
Mexico, 503 t. Anglo-Mex. Petr.

PLUMBAGO—
Ceylon, 62 brls. Morgan Crucible
,, 286 cks. H. Johnson

PLUMBAGO—
Germany, 70 cks. A. Bramwell
,, £176. J. G. Hems

POTASSIUM CARBONATE—
Canada, 5 pkgs. Charles & Fox
Germany, 11 Scheuer
,, 26 Petri
,, 36 cks. J. M. Steel
,, 13 Barber & Kent

POTASSIUM CYANIDE—
Germany, £100. Neale & Wilkinson

POTASSIUM NITRATE—
Brit. India, 1,139 pkgs. G. & H. Green

POTASSIUM PERMANGANATE—
France, 500 pkgs. C. Tennant

POTASSIUM PRUSSIATE—
Holland, 4 pkgs. Harrison

PRUSSIAN BLUE—
Belgium, 10 cks. H. H. Poole
Germany, 5 Stancourt & Muir

PYROGALLIC ACID—*
——— £187.

ROSIN—
France, 6 cks. Jenson & Nicholson
,, 152 Lowden Connell
,, 56 Rosin & Turp. Imp.
,, 100 brls. Langley Smith
,, 25
,, 13 W. J. Gardiner
Italy, 3 brls. W. M. Smith
Portugal, 49 cks. Rosin & Turp. Imp.
,, 65 brls. Langley Smith
U.S.A., 697 Lowden, Connell
,, 1,400
,, 100 Rosin & Turp. Imp.

SALAMMONIAC—
Germany, 8 cks.

SALT—
Germany, 30 t.

SHELLAC—
Brit. India, 29 t. 2 c. Litchfield & Saundy
,, 23 t. 12 c. J. W. Cook
U.S.A., 1 t. 9 c. Adolphe Hurst

SOAP—
Austria, £12.
Belgium, £45. Davidson Park
Canada, £6,433. Gerhard & Hey
Denmark, £18.
,, £18. H. Honeychurch
France, £8. Mory
,, £187. Pronk Davis & Rushby
,, £267.
,, £90. E. A. Kimpton
Germany, £112.
,, £5. Beck & Pollitzer
,, £25. L. Duforest
,, £63. A. Potter
Holland, £350. C. W. Hartrodt
Hungary, £51. Schenkers

SOAP—
Palestine, £142. G. W. Wheatley
U.S.A., £720. H. C. Hacking
,, £354. Knight & Morris

SODA CRYSTALS—
Belgium, 10 t. P. Winn

SODIUM BENZOATE—*
——— £301.

STEARINE—
Argentine R. 50 tres. Armour
Belgium, 38 bgs. Barrow, Hepburn & Gale
Holland, 19
Victoria, 40 pkgs.

SULPHUR—
France, £54. G. W. Wheatley
Germany, £34. J. Schnurmann
Italy, £40. Houlder
,, £226. Typke & King
,, £200.

TALLOW—
Argentine R., 8 t. 17 c. Armour
France, 9 17 A. W. Page
Holland, 30
N.S.W., 148
N.Z., 27 12
,, 2 10 Anning & Cobb
Norway, 66 Burroughs, Wellcome
Queensland, 103 18 Anning & Cobb
Victoria, 25 2 H. Hill

TANNING MATERIALS—
Divi Divi
Brit. India, 256 pkgs. Flack, Chandler
Gall Nut
China, £1,755. J. W. Cook
Gambier
Dutch Indies, 340 pkgs. Humphrey & H. Grey
Straits Setts., 170 Dalton & Young
Myrabolans
Brit. India, 800 pkgs.
Sumac
Italy, 250 pkgs. Fisher King
Spain, 476
Unspecified
Natal, 218 t. Page & East
,, 25 Mimosa Bark
,, 50 Boutcher, Mortimore

TAR (*otherwise undescribed*)—
Natal, 53 brls.
Poland, 101 White Sea & Baltic
,, 438 Bergenske

TAR (WOOD)—
Finland, 38 brls.

TARTARIC ACID—
Italy, 50 pkgs.

TURPENTINE—
Poland, 19 brls. White Sea & Baltic
,, 34 Sale
U.S.A., 200 Lowden, Connell
,, 358

WHITE LEAD—
Germany, 96 cks. Pallister, Luck
,, 41 H. Smart
U.S.A., 24 cks. Greeff

ZINC OXIDE—
U.S.A., 250 cks. M. Ashby

MANCHESTER.

Week ending August 28.

ACETIC ACID—
Hamburg, 21 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
Hamburg, 13 cks.

DEXTRINE—
Hamburg, 350 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 23 cks.

SALT—
Hamburg, 200 bgs.

SODIUM ACETATE—
Hamburg, 56 cks.

SODIUM NITRITE—
Hamburg, 200 cks.

TANNIC ACID—
Hamburg, 20 cks.

TARTARIC ACID—
Hamburg, 43 kgs.

NEWCASTLE-ON-TYNE

Week ending September 1.

BARYTES—
Hamburg, 48 brls.

CALCIUM CARBIDE—
Christiania, 800 drms.
Hamburg, 280 drms.
Rotterdam, 170 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 2 cs.

GLUE—
Antwerp, 204 bls.

MAGNESITE—
Rotterdam, 100 bgs.

MAGNESIUM (METAL)—
Hamburg, 40 drms.

POTASSIUM NITRATE—
Bremen, 220 t.

SALAMMONIAC—
Hamburg, 20 brls.

SALT—
Hamburg, 130 bgs.

SOAP—
Copenhagen, 4 cs.

SODIUM NITRATE—
Christiania, 50 bgs.

WHITE LEAD—
Antwerp, 3 cks.

N. & S. SHIELDS.

Week ending September 1.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending September 1.

AMMONIUM SULPHATE—
Mauritius, 200 t.

CHEMICALS (*otherwise undescribed*)
Adelaide, 3 pkgs.; Auckland, 270 pkgs.; Benkoelen, 150 pkgs.; Delagoa Bay, 1,770 pkgs.; Durban, 1,203 pkgs.; Dunedin, 2 pkgs.; Madras, 320 pkgs.; Mauritius, 45 pkgs.; Melbourne, 60 pkgs.; Monte Video, 29 pkgs.; Montreal, 635 pkgs.; Rouen, 298 pkgs.; Sydney, 219 pkgs.; Wellington, 95 pkgs.

CHROMIUM OXIDE—
Sydney, 2 c.

COAL TAR PRODUCTS—
Tar
Durban, 29 t. 15 c.; Helsingfors, 16 t.; Kotka, 4 t.; Mauritius, 3 t. 12 c.; Rouen, 4 t.
Unspecified
Gothenburg, 10 t. 16 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Lyttleton, 1 c.

DYESTUFFS (NATURAL)—
Logwood
Dunedin, 1 t. 1 c.

GLUE—
Montreal, 4 c.

MAGNESIA—
Gothenburg, 3 t.

PARAFFIN WAX—
Hamburg, 1 t.; Sourabaya, 50 t.

POTASSIUM BICHROMATE—
Calcutta, 1 t.; Delagoa Bay, 10 c.; Hamburg, 1 t. 3 c.; Lyttleton, 8 c.; Madras, 5 t.; Sydney, 11 t. 19 c.

SHEEP DIP—
Auckland, 5 t. 14 c.; Dunedin, 13 c.; Lyttleton, 1 t. 7 c.; Wellington, 2 t. 14 c.

SOAP—
Durban, 1 t. 2 c.

SODA ASH—
Adelaide, 10 c.

SODA CRYSTALS—
Auckland, 1 t. 17 c.

SODA CRYSTALS—
Chittagong, 3 c.

SODIUM BICHROMATE—
Adelaide, 1 t. 5 c.; Calcutta, 1 t. Dunedin, 1 t.; Hamburg, 19 c. Melbourne, 3 t. 16 c.; Sydney, 2 t. 17 c.

SPERMACETTI WAX—
Hamburg, 16 c.

SUPERPHOSPHATE—
Durban, 64 t. 10 c.

TALLOW—
Mauritius, 12 c.

WAX (*otherwise undescribed*)—
Melbourne, 15 t.

ZINC CHLORIDE—
Rouen, 6 t.

* Entered under the Safeguarding of Industries Act.

GRANGEMOUTH.

Week ending September 1.

AMMONIUM CHLORIDE—
Rouen, 5 t. 14 c.

BORAX—
Rotterdam, 2 t.

BORIC ACID—
Rotterdam, 3 t 4 c.

CAUSTIC SODA—
Riga, 4 c.

COAL TAR PRODUCTS—
Naphtha
Rouen, 1,122 galls.
Napthalene
Rotterdam, 20 t.
Tar
Reval, 84 t.

MAGNESIUM CARBONATE—
Antwerp, 10 c.

MAGNESIUM OXIDE—
Antwerp, 12 c.; Rouen, 2 t. 15 c.

PARAFFIN WAX—
Riga, 2 t.; Rouen, 2 t.

PITCH (*otherwise undescribed*)—
Christiansand, 10 t.

SHEEP DIP—
Christiansand, 3 c.

SOAP—
Christiansand, 1 t. 2 c.

HULL.

Week ending August 28.

AMMONIUM SULPHATE—
Naples, 1,010 bgs.

CHEMICALS (*otherwise undescribed*)
Antwerp, 267 drms.; Amsterdam, 18 cks., 180 drms.; Copenhagen, 7 cks., 22 drms.; Hamburg, 3,764 cks., 60 drms.; Harlingen, 10 drms.; Hango, 20 cks., 20 drms.; Helsingfors, 55 pkgs., 70 kgs.; Malmo, 1 ck., 15 drms.; New York, 20 drms.; Palermo, 2 cs.; Rotterdam, 2 cs., 2 cks., 43 drms.

COAL TAR PRODUCTS—
Pitch
Genoa, 100 cks.; Hamburg, 85 cks.; New York, 136 brls.

GELATINE—
Montreal, 50 bgs.

GLUE—
Malmo, 1 bg.
New York, 80 bgs., 14 cks.

GLYCERINE—
Copenhagen, 6 drms.
Amsterdam, 80 drms.
Hamburg, 30 drms.

LITHARGE—
Helsingfors, 17 cks.

MINERAL WHITE—
New York, 1,200 bgs.

SOAP—
Amsterdam, 500 cs.
Copenhagen, 1,013 cs.
Malmo, 12 bls.
Rotterdam, 243 cs.
Trieste, 40 kgs.

TANNING MATERIALS—
Unspecified
Leghorn, 120 bls.

TURPENTINE—
Copenhagen, 18 cks.

LEITH.

Week ending September 1.

ACETIC ACID—
Thorshavn, 2 cs.

AMMONIUM SULPHATE—
Alicante, 5,419 bgs.; Malaga, 5,419 bgs.; Tarragona, 5,419 bgs.

AMMONIUM CARBONATE—
Copenhagen, 10 brls.

COAL TAR PRODUCTS—
Tar
Gothenburg, 60 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 3 cs.

GLUE—
Gothenburg, 108 pkgs.

IRON OXIDE—
New York, 185 cks.

MAGNESIA—
Amsterdam, 4 cs.

MAGNESIUM SALTS (*otherwise undescribed*)—
Montreal, 17 cs.

PARAFFIN WAX—
Amsterdam, 160 bgs.
Antwerp, 32 bgs.
Ghent, 816 bgs.

POTASSIUM BICHROMATE—
Gothenburg, 4 cks.

SOAP—
Thorshavn, 2 cs.
Trangisvaag, 6 cs.

TALLOW—
Rotterdam, 50 cks.

TANNIC ACID—
Rotterdam, 20 kgs.

LIVERPOOL.

Week ending August 28.

CALCIUM CHLORATE—
Melbourne, 82 pkgs.
Newcastle, 37 pkgs.

CASEIN—
Calcutta, 7 bgs.

CAUSTIC SODA—
Adelaide, 50 drms.; Amsterdam, 237 drms.; Arica, 24 pkgs.; Auckland, 84 drms.; Bari, 17 drms.; Bombay, 60 drms.; Bourgas, 3 drms.; Buenos Aires, 85 pkgs.; Cape Town, 45 drms.; Copenhagen, 6 drms.; Dalny, 101 drms.; Dunedin, 40 cs.; Durban, 380 drms.; Fiume, 7 drms.; Hamburg, 355 drms.; Hong Kong, 84 drms.; Kin Kiang, 50 drms.; Malta, 1 drm.; Madras, 250 drms.; Melbourne, 9 drms.; Moji, 41 drms.; Oporto 58 drms.; Padang, 20 drms.; Penang, 60 drms.; Reval, 315 drms.; Satang, 50 drms.; Stockholm, 60 drms.; Tegal, 36 drms.

FERRO MANGANESE—
New Orleans, 416 t.

GLUE, SIZE, AND GELATINE—
Boston, 41 pkgs.
Dalny, 60 pkgs.
East London, 25 pkgs.
Melbourne, 10 cks.

PARAFFIN WAX—
Talcahuano, 267 bgs.
Trinidad, 80 brls.

SALT—
Accra, 2 t.; Antwerp, 200 t.; Auckland, 127 t.; Bombay, 8 t.; Bonny, 10 t.; Buenos Aires, 100 t.; Burutu, 20 t.; Calabar, 358 t.; Cape Palmas, 26 t.; Cotonou, 17 t.; Duala, 211 t.; Durban, 4 t.; Egwanga, 10 t.; Gothenburg, 7 t.; Halifax, N.S., 237 t.; Havre, 6 t.; Helsingfors, 110 t.; Iddo, 244 t.; Koko, 4 t.; Lagos, 115 t.; Livingston, 49 t.; Melbourne, 50 t.; New Orleans, 305 t.; New York, 200 t.; Norrkoping, 70 t.; Opobo, 10 t.; Pt. Antonio, 5 t.; Victoria, W.C.A., 10 t.

SOAP—
Abonema, 100 pkgs.; Aden, 30 pkgs.; Alexandria, 275 pkgs.; Amboina, 1,000 pkgs.; Amoerang 200 pkgs.; Antwerp, 576 bxs.; Antofagasta, 5 bxs.; Auckland, 840 bxs.; Arica, 25 pkgs.; Antigua, 160 pkgs.; Bandjermassin, 926 bxs.; Bangkok, 266 pkgs.; Banjoewangie, 100 bxs.; Barbados, 454 pkgs.; Batavia, 3,615 pkgs.; Batjan, 80 bxs.; Beira, 24 pkgs.; Belawan, 1,420 bxs.; Bombay, 4,294 pkgs.; Boston, 3 cs.; Bourgas, 745 cs.; Buenos Aires, 1,052 pkgs.; Calabar, 278 pkgs.; Calcutta, 252 pkgs.; Callao, 6 pkgs.; Cape Coast, 350 pkgs.; Caracas, 2 pkgs.; Colon, 365 pkgs.; Colombo, 143 pkgs.; Corral, 5 pkgs.; Copenhagen, 250 bxs.; Curacao, 313 pkgs.; Cotonou, 35 pkgs.; Demerara, 8 bxs.; Djambi, 416 pkgs.

SOAP—
Duala, 1,250 bxs.; Dunedin, 342 bxs.; Durban, 248 bxs.; Egwanga, 100 pkgs.; Fernando Po., 65 pkgs.; Gisborne, 5 pkgs.; Gorontalo, 170 bxs.; Grand Bassa, 21 pkgs.; Grand Bassam, 65 bxs.; Grenada, 50 bxs.; Hong Kong, 250 bxs.; Iddo, 4 pkgs.; Karachi, 590 bxs.; Khota Radja, 100 bxs.; Kilindini, 223 bxs.; Kingston (Jam.), 150 bxs.; La Libertad, 35 pkgs.; Las Palmas, 130 bxs.; Langsa, 5 pkgs.; Lho Seumaweh, 100 pkgs.; Liroeng, 15 pkgs.; Limon, 35 pkgs.; Lome, 55 pkgs.; Malta, 26 pkgs.; Macassar, 1,075 bxs.; Madras, 683 pkgs.; Mauritius, 210 bxs.; Melbourne, 71 cs.; Matadi, 20 bxs.; Menado, 1,250 bxs.; Merauke, 100 bxs.; Mombasa, 324 pkgs.; Monrovia, 55 cs.; Montserrat, 60 cs.; New York, 5 pkgs.; Olchleh, 25 bxs.; Oratava, 56 bxs.; Pangkalen Brandon, 50 bxs.; Pankal, Penang, 100 bxs.; Paramaribo, 119 pkgs.; Pasir, 40 bxs.; Penang, 597 pkgs.; Petta, 40 bxs.; Piraeus, 47 pkgs.; Pontianak, 310 bxs.; Pt. Harcourt, 707 cs.; Pt. Louis, 27 pkgs.; Pt. Swettenham, 60 pkgs.; Pt. Said, 703 cs.; Pt. Sudan, 89 pkgs.; Punta Arenas, 37 cs.; Rangoon, 561 pkgs.; Rio de Janeiro, 32 cs.; Rotterdam, 48 pkgs.; Salonika, 20 cs.; Saltpond, 100 cs.; Samarinda, 500 bxs.; San Fernando, 150 cs. Sapele, 125 pkgs.; Saparoea, 100 cs.; Sekondi, 13 cs.; Sherbro, 40 cs.; Siauw, 60 bxs.; Soderhamn, 1 cs.; Soembawa, 35 cs.; Sourabaya, 375 bxs.; St. Lucia, 225 cs.; Stockholm, 4 bxs.; Suez, 50 cs.; Sundsvall, 1 cs.; Tajoelandang, 20 bxs.; Talcahuano, 50 cs.; Tamatave, 200 bxs.; Tandjong Balei, 25 bxs.; Tanga, 11 cs.; Taroena, 80 bxs.; Teneriffe, 269 pkgs.; Ternate, 135 bxs.; Tientsin, 1,450 cs.; Trinidad, 1,320 pkgs.; Tumaco, 200 bxs.; Varna, 275 cs.; Victoria, W.C.A., 20 bxs.

SODA ASH—
Auckland, 19 pkgs.; Barranquilla, 75 pkgs.; Batavia, 100 pkgs.; Brisbane, 152 pkgs.; Colombo, 200 pkgs.; Copenhagen, 50 pkgs.; Dalny, 4,480 pkgs.; Delagoa Bay, 620 pkgs.; Hankow, 4,480 bgs.; Kobe, 1,082 pkgs.; Malta, 50 bgs.; Madras, 25 kgs.; Monte Video, 50 pkgs.; Moji, 5,464 bgs.; Norrkoping, 50 bgs.; Oporto, 100 bgs.; Penang, 25 pkgs.; Rangoon, 900 bgs.; Riga, 150 bgs.

SODA CRYSTALS—
Algoa Bay, 25 pkgs.
Barbados, 50 kgs.

SODIUM BICARBONATE—
Abo, 120 pkgs.; Algoa Bay, 77 pkgs.; Alexandria, 50 kgs.; Amsterdam, 400 pkgs.; Antwerp 508 pkgs.; Bangkok, 20 kgs.; Barbados, 50 kgs.; Batavia, 40 pkgs.; Bourgas, 150 kgs.; Brisbane, 135 pkgs.; Cape Town, 55 pkgs.; Caracas, 22 pkgs.; Copenhagen, 75 pkgs.; Dalny, 101 pkgs.; Durban, 90 pkgs.; Mazatlan, 100 kgs.; Melbourne, 100 kgs.; Montreal, 75 pks.; Newcastle, 7 kgs.; Penang, 24 pkgs.; Rangoon, 1,750 pkgs.; Varna, 60 kgs.

SODIUM CYANIDE—
Cape Town, 10 cs.

SODIUM SALTS (*otherwise undes.*)
Malta, 1 cs.

SODIUM SILICATE—
Auckland, 82 pkgs.; Buenos Aires, 221 pkgs.; Delagoa Bay, 75 pkgs.; Dunedin, 197 pkgs.; Durban, 295 pkgs.; Funchal, 39 pkgs.; Helsingfors, 5 pkgs.; Kobe, 32 pkgs.; Monte Video, 300 bgs.; Oporto, 33 cks.; Rangoon, 19 cks.

SODIUM SULPHATE—
Melbourne, 34 drms.

SODIUM SULPHIDE—
Auckland, 41 pkgs.; Cape Town, 13 pkgs.; Colombo, 40 pkgs.; Cisborne, 40 pkgs.

STEARINE—
Cuidad Bolivar, 40 bgs.

Week ending August 30.

ACETIC ACID—
Colombo, 8 c., £34.

ALUM—
Durban, 1 t., £11.; Havana, 4 t. 1 c., £42.; Hamburg, 10 t. 4 c., £184.; Lagos, 1 t., £11.

ALUMINOFERRIC—
Calcutta, 5 t., £36.

ALUMINIUM SULPHATE—
Lisbon, 60 t., £559.

AMMONIUM CARBONATE—
Bombay, 1 t., £43.; Calcutta, 1 t. 10 c., £50.; Guayaquil, 1 t. 9 c., £82.; Hamburg, 6 t. 15 c., £196.; Havana, 5 t., £166.; Hobart, 10 c., £20.; Melbourne, 1 t., £39.; Madras, 1 t., £43.; Rangoon, 1 t., £50.; Singapore, 3 t. 10 c., £156.; Salonika, 1 t., £33.

AMMONIUM CHLORIDE—
Auckland, 8 t., £360.; Bombay, 5 t., £203.; Bourgas, 2 t., £87.; Calcutta, 2 t., £78.; Cartagena, 1 t. 17 c., £70.; Constantinople, 19 c., £41.; Gothenburg, 14 c., £25.; Karachi, 6 t. 5 c., £244.; Kobe, 30 t., £879.; Lyttleton, 5 t., £225.; Melbourne, 3 t. 11 c., £121.; Patras, 10 c., £16.; Pt. Chalmers, 5 t., £225.; New York, 2 t. 10 c., £124.; Rouen, 3 t. 1 c., £94.; Smyrna, 1 t., £41.; Varna, 1 t., £42.; Valparaiso, 19 c., £36.; Wellington, 12 t., £540.; Yokohama, 9 t. 19 c., £294.

AMMONIUM SULPHATE—
Barcelona, 148 t. 6 c., £2,262.; Calicut, 10 t., £160.; Hong Kong, 250 t., £4,339.; Jersey, 5 t., £63.; Kobe, 440 t., £7,647.; Lisbon, 19 t. 17 c., £308.; Las Palmas, 40 t. 2 c., £611.; Mauritius, 1,324 t. 15 c., £20,232.; Nagasaki, 100 t., £1,650.; Sourabaya, 25 t., £413.; Samarang, 100 t., £1,657.; Savila Mar, 5 t., £75.; Tarragona, 183 t. 1 c., £2,883.; Teneriffe, 20 t., £305.; Yokkaichi, 700 t. 4 c., £11,550.; Yokohama, 100 t., £1,650.

ANTIFOULING PAINT—
Auckland, 3 t. 15 c., £430.; Antwerp, 1 t. 3 c., £82.; Calabar, 10 c., £36.; Gibraltar, 4 t. 15 c., £468.; Kobe, 4 t., £365.; Pt. Said, 1 t. 1 c., £82.; Rio de Janeiro, 1 t. 6 c., £137.; Sydney, 8 t., £801.

ANTIMONY REGULUS—
Monte Video, 1 t., £35.
Sydney, 5 t., £210.

BARIUM CARBONATE—
Durban, 3 t., £46.

BARIUM CHLORIDE—
Rouen, 20 t., £300.

BARIUM PEROXIDE—
Yokohama, 11 t. 9 c., £623.

BARIUM SULPHIDE—
Palermo, 2 t. 10 c., £41.

BENZOIC ACID—
Yokohama, 5 c., £51.

BLEACHING POWDER—
Auckland, 2 t. 10 c., £29.; Bahia, 7 t. 3 c., £72.; Baltimore, 3 t. 3 c., £81.; Bombay, 25 t., £310.; Brisbane, 1 t., £12.; Calcutta, 46 t. 13 c., £459.; Colombo, 6 t., £72.; Corunna, 7 t. 9 c., £90.; Durban, 1 t., £12.; Delagoa Bay, 38 t., £447.; Melbourne, 2 t., £29.; Madras, 5 t., £60.; Montreal, 10 t. 10 c., £95.; Odense, 45 t. 4 c., £407.; Philadelphia, 1 t. 6 c., £36.; Piraeus, 1 t. 19 c., £24.; Rio de Janeiro, 7 t. 11 c., £86.; Sydney, 5 t. 19 c., £77.; San Antonio (Chile), 10 t., £120.; Toronto, 17 c., £24.; U.S.A., 17 t. 13 c., £506.

BOILER COMPOSITION—
Calcutta, 2 t. 17 c., £360.; Christiania, 3 t. 16 c., £165.; Durban, 3 t. 5 c., £165.

BORIC ACID—
Cartagena, Col., 1 c., £1. 15s.; Karachi, 1 c., £4. 10s.; Lyttleton, 3 c., £8.; St. John's, N.F., 2 qrs., £2.

CALCIUM ACID PHOSPHATE—
Valencia, 1 t., £32.

CALCIUM CARBIDE—
Iddo, 12 c., £20.

CALCIUM CHLORIDE—
Auckland, 5 t. 2 c., £30.; Bombay, 10 t., £48.; Gisborne, 5 t. 2 c., £30.; Melbourne, 15 t. 7 c., £89.; Rockhampton, 9 t. 19 c., £57.; Sydney, 35 t. 17 c., £204.

CHEMICALS (*otherwise undescribed*)
Auckland, 7 t., £210.; Antwerp, 5 t. 1 c., £139.; Barbados, 2 t., £194.; Calcutta, 5 t., £156.; Dunedin, 26 t. 14 c., £202.; Hamburg, 14 t. 15 c., £391.; Hong Kong, 10 t. 8 c., £323.; Helsingfors, 5 t., £135.; Hankow, 6 t. 5 c., £194.; Lyttleton, 3 t., £30.; Monte Video, 48 t. 18 c., £350.; Stockholm, 10 t., £52.; Vera Cruz, 5 t., £145.; Wellington, 12 t. 3 c., £324.

CHLORINE—
Bombay, 2 t., £313.
Calcutta, 12 c., £16.
Durban, 7 c., £12.

CITRIC ACID—
Sourabaya, 4 c., £48.

COAL TAR PRODUCTS—
Carbolic Acid
Calcutta, 4 c., £77.; Genoa, 2 t. 19 c., £426.; Hamburg, 25 t. 2 c., £3,256.; Sydney, 1 t. 8 c., £49.

Creosote
Auckland, 9 c., £14.
Boston, 6 t. 4 c., £318.

Mirbane Oil
Auckland, 1 c., £15.
Sydney, 1 t. 5½ c., £102.

Naphthalene
Dunedin, 1 t. 6 c., £20.
Wellington, 1 t. 6 c., £20.

Pyridine
Antwerp, 3 t. 3 c., £342.
Brisbane, 8 c., £66.

Tar
Congo, 19 c., £12.; Lagos, 25 t. 4 c., £256.; Lome, 16 c., £10.; Sierra Leone, 19 c., £12.; Trieste, 1 t., £42.

Unspecified
Shanghai, 13 c., £64.

COBALT LINOLEATE—
Genoa, 1 t., £150.

COPPER SULPHATE—
Barbados, 1 c., £1. 5s.; Lagos, 10 c., £13.; Melbourne, 10 c., £13.; New Orleans, 25 t. 1 c., £612.; Pt. Elizabeth, 1 c., £1 10s.

CREAM OF TARTAR—
Auckland, 1 t., £88.; Freemantle 4 c., £17.; Dunedin, 1 t., £88.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 2 t. 3 c., £35.; Alexandria, 1 t. 16 c., £81.; Barcelona 11 c., £39.; Boston, 23 t. 4 c., £938.; Bluff, 15 c., £68.; Bombay, 16 t. 5 c., £140.; Beira, 1 t. 10 c., £123.; Bermuda, 10 c., £10.; Colombo, 18 c., £38.; Calabar, 7 c., £21.; Durban, 4 c., £13.; Guayaquil, 1 t. 6 c., £35.; Hamburg, 10 t. 1 c., £563.; Havana, 1 t. 17 c., £35.; Hankow, 1 t. 10 c., £64.; Kilindini, 7 c., £22.; Lisbon, 1 t. 2 c., £37.; Lyttleton, 19 c., £94.; Madras, 1 t. 3 c., £23.; New York, 47 t. 12 c., £3,076.; Oamaru, 5 qrs., £17.; Pt. Harcourt, 7 qrs., £21.; Rangoon, 2 c., £25.; Rotterdam, 1 c., £10.; Sekondi, 9 qrs., £14.; Sarawak, 14 c., £22.; Singapore, 9 qrs., £16.; St. John's, N.F., 7 c., £80.; Tientsin, 8 t. 14 c., £453.; Timaru, 3 t. 11 c., £194.; Vancouver, B.C., 1 t. 3 c., £42.; Vera Cruz, 11 c., £20.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 7 t. 5 c., £2,091.

Indigo
Shanghai, 11 t. 7 c., £1,480.

Unspecified
Barcelona, 7 c., £172.; Halifax, 1 c., £13.; Lisbon, 19 c., £125.; Lagos, 2 c., £28.; Vera Cruz, 7 qrs., £20.; Singapore, 6 qrs., £29.; Shanghai, 15 c., £230.

DYESTUFFS (NATURAL)—
Orchil
New York, 1 t. 18 c., £112.

ESSENTIAL OILS (SYNTHETIC)—
Boston, 4 c., £202.

FERTILISER (DRIED BLOOD)—
Colombo, 41 t. 18 c., £712.

FERTILISERS (*otherwise undes.*)—
Dominica, 1 t. 18 c., £20.
Kingston, 38 t. 4 c., £292.

GLYCERINE—
Bolivia, 5 c., £25.; Buenos Aires, 3 c., £22.; Constantinople, 1 t., £77.; Copenhagen, 1 t. 19 c., £139.; Durban, 1 t., £90.; Hong Kong, 15 t. 9 c., £1,288.; Kobe, 10 t. 3 c., £743.; Shanghai, 3 t., £268.; Vera Cruz, 5 c., £20.; Wellington, 9 t. 19 c., £872.; Yokohama, 4 t. 17 c., £386.

IODOFORM—
Calabar, 19 lb., £36.

LEAD ACETATE—
Dunedin, 5 c., £10.
Fremantle, 2 t. 5 c., £96.

LITHOPONE—
Copenhagen, 10 t., £230.

MAGNESIA (CALCINED)—
Cartagena, Col., 2 c., £18.

MAGNESIUM SULPHATE—
Bonny, 8 c., £10 10s.; Calabar, 2 c., £3.; Cartagena, Col., 2 c., £2. 15s.; Christiania, 1 t., £7.; Durban, 3 c., £4.; Lagos, 5 c., £6. 5s.; St. John's, N.F., 10 c., £12. 10s.

MANGANESE BORATE—
Buenos Aires, 10 c., £47.
Dunedin, 5 c., £17.

NICKEL SULPHATE—
Sydney, 1 t., £43.

PHOSPHORUS (AMORPHOUS)—
Buenos Aires, 2 c., £23.
Melbourne, 1 t. 9 c., £350.

PITCH (BITUMEN)—
Genoa, 21 t. 2 c., £162.

PLATING SALTS (*otherwise undes.*)
Hong Kong, 2 c., £17.

POTASSIUM BICHROMATE—
Durban, 7 c., £18.

POTASSIUM IODIDE—
Abonema, 38 lb., £40.; Calabar, 338 lb., £313.; Opobo, 9 qrs., £300.; Pt. Harcourt, 45 lb., £18.

POTASSIUM SILICATE—
Amsterdam, 2 t. 8 c., £42.

SALAMMONIAC—
Adelaide, 9 c., £24.
Brisbane, 5 c., £14.
Melbourne, 4 c., £12.
Tientsin, 3 t., £178.

SALICYLIC ACID—
Singapore, 1 c., £12.

SALTCAKE—
Three Rivers, 150 t. 9 c., £13,540.

SHEEP DIP—
Auckland, 15 t. 16 c., £674.; Bahia, 14 t. 14 c., £840.; Bluff, 8 t. 18 c., £609.; Buenos Aires, 11 t. 7 c., £438.; Durban, 1 t. 7 c., £58.; Delagoa Bay, 5 t. 7 c., £408.; East London, 10 t. 13 c., £393.; Gisborne, 8 t. 7 c., £496.; Lyttleton, 12 t. 10 c., £841.; Melbourne, 4 t. 14 c., £175.; Napier, 23 t. 7 c., £1,577.; Punta Arenas, 7 t. 17 c., £340.; Pto. Colombia, 16 c., £56.; Timaru, 15 c., £190.; Wellington, 6 t. 18 c., £560.; Wanganui, 1 t., £61.

SULPHATE OF LIME—
Oporto, 1 t. 3 c., £21.

SULPHURIC ACID—
Antofagasta, 14 t. 15 c., £147.; Sekondi, 1 t. 4 c., £22.; Santos, 1 t. 4 c., £31.

SUPERPHOSPHATE—
Jersey, 10 t., £31.
Rio de Janeiro, 6 t. 18 c., £53.

TANNING MATERIALS—
Unspecified
Auckland, 3 t. 3 c., £80.; Christiania, 4 t. 12 c., £114.; Gothenburg, 8 c., £11.; Madras, 1 t. 18 c., £58.; Mossel Bay, 6 t. 6 c., £145.; Montreal, 13 t. 3 c., £212.

TARTARIC ACID—
Melbourne, 1 t., £126.; Sydney, 4 t. 10 c., £604.; Vera Cruz, 2 c., £17.

TIN OXIDE—
Rauno, 1 t. 19 c., £84.

TIN PERCHLORIDE—
Rotterdam, 2 t. 18 c., £296.

WOOD PRESERVATIVE—
Bangkok, 1 t. 9 c., £94.; Batavia, 2 t., £62.; Demerara, 1 t. 1 c., £29.; Madras, 1 t., £30.; Singapore, 2 t. 10 c., £64.

ZINC CHLORIDE—
Bombay, 4 t. 3 c., £106.; Calcutta, 1 t. 5 c., £32.

ZINC OXIDE—
Singapore, 5 t. 1 c., £200.

LONDON.

Week ending August 29.

ACETIC ACID—
Hong Kong, 5 cs., £9.
Pt. Sudan, 15 cs., £19.

ALUM—
Christiania, 8 kgs., £5.; Delagoa Bay, 20 cs., £13.; Durban, 5 kgs., £5.; Pt. Elizabeth, 45 cs., £6.; Wellington, 5 kgs., £5.

ALUMINIUM SULPHATE—
Delagoa Bay (F.), 4 cks., £8.

AMMONIA—
Brussels, 4 cs., £7.; Kilindini, 3 cs., £5.; Singapore, 3 cs., £6.

AMMONIA (ANHYDROUS)—
Alexandria, 1 cyld., £2.
Rotterdam, 118 cylds., £912.

AMMONIUM CARBONATE—
Barcelona, 12 c., £23.; Cape Town, 2 c., £5.; Limon, 3 c., £7.; Melbourne, 8 c., £15.; Palembang, 6 c., £22.; Wellington, 2 c., £5.

AMMONIUM CHLORIDE—
Melbourne, 2 kgs., £6.

AMMONIUM PHOSPHATE
Aarhus, 10 cks., £70.

AMMONIUM SULPHATE—
Hong Kong, 200 t., £3,200.
Yokohama, 200 t., £3,500.

BARIUM HYDRATE—
Calais, 20 cs., £91.

BENZOIC ACID—
Bangkok, 1 cs. (pt.), £18.

BISMUTH CARBONATE—
Melbourne, 1 cs., £72.

BISMUTH NITRATE—
Switzerland, 2 cs., £70.

BISMUTH SALTS (*otherwise undes.*)
Karachi, 1 cs. (pt.), £16.; Montreal, 1 cs., £53.; Toronto, 1 cs. (pt.), £24.

BISULPHITE OF LIME—
Toronto, 4 kgs., £29.

BITUMEN—
Valparaiso, 12 cks., £35.

BONE FERTILISER—
Amsterdam, 1 t., £16.
Channel Islands, 12 t. 9 c., £110.

BORAX—
Durban, 1 t. (F.), £26.; Hamburg 105 t. (F.), £2,563.; Rangoon, 10 c., £28.; Rotterdam, 1 t., £78.

BORIC ACID—
Buenos Aires, 5 t. 10 c., £438.
Rangoon, 1 c., £5.
Toronto, 6 c., £18.

BORIC ACID—
Wellington, 1 c., £8.

CARBON (RETORT)—
Christiania, 38 cs., £86.

CARBON BISULPHIDE—
Channel Islands, 300 drms., £263.

CHEMICALS (*otherwise undescribed*)
Alexandria, 4 cs. (pt.), £34.; Antwerp, 100 pkgs., £269.; Auckland, 3 cs. (F.), £9.; Auckland, 47 pkgs., £240.; Barbados, 1 cs. (pt.), £7.; Beira, 100 cs., £375.; Belize, 3 cs. (pt.), £5.; Bermuda, 6 pkgs., £8.; Bombay, 81 pkgs., £140.; Bordeaux, 67 pkgs., £69.; Buenos Aires, 50 cs., £440.; Calcutta, 12 cs., £25.; Cape Town, 15 pkgs., £33.; Channel Isles, 2 pkgs., £5.; Christiania, 7 pkgs., £19.; Christiania, 10 pkgs. (F.), £32.; Colombo, 3 pkgs. (pt.), £12.; Delagoa Bay, 150 pkgs., £555.; Delagoa Bay, 5 pkgs. (F.), £26.; East London, 5 pkgs., £7.; East London, 10 pkgs. (F.), £26.; Fremantle, 110 cs., £413.; Italy, via Ghent, 1 cs. (pt.), £8.; Gijon, 10 pkgs., £28.; Gothenburg, 50 pkgs., £140.; Hamburg, 122 pkgs., £332.; Havana, 30 pkgs., £54.; Hong Kong, 2 cks., £26.; Karachi, 2 pkgs. (pt.), £14.; Madras, 110 pkgs., £413.; Malmo, 10 pkgs. (F.), £50.; Melbourne, 2 cs. (pt.), £12.; Monte Video, 1 cs., £5.; New Plymouth, 46 pkgs., £70.; New York, 2 cs., £200.; Paris, 1 pkg., £42.; Pt. Madryn, 5 pkgs., £9.; Pt. Said, 7 cs., £9.; Rangoon, 4 pkgs. (pt.), £8.; Rotterdam, 100 pkgs., £273.; Seville, 200 pkgs., £540.; Suez, 2 cs., £10.; Sydney, 6 cs., £125.; Trinidad, 4 cs. (pt.), £18.; Trujillo (Honduras), 3 cs. (pt.), £7.; Wellington, 6 cs., £66.; Wellington, 5 cs. (F.), £9.; Winnipeg, 1 cs. (pt.), £5.

CHROMIUM FLUORIDE—
Genoa, 20 kgs., £95.

CITRIC ACID—
Adelaide, 5 c., £41.; Antwerp, 1 t., £177.; Auckland, 1 c., £6.; Barcelona, 3 t., £492.; Brisbane, 2 c., £21.; Delagoa Bay, 1 c., £11.; Hamburg, 1 t., £164.; Lyttleton, 5 c., £41.; Macassar, 1 cs., £5.; Napier, 1 c., £12.; Rotterdam, 11 c., £104.; Sydney, 5 c., £41.; Valencia, 10 c., £44.; Wellington, 8 c., £66.

COAL TAR PRODUCTS—
Betanaphthol
Hamburg, 40 cks., £1,167.

Carbolic Acid
Auckland, 1 cs., £5.

Creosote
Hamburg, 90 drms., £1,560.
Malta, 10 drms., £6.

Naphthalene
Pt. Said, 10 cks., £13.
Rotterdam, 1,250 bgs., £1,270.

Nitronaphthalene
Antwerp, 2 kgs., £8.

Pitch
Alexandria, 175 brls., £255.
Demerara, 20 firkins, £24.

Tar
Channel Islands, 100 cks., £219.; East London, 250 drms., £28.; Karachi, 4 cs., £5.; Pt. Elizabeth, 275 cs., £39.

COPPER SULPHATE—
East London, 7 c., £11.
Pt. Elizabeth, 4 c., £7.

COPPERAS—
Pt. Elizabeth, 25 cs., £6.

CREAM OF TARTAR—
Brisbane, 2 t. 8 c., £209.; Delagoa Bay, 2 c., £13.; Dunedin, 3 t. 5 c., £285.; Durban, 2 c., £11.; East London, 4 c., £27.; Hamburg, 1 t. 10 c., £131.; Limon, 1 c., £5.; Lyttleton, 8 t. 8 c., £733.; Maryborough, 10 c., £44.; Melbourne, 7 t., £609.; Pt. Elizabeth, 2 c., £11.; Sydney, 18 t., £1,577.; Wellington, 1 t. 5 c., £109.

DISINFECTANTS (*otherwise undes.*)
Switzerland, via Antwerp, 11 c. (F.), £42.; Auckland, 1 t. 3 c., £134.; Bombay, 1 t. 2 c., £36.; Calcutta, 2 t. 1 c., £80.; Christchurch, 9 c., £151.; Christiania, 8 c., £28.; Colombo, 7 c., £8.; Demerara, 8 c., £12.; Dominica, 3 c., £12.; Hong Kong, 9 t. 10 c., £275.; Kuantan, 18 c., £44.; Lagos, 12 c., £44.; Las Palmas, 15 c., £20.; Malta, 6 c., £11.; Napier, 6 c., £27.; Paris, 4 t. 12 c., £75.; Pt. Swettenham, 14 c., £16.; Rangoon, 2 t. 14 c., £145.; St. Lucia, 4 c., £6.; Singapore, 1 t. 18 c., £58.; Syra, 3 c., £5.; Trinidad, 15 c., £21.

DYESTUFFS (ARTIFICIAL)
Alizarine
Wellington (F.), 1 kg., £7.
Unspecified
Auckland, 1 cs., £13.; Calcutta, 1 cs. (pt.), £17.; Colombo, 2 cs. (pt.), £6.; Demerara, 2 cs. (pt.), £10.; Durban, 7 pkgs., £197.; Manila, 1 cs., £61.; Montreal, 2 cs. (pt.), £56.; New York, 1 cs. (pt.), £8.; Penang, 1 cs., £6.; Wellington, 5 kgs., £72.; Wellington (F.), 19 kgs., £557.

FERTILISERS (*otherwise undes.*)—
Aarhus, 10 c., £13.; Christiania, 3 t., £75.; Copenhagen, 2 t. 10 c., £63.; Grimstad, 2 t., £50.; Stockholm, 2 t., £50.

GALLIC ACID—
Bilbao, 1 cs. (pt.), £20.

GLYCERINE (CRUDE)—
Amsterdam (F.), 7 t. 2 c., £320.
Hong Kong, 1 c., £5.
New York, 50 t., £2,345.

HYDROFLUORIC ACID—
Auckland, 2 brls., £7.

HYDROGEN PEROXIDE—
Alexandria, 2 cs., £12.

IODIDES (*otherwise undescribed*)—
Montreal, 1 cs. (pt.), £24.

IODINE—
Calcutta, 2 cs. (pt.), £79.

IODINE (RESUBLIMED)—
Buenos Ayres, 2 cs., £221.
Christchurch, 1 cs., £27.
Sydney, 10 cs. (pt.), £50.

IRON AMMONIUM CITRATE—
Montreal, 2 cs., £21.
Toronto, 1 cs., £11.

KIESELGUHR—
Paris (F.), 4 t. 18 c., £50.

LEAD NITRATE—
Rouen, 10 cks., £87.

MAGNESIA—
Napier, 10 cs., £24.
Valparaiso, 2 cs., £50.

MAGNESIA (CALCINED)—
Vera Cruz, 2 cs., £18.

MAGNESIUM CARBONATE—
Vera Cruz, 8 cs., £31.

MAGNESIUM CITRATE—
Limon, 1 cs., £5.

MAGNESIUM HYDRATE—
Alexandria, 5 cs. (pt.), £11.

MAGNESIUM SULPHATE—
Auckland, 8 t. 2 c., £191.; Bombay, 13 c., £16.; Colombo, 1 t., £14.; East London, 4 c., £5.; Montreal, 8 c., £6.; Napier, 1 t. 15 c., £41.; Toronto, 11 c., £13.; Wellington, 1 t. 8 c., £22.

MANGANESE OXIDE (HYDRATED)—
Genoa, 2 cs., £27.

MERCURIALS (*otherwise undes.*)—
Melbourne, 1 cs. (pt.), £21.
Montreal, 1 cs. (pt.), £11.

PHOSPHATE OF LIME—
Dunkirk, 10 kgs., £34.

PLATING SALTS (*otherwise undes.*)
Switzerland, 1 cs., £27.
Wellington, 1 ck., £6.

POTASSIUM BICARBONATE—
Toronto, 2 cks., £6.

POTASSIUM CARBONATE—
Antwerp, 4 cs., £8.

POTASSIUM CITRATE—
Calcutta, 1 cs., £13.; Melbourne, 1 cs. (pt.), £6.; Montreal, 1 ck., £10.; Sydney, 10 cs. (pt.), £64.

POTASSIUM CYANIDE—
Switzerland, 1 cs., £16.
Wellington, 1 cs., £24.

POTASSIUM IODIDE—
Alexandria, 2 cs., £169.; Calcutta, 2 cs., £176.; Christchurch, 1 cs., £88.; Canton, 1 cs. (pt.), £10.; Colombo, 4 cs. (pt.), £22.; Oruro, 1 cs. (pt.), £6.; Sydney, 10 cs. (pt.), £330..

POTASSIUM METABISULPHITE—
Oporto, 2 kgs., £10.

POTASSIUM PRUSSIATE—
Bombay, 5 kgs., £32.

PYROGALLIC ACID—
Paris, 3 cs., £120.

SALAMMONIAC—
Athens, 4 cks., £12.
Syra, 3 cks., £8.

SALICYLIC ACID—
Demerara, 1 cs., £6.

SALTPETRE—
Bahia, 1 t., £39.
Pernambuco, 1 t., £39.
Wanganui, 10 c., £20.

SHEEP DIP—
Napier, 15 t., £629.

SILVER NITRATE—
Hong Kong, 1 cs., £77.

SODIUM ARSENITE—
Delagoa Bay, 1 t., £73.

SODIUM BICARBONATE—
Bombay, 2 c., £6.; Cape Town, 5 c., £7.; Colombo, 1 t. 10 c., £24.; East London, 14 c., £20.; Montreal, 7 c., £19.; Oporto, 10 c., £28.; Santander, 9 c., £32.; Toronto, 8 c., £7.

SODIUM BISULPHITE—
Antwerp, 16 c., £20.
Penang, 1 t., £21.

SODIUM CARBONATE—
Antwerp, 1 t., £14.; Christiania, 10 c., £8.; Leghorn, 1 t., £15.

SODIUM CITRATE—
Montreal, 1 ck., £8.

SODIUM HYPOCHLORITE—
Brussels, 1 c., £5.

SODIUM HYPOSULPHITE—
Hong Kong, 1 t., £15.
Wellington, 4 cs. (pt.), £68.

SODIUM IODIDE—
Calcutta, 1 cs. (pt.), £25.

SODIUM PYROPHOSPHATE—
Leghorn, 3 t. 1 c., £108.

SODIUM SALICYLATE—
Christchurch, 1 c., £13.
New Plymouth, 1 cs. (pt.), £7.

SODIUM SILICATE—
Durban, 15 c., £23.

SODIUM SULPHATE—
East London, 11 c., £6.
Trinidad, 1 t. 2 c., £15.

SODIUM SULPHITE—
Antwerp, 15 c., £17.

SODIUM TARTRATE—
Brussels, 4 c., £17.

SULPHUR—
Trinidad (F.), 10 c., £6.

SULPHURIC ACID—
Antwerp, 15 c., £10.; Antofagasta, 10 c., £10.; Barbados, 5 c., £6.; Sekondi, 4 c., £88.

SUPERPHOSPHATE—
Durban, 12 t. 9 c., £95.

TARTARIC ACID—
Adelaide, 1 t. 10 c., £226.; Bombay (F.), 1 t., £130.; Brisbane, 1 t. 13 c., £209.; Bucharest, 2 c., £17.; Calcutta, 1 c., £9.; Chi tobal (F.), 1 c., £9.; Delagoa Bay, 1 c., £9.; Dunedin, 1 t. 3 c., £147.; Durban, 2 c., £16.; Hong Kong, 1 c., £7.; Limon, 1 c., £7.; Melbourne, 10 t. 10 c., £1,292.; Perth, 6 c., £37.; Rotterdam (F.), 1 t. 10 c., £260.; Singapore (F.), 5 c., £32.; Stockholm, 2 c., £15.; Sydney, 1 t., £123.; Valparaiso, 5 c., £39.; Wellington, 2 c., £12.

THEOBROMINE SALTS (*otherwise undescribed*)—
Calcutta, 1 cs. (pt.), £5.

THORIUM NITRATE—
Copenhagen (F.), 1 cs., £69.

TIN OXIDE—
Brussels, 3 cks., £62.

TIN SALTS (*otherwise undescribed*)
Valparaiso, 6 cs., £51.

ZINC OXIDE—
Alexandria, 20 cks., £115.
Pt. Madryn, 1 ck., £5.
Pt. Swettenham, 3 pkgs. (pt.), £9.

Week ending September 1.

ANTIMONY REGULUS—
Danzig, 2 t.

FULLER'S EARTH—
Antwerp, 15 t.; Christiania, 8 t.; Colombo, 4 c.; New York, 77 t.; Rotterdam, 11 t.

GLUE, SIZE, AND GELATINE—
Antwerp, 5 c.; Alexandria, 3 c.; Auckland, 3 c.; Bombay, 2 t. 8 c.; Bordeaux, 6 t. 7 c.; Boulogne, 2 c.; Brussels, 1 t. 10 c.; Buenos Ayres, 1 t.; Callao, 2 c.; Cape Town, 6 c.; Copenhagen, 10 c.; Limon, 1 c.; Malta, 10 c.; Napier, 10 c.; New York, 15 c.; Pt. Swettenham, 10 c.; Paris, 14 t. 15 c.; Pt. Elizabeth, 4 c.; Reval, 1 t.; Seville, 3 c.; Shanghai, 1 c.; Sydney, 2 t.; Wellington, 10 c.

ISINGLASS—
Bombay, 2 c.

MINERAL WAX—
Bermuda, £37.; Bordeaux, 7 c.; Catania, 15 c.
Christiania, 10 c.

PARAFFIN WAX—
Adelaide, 10 c.

PLUMBAGO—
Pt. Said, 1 t. 1 c.
Singapore, 10 c.

QUININE—
Bombay, 1,000 oz.; Calcutta, 22,608 oz.; Ghent, 62 oz.; Karachi, 400 oz.; Mombasa, 228 oz.; Rangoon, 1,800 oz.

SALT—
Alexandria, 3 c.; Auckland, 1 c.; Brussels, 14 c.; Dar-es-Salaam, 9 c.; Jamaica, 1 c.; Karachi, 2 t. 5 c.; Kilindini, 6 c.; Monte Video, 19 c.; Napier, 8 t. 10 c.; Penang, 3 c.; Sekondi, 4 c.; Surinham, 3 t. 10 c.; Timaru, 1 t. 18 c.

SHELLAC—
Hamburg, 4 c.

SOAP—
Acera, 8 t. 16 c.; Alexandria, 1 t. 16 c.; Amsterdam, 4 c.; Antwerp, 9 c.; Auckland, 2 c.; Barbados, 5 c.; Bermuda, 1 c.; Bombay, 11 c.; Bordeaux, 2 c.; Boulogne, 1 c.; Bremen, 1 t. 2 c.; Brussels, 1 c.; Cairns, 1 c.; Calcutta, 2 c.; Colombo, 1 t.; Constantinople, 4 c.; Demerara, 1 c.; Dunedin, 4 c.; Dominica, 1 c.; Durban, 2 c.; Ghent, 2 c.; Gibraltar, 2 c.; Hong Kong, 2 c.; Italy, 1 c.; Jamaica, 1 t.; Kilia, 1 c.; Kilindini, 2 t. 1 c.; Larache, 1 t.; Los Angeles, 2 c.; Malta, 2 c.; Marseilles, 3 t. 7 c.; Melbourne, 1 c.; Oamaru, 2 c.; Paris, 13 c.; Petrograd, £12.; Piraeus, 3 c.; Penang, 1 c.; Perth, 1 c.; St. Helena, 2 c.; St. Lucia, 9 c.; Sierra Leone, 3 c.; Singapore, 1 c.; Trinidad, 10 t. 14 c.; Trondhjem, 9 c.; Valparaiso, 1 c.; Wellington, 6 c.; Yokohama, 1 c.

STEARINE—
Paris, 3 t.

TALLOW—
Cologne, 5 t.
Hamburg, 5 t. 4 c.
Helsingfors, 5 t. 10 c.

TAR (STOCKHOLM)—
Gisborne, 8 c.; Napier, £21.

WAX (*otherwise undescribed*)—
Melbourne, 10 t.; Montreal, 1 t. 19 c.; New York, 8 c,

WHITE LEAD—
Adelaide, £116.; Auckland, £193.
Bermuda, £37.; Brisbane, £46.; Christchurch, £54.; Curacao, £33.
Dunedin, £88.; Gisborne, £46.; Lyttleton, £110.; Malta, £80.; Melbourne, £952.; Napier, £627.; Suez, £5.; Wellington, £97.

MANCHESTER.

Week ending August 28.

AMMONIUM SALTS (*otherwise undescribed*)—
France, 8 cks.

AMMONIUM SULPHATE—
France, 1,010 bgs.

CHEMICALS (*otherwise undescribed*)
Belgium, 2 pkgs.

COAL TAR PRODUCTS—
Unspecified
Basle, 14 cks., 2 kgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Australia, 84 kgs., 2 cs., 78 drms.
Bombay, 155 cks.

LEAD NITRATE
France, 10 cks.

RED LEAD—
Montreal, 2 drms.

SALT—
St. John, 10 t.

SHEEP DIP—
Sydney, 20 cs.

SIZE—
France, 1 cks.

SOAP—
Bombay, 5 cs.

TALLOW—
Bombay, 48 brls.

NEWCASTLE-ON-TYNE

Week ending September 1.

ANTIMONY—
Antwerp, 5 tres., 42 kgs., 10 cs.
Christiania, 1 ck.

ANTIMONY SULPHIDE—
Antwerp, 4 cks.

BARIUM SULPHATE (BLANC FIXE)—
Bergen, 22 cks.

BARYTES—
Hamburg, 50 bgs.

BLEACHING POWDER—
Christiania, 158 cks.
Gothenburg, 17 cks.

CAUSTIC SODA—
Bergen, 6 drms.; Christiania, 15 drms.; Copenhagen 30 drms.; Gothenburg, 258 drms.; Hamburg 104 drms.

COPPER SULPHOCYANIDE—
Copenhagen, 2 cks.

CUPROUS OXIDE
Genoa, 5 drms.

DYESTUFFS (ARTIFICIAL)
Unspecified
Bergen, 2 kgs.

LITHARGE—
Antwerp, 6 cks.; Christiania, 4 cks.; Gothenburg, 30 cks.; Hamburg, 9 cks., 40 bgs.

MAGNESIUM CARBONATE—
Antwerp, 240 bgs.

RED LEAD—
Bergen, 2 cks., Christiania, 19 cks., 5 kgs.; Copenhagen, 93 cks.; Gothenburg, 10 cks.; Hamburg, 120 cks.

SODIUM SULPHITE—
Copenhagen, 25 drms. and bgs.

WHITE LEAD—
Antwerp, 150 kgs., 56 tres., 2,222 ktls.; Copenhagen, 10 cks.; Hamburg, 16 cks.

ZINC OXIDE—
Antwerp, 50 cks.
Hamburg, 10 cks.

N. & S. SHIELDS.

Week ending August 28.

NIL.

PRICES CURRENT.

WEDNESDAY, SEPT. 5, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23	6 &	47/-
Acetic, (Glacial, B.P.) in carboys	*ton	66	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	8¼
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	9
Tarteric (crystals)	lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	6	15	0
Pyridin	gallon	1	0	0
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	130	0	0
Alum, loose lump (delivered)	*ton	12	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	10	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	68	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	10	0
Formaldehyde, 40%	ton	78	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	0	0
Lead Acetate (brown)	ton	43	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	21	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	35	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	46	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	9¾
Potassium Prussiate (yellow)	lb.	0	1	1
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/-	&	57/-
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11½
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	6
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	15	0	0
Sodium Sulphide Crystals (casks)	†ton	8	10	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	64	5	0
Lead (Chemical Sheet), delivered	cwt.	1	14	0
Lead (Foreign Pig)	ton	25	10	0
Nickel	ton	130	0	0
Silver	oz.	0	2	7d.
Tin, English Ingots	ton	198	0	0
Zinc (Spelter)	ton	33	12	6
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	42	0	0
Linseed, Raw	*ton	43	10	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	38	0	0
Turpentine	cwt	3	11	9

* *Packages extra or returnable*; otherwise prices usually include packages.

† Makers' prices for home consumption only

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
Atomic Structure and Atomic Energy	299
Sulphuric Acid Production	300
An Excess of Zeal	300
The Modern Adhesives Industry	301
The Estimation of Sulphur	303
The Institute of Metals	304
Hydrogenated Phenols and Cresols	305
Modern Methods of Water Purification	306
Mechanism of Metallic Corrosion	307
Phenols in Coal-tar Oils	308
Commercial Ethylations	309
Potassium Permanganate in Volumetric Analysis	309
Notes on the Italian Chemical Industry	310
Casein in the Paints Industry	310
French Artificial Silk Industry	311
Gazette News	311
South Wales Notes	311
New Companies	311
Items of Interest	312
Coming Events	313
Reports of Companies	314
Cumberland Coking and By-product Industries	314
Thirty-five Years Ago	314
Fertiliser News	315
Trade Inquiries	315
The Patent List:—	
Applications for British Letters Patent	316
Complete Specifications Accepted	316
Complete Specifications Open to Public Inspection before Acceptance	316
Abstracts of Latest Complete Specifications	316
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	317
Market Reports:	
London "Open Market" Report	317
Italian Chemical Market	319
London Metal Market	319
Manchester Chemical Market	319
Swansea Market Report	319
Liverpool Chemical Market	320
West of Scotland Chemicals	320
Imports of Chemical Products	321
Exports of Chemical Products	323
Prices Current	328

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CURRENT TOPICS.

ATOMIC STRUCTURE AND ATOMIC ENERGY.

SIR Ernest Rutherford's presidential address to the British Association on Wednesday night, whilst containing nothing fundamentally new, presented the whole subject of the electrical structure of matter in an exceptionally concise and intelligible form. It may now be taken as definitely proved that the fundamental units of atomic structure are the electron, the ultimate particle of negative electricity, and the proton, its corresponding analogue of positive electricity. The possibility does exist, as Sir Ernest pointed out, that future inquiry may some day show that these units are complex, and divisible into even more fundamental entities, but this is far from likely. The epoch-making work of modern physicists has given us an illuminating insight into the manner in which these units are built up and arranged to form the structure of the atoms of all the chemical elements. The atom may be regarded as a miniature solar system—although the analogy must not be pressed too far—in which rapidly rotating electrons take the place of the planets, and a nucleus corresponds to the central sun. The chemical and physical properties of an atom are functions of the number, arrangement, and relative motions of its planetary electrons, whilst its mass and radio-active properties are bound up entirely with the nature of the nucleus. The electron itself has been comparatively easy to isolate and study, so that modern knowledge of this fundamental unit is fairly extensive. With regard to the proton, however, quite a different state of affairs prevails, and although it is highly probable that the charged hydrogen atom consists of, and is identical with, the proton, such has not been definitely proved. Study of the proton, and of the manner in which protons are assembled to form atomic nuclei constitutes indeed one of the most difficult problems confronting modern science. It is known that although the negative electrical charge of the electron and the positive charge of the proton are quantitatively identical, yet the mass of the proton is infinitely smaller than that of the electron. Explanation of this striking difference in mass is not easy, but Sir Ernest Rutherford expressed his opinion that, were it not for this difference, matter—as we now know it—could not exist. Sir Ernest had some

interesting things to say about atomic energy. For the past decade or so, both the scientific and layman alike have been fascinated by the possibility of releasing and utilising industrially the tremendous forces locked up in the interior of the atom. It is doubtful, however, that such a project will ever be realised. It has been found absolutely impossible by the most powerful laboratory agencies to alter in the slightest degree the rate of disintegration of the radio-active elements. When these latter have reached a stage of nuclear stability, the energy then contained in the nucleus—of whatever magnitude it may be—is forever beyond our control. This, at least, is the opinion held by physicists to-day. By the employment of suitable forces, it is true, the outer planetary electrons may be caused to move slightly from their orbits of maximum equilibria, and, in returning, to liberate energy; but this energy is by no means comparable in magnitude to that liberated by nuclear radio-active disintegration. The conversion of hydrogen into helium in which process four hydrogen nuclei condense to form one helium nucleus is also an operation involving, theoretically, huge energy release; but in this case also no experimental evidence has yet been obtained to prove that such a synthesis can ever be carried out.

AN EXCESS OF ZEAL.

The Customs and Excise authorities of this country usually exercise a certain amount of discretion in the performance of their duties, and do not insist too emphatically on the strict letter of the law. Unfortunately, their lapses from such a commonsense attitude have been increasingly frequent within recent years, a state of affairs to which testimony can readily be borne by many chemical importers and exporters. Within the last few months several cases have come to our notice in which a rather unreasonable attitude has been adopted by the Customs authorities, and one which has occurred during the last week or so is typical of the rest. A firm of merchants imported a number of drums of commercial formaldehyde into this country. This formaldehyde, in addition to its usual content of methyl alcohol, contained also an appreciable percentage of ethyl alcohol, and the whole consignment is being held up by the Customs until the full duty on the ethyl alcohol has been paid. Notwithstanding the fact that the alcohol is absolutely impotable and cannot be recovered from the formaldehyde by any commercially practicable process, the authorities are standing fast in their refusal to release the material until payment has been made. In this particular case the amount demanded as duty is more than the actual value of the consignment, and it appears that the only course open to the importers will be to re-ship the formaldehyde and cut their losses. Although the Excise authorities reserve to themselves the right to determine whether methyl alcohol in admixture with other substances shall or shall not be dutiable, it has been customary to pass, as "duty-free," methyl alcohol contained in commercial formaldehyde, and it is difficult to see why a similar line of action should not be adopted in the case of ethyl alcohol. The latter product is present as a preservative for the formaldehyde, and is used doubtlessly because it is cheaper than the methyl alcohol. We are not dealing at the moment with the broad question of whether the free importation of formaldehyde is or is not to the best interests of the country. Our attitude on this point was expressed clearly some weeks ago in reference to the referee's decision. Whilst, however, the law remains in its present state, formaldehyde can be imported freely, and it is manifestly absurd to tax its ethyl-alcohol content as potable spirit.

SULPHURIC-ACID PRODUCTION.

The official statistics on the output of the British sulphuric-acid industry during the year ended June 30 last make rather encouraging reading. During the period under review the total production of all strengths of acid, including oleum, expressed as 70 per cent. sulphuric acid, was 1,225,000 tons, an increase of 340,000 tons over the 1921-1922 figure, but a reduction of 745,000 tons against the maximum war-figure of 1917. In terms of plant capacity the 1922-1923 output represents 62 per cent. of the available total, an appreciable increase over the 48 per cent. of 1921-1922. In a normal pre-war year such as 1913, the sulphuric-acid output represented the utilisation of about 85 per cent. of the available plant capacity, and the present figure is still too low to allow manufacture on the most economical basis. An examination of the raw materials used in the process is also not without interest. The consumption of spent oxide as a source of sulphur is growing steadily, the amount used in the year 1922-1923 being 157,000 tons against 129,000 tons in 1921-1922 and only 110,000 tons in 1913. With the diminution in the stocks of this material which accumulated in the years immediately following the war, however, a decline in the consumption may be anticipated in the near future. The official figures confirm the growing importance of sulphur even in the working of chamber plants and the consequent diminution in the amount of pyrites used. Thus in the year 1922-1923 45,000 tons of sulphur were burnt, an amount which was not exceeded in 1917 when the acid production was mainly oleum, and over 50 per cent. above last year's figure. With regard to pyrites, the consumption figures for the years 1922-1923, 1921-1922, 1917, and 1913 were 365,000 tons, 358,000 tons, 871,000 tons, and 800,000 tons. Whether in view of the recent agreement amongst pyrites producers, the mineral will regain its pre-war ascendency as a source of sulphur for acid manufacture, is, to say the least, problematical. The fertiliser industry is still responsible for the consumption of the major portion of the sulphuric acid produced, the superphosphate and sulphate-of-ammonia industries alone accounting for over half of the total production, whilst the dyestuffs industry consumes under 3 per cent. of the output.

THE MODERN ADHESIVES INDUSTRY.*

A SUMMARY OF TECHNICAL PROGRESS.

By "Investigator."

ALTHOUGH animal glues have been known from the very earliest times, only in recent years have attempts been made to systematise knowledge on the subject. Recently, the need for water-resistant glues, especially for aeroplane construction and propeller work, has led to the development of casein products, and attempts have also been made to eke out supplies of animal glues by the introduction of vegetable products prepared from soluble starch. With a view to obviating the use of the costly ester gums, attention has been given to dextrin-like materials. Many industrial vegetable offals have been utilised in order to conserve food materials, while the consumption of sodium silicate adhesives now runs into many thousands of tons per annum.

The Extraction of Animal Glues.

Described briefly, a 20 per cent. crude glue solution is obtained from bones by the following process: The crushed material is first freed from fat (12 to 18 per cent.) by repeated hot extraction with petroleum or shale oil distillates (boiling point 100°–115° C.), in batteries of extractors provided with condensers. The de-fatted and solvent-free residue is sifted in rotating cylindrical screens and then "cooked" with water in autoclaves, first under 15lb. and finally under 5lb. pressure, to facilitate the exudation of the glue.

"Osseine" is the residual product after extracting the mineral matter from bones. By treating this with hot water, glue can readily be prepared. Another procedure, which avoids the deleterious effect of heating, is to treat the phosphate-freed bones with pepsin in order to hydrolyse the proteins, and so render them soluble. Decomposition of the fats is avoided by working in an acid medium (*Ger. Pat.* 345,775, of 1918).

Hide stock and animal refuse are shredded, after washing to remove salt and dirt, and then unhaired and de-fatted ("limed"), by repeated treatments with milk of lime, the process extending over several weeks. After scraping, the swollen material is washed with water and dilute hydrochloric acid, put into sacks, and a 32 per cent. glue liquor extracted by treatment with water and steam at 80° C. For pale glues the lime should be free from iron.

Glue can be extracted from fish offals by methods similar to those used for bone glue. According to a recent specification, the offal is freed from mineral matter by treatment with hydrochloric acid (10 per cent.), the neutral residue bleached with zinc hydrosulphite, neutralised with lime water, and then "cooked." (*Brit. Pat.* 153,526, of 1920.)

The warm glue extracts obtained by any of the foregoing processes are clarified by standing in tanks, any residual grease is separated, and the liquor strained at 80° C. Clarification is usually accelerated by adding ½ per cent. of alum. Owing to hydrolysis of the latter, sulphuric acid remains in the glue, and this may lead to serious deterioration. After concentrating under reduced pressure, the residue is bleached in lead-lined tanks by means of sulphur-dioxide gas, and allowed to set in galvanised iron troughs, thinly coated with oil or paraffin, or on water-cooled glass slabs. Bleaching is sometimes effected by charcoal alone, or in combination with kieselguhr. The drying, to a water content of 10–13 per cent., is a delicate operation, and is carried out in chambers, under regulated conditions of temperature and humidity.

Modern Developments in Glue Manufacture.

A recent proposal is to utilise the colloid mill for both glue extraction and de-fatting, the order of the operations being the reverse of the usual (*Ger. Pat.* 344,238, of 1921). In order to shorten the "liming" process, the use of the Twitchell and other fat-splitting catalysts, in alkaline media, has been suggested (*Ger. Pat.* 365,448, of 1921), while Röhm claims to be able to eliminate this lengthy process altogether by a short treatment with pancreatic and similar enzymes (*Brit. Pat.* 104,181, of 1916).

Concentration of the glue liquors is usually carried out in multiple-effect evaporators at as low a temperature as possible, so as not to injure the adhesiveness of the finished product. In another method, a fine rain of glue liquor is distributed from a revolving plate on to the corrugated walls of a column, down which it flows, meeting a counter-current of warm air (*Ger. Pat.* 323,845, of 1917). Thin films of glue can also be obtained by the use of heated revolving rollers, the dried film being continuously scraped off. An interesting procedure is that of simultaneous purification and concentration by electro-osmosis. The glue extract is subjected to a potential difference between diaphragms, when the glue is coagulated, leaving the mineral matter dissolved in the liquid (*Brit. Pat.* 21,448, of 1914).

Glue from Chrome Leather Waste.

Among processes for utilising chrome leather scrap may be mentioned preliminary digestion with aqueous caustic soda (*U.S. Pat.* 1,285,474, of 1918), with solutions of Rochelle salt or salts of other hydroxyacids (Procter), with sodium peroxide and 2 per cent. sodium bisulphate at 45° C. Usually, the insoluble basic chromium compounds in the leather are converted into soluble salts. Thus, Rochelle salt forms soluble double tartrates, bisulphates form the soluble normal sulphate, while sodium peroxide gives rise to sodium chromate, which is recovered as such.

Composition and Properties of Animal Glues.

Animal glues are the products of hydrolysis of various nitrogenous tissue substances, known collectively as collagens. (The process can be reversed by dehydration). They consist chiefly of glutin, together with minor amounts of the less adhesive chondrin and mucin. Fish glues differ from animal glues in having a lower content of the amino-acids proline, oxyproline and tryptophane. Glutin (nitrogen content 18 per cent.), can be obtained ash-free by precipitation with alcohol. It is soluble in acetic and mineral acids and is not precipitated by salts such as alums, lead acetate or ferric chloride, differing in both these respects from chondrin. A delicate test for glutin is the formation of a brown precipitate with platinum salts. Tannic acid and formaldehyde both combine with animal glue, the former giving rise to a leather-like substance, while the formaldehyde compound has been utilised as an artificial silk.

The colloid content of glue solutions has been estimated by filtering dilute solutions (0.1 per cent.) through fibrous alumina. Values of 92.8 and 72.0 per cent., calculated on the total solids, were obtained for a first grade hide glue and for a photographic gelatin, respectively, these values being directly related to the adhesive power. Owing to the presence of gelatin-degradation products, such as peptones, gelatin (glutin) determinations by direct Kjeldahl method give misleading results. Such estimations should be made by precipitating the gelatin with tannic acid solution, previously standardised against pure gelatin. According to Bogue (*Chem. and Met., Eng.*, 1920), the strongest joint is given by glues with the highest content of unhydrolysed gelatin. The same investigator supports the "streptococcic" theory of glue constitution, in accordance with which, the glue consists of string-like formations of protein aggregates.

The Sterilisation of Glues.

To prevent the growth of liquefying bacteria in glues, the following concentrations (parts per litre) of antiseptics will suffice:—sulphurous acid 0.15, sulphuric acid 0.30, 40 per cent. formaldehyde 1.5, and phenol 15.0. The highly efficient sulphurous acid acts also as clarifier and decolouriser. These additions will not, however, prevent the growth of moulds in gels weaker than 40 per cent., but a gel of this concentration and above will remain free from moulds in a moist atmosphere. Sodium hypochlorite, salicylic acid, clove oil and thymol have also been used. In the case of hypochlorite, the liquefied glue is treated with twice its volume of a solution containing 3 grammes of available chlorine per litre (*Ger. Pat.*, 313,141, of 1917).

To determine free SO_2, the solution should be titrated with N/10 iodine in the usual way. Hide or leather glues, in which the SO_2 is usually combined with lime, are treated with phosphoric acid and distilled in a current of steam and CO_2. The SO_2 is oxidised in iodine solution and then precipitated as $BaSO_4$ in the usual way. Any formaldehyde is collected in Schiff's reagent (Gutbier, *Kolloid Zeit.*, 1921).

Viscosity, Adhesiveness, and Tensile Strength.

According to Bogue (*Loc. cit.*), the viscosity values, as determined in the MacMichael rotating viscometer, are directly related to the melting point, gelatin content, and joint strength. The values are referred to the viscosity of the 20 per cent. solution at 32° C. From the viscosity-temperature curve, the melting point can be obtained by

* See also the Report of the Adhesives Research Committee, *The Chemical Trade Journal and Chemical Engineer*, August 4, 1922.

extrapolating to the point of non-fluidity. Gelatin content, and hence the strength of the joint in practice are stated to be directly connected with the melting point. At temperatures well above the latter point, the viscosity increases logarithmically with the concentration. Prolonged heating and vigorous agitation diminish the viscosity, an effect frequently observed on breaking down colloidal structures by "working." On adding formaldehyde or alums, the viscosity is raised, but electrolytes do not appear to follow any definite rule in this respect.

Rudeloff (*Mitt. K. Materialprüf.* 1918) has found the most suitable conditions for testing the adhesiveness to be as follow: ratio glue to water, 2:3 (calculated on the dry weight at 100° C.); the wood pieces to be heated to 40° C. in dry air; the glue film to be dried under a pressure of 0.84 kilo per sq. cm. This investigator found that the adhesiveness of the glue film is not strictly proportional to the glue concentration, and that this property is also influenced by the temperature to which the wood is heated and by the pressure applied during the drying of the joint.

The average tensile strengths of three ordinary glues, determined on thin strips (0.1 inch), cast from the molten glue, are given as 13.2, 8.5, and 11.5lb. per square inch (Hopp, *J. Ind. Eng. Chem.*, 1920). Another method employs the torsion dynamometer on cylindrical test pieces (Sheppard, *J. Ind. Eng. Chem.*, 1920). The conclusion was reached that there was no simple relation between the concentration and the tensile strength, nor between the latter and the strength of the dry glued joint.

The acidity of glue is usually determined on a 1 to 6 per cent. solution with N/10 NaOH, using phenolphthalein, rosolic acid, or fluorescein as indicators. The latter is especially useful with dark glues. For free mineral acid alone, alizarin should be used. Hide glues are generally neutral or slightly alkaline. Bogue (*Loc. cit.*) recommends the hydrogen-ion concentration, viscosity at 60° C., consistency of the jelly, absence of foam, grease or odour, and appearance as the most suitable tests of quality and further asserts, that a high melting point affords a true index of the actual strength in service.

The Preparation of Liquid Glues.

A solution of glue loses its gelatinising power when mixed with acetic, nitric or hydrochloric acid, or when heated with zinc chloride. This property is utilised for preparing glues with low setting points, such adhesives having obvious advantages over solid compositions. Thus, the solution in acetic acid is the basis of some well known liquid adhesives ("seccotine" and "diamond cement.") Additions of calcium salicylate, thiourea, alkali sulphonates, soluble formates and formic acid have also been proposed with the same end in view. According to the Schütte-Lanz Airship Company, glues containing the latter two substances can be cooled below 0° C. without setting. (*Ger. Pat.*, 325,246, of 1917). Another liquid adhesive consists of animal glue "swelled" with carbon tetrachloride (*Ger. Pat.*, 345,601, of 1920). Channon claims non-setting properties (at 21° C.) and good penetrating power for wood, for a complex mixture, the main ingredients of which are ordinary glue, phosphoric acid, phenol and water (*Brit. Pat.*, 122,807, of 1918). In order to render glue soluble without warming, the finely-powdered material is incorporated with about one-third its weight of calcium chloride (*U.S. Pats.*, 1,300,096-7, of 1919).

Water-resisting Adhesives with Casein Basis.

The water-resistant property of casein and similar albuminous adhesives is conditioned by their limited water absorption, the glue, when saturated, having still sufficient strength to hold. Casein compositions do not require to be heated for coagulation and so can be applied cold. Owing to their poor-keeping qualities, these mixtures are kept dry until ready for use. They are usually made by treating fat-free casein with an alkali and a preservative. When hydrated lime is used, "lime binding salts" are frequently added—*e.g.*, fluoride, silicate, sulphite and phosphate of sodium. The composition of some casein glues is shown in the following examples:-

	U.S. Pat. 1,291,336/'19.				Brit. Pat. 148,216/'20.
	Parts.	*Parts.*	*Parts.*	*Parts.*	*Parts.*
Casein	100	100	100	100	100
Slaked lime	15	50	—	—	28
Borax	—	—	—	50	—
Sodium bicarbonate	—	—	3·5	—	—
Sodium silicate (S.G.1.4)	70	—	—	—	—
Sodium phosphate	—	—	—	—	60
Sand	—	50	—	—	—
Oil	1·5	—	—	—	—
Water	290	To paste	400	To paste	To paste

An aircraft adhesive, giving good results on immersion in water, consists of 66 per cent. casein, 23 per cent. mineral matter (lime, sodium salts, silica, and alumina), and 1 per cent. petroleum, the remainder being water. It is claimed that the water-resisting property is improved by adding 1.5 per cent. of barium peroxide (*Ger. Pat.*, 345,684, of 1920). Another procedure is to evaporate, at low temperatures, a solution of the lime compound of casein and to incorporate lime with the residue. Casein dissolved in a cuprammonium solution constitutes another adhesive (*U.S. Pat.*, 1,244,463, of 1917), while a more complex composition is made by incorporating a 5 per cent. solution of camphor in castor oil with casein, barium sulphate, lime and soda ash (*Brit. Pat.*, 131,400, of 1918).

Waterproof Glue from Oil Seed Residues.

According to O'Gorman and Schryver, the proteins isolated from castor-bean and hempseed residues can be utilised. These are treated with magnesium or calcium hydroxide, and certain alkali salts, such as the fluoride or arsenate of sodium, capable of slowly reacting with the bases, with the liberation of caustic soda. The resulting product is mixed with dilute NaOH (*Brit. Pat.*, 140,911, of 1919).

Blood albumen, made by removing the fibrin and part of the hæmoglobin from blood, constitutes the basis of another class of water-resistant adhesives. A satisfactory product can be prepared by soaking black blood albumen (10 parts) in water (18 parts), straining, and then treating the liquid with a little lime or ammonia. Members of this group differ from casein adhesives in that they must be applied hot, as hardening depends on coagulation by heat (above 74° C.). The Schütte-Lanz Aircraft Company treat fresh blood with oxalic acid or sodium citrate and evaporate *in vacuo* to prevent coagulation. The residue is then dissolved in a small quantity of water, and rendered alkaline (*Brit. Pat.*, 169,509, of 1920).

Attempts have been made to confer water-resisting qualities on ordinary animal glues, by rendering them insoluble by means of formaldehyde. Thus the surfaces to be glued together are first treated with formalin and then with the glue. An ingenious procedure is to treat the glue with the loose compound of albumin and formaldehyde. The heating, necessary in making the joint, serves to liberate formaldehyde, which then renders the glue insoluble (*Ger. Pat.*, 317,963, of 1918). The addition of alum and formaldehyde to liquid glue containing a formate, is claimed to render the glue insoluble after coagulation (*Ger. Pat.*, 328,692, of 1917).

Vegetable Glues from Starch.

The high cost of ester gum adhesives of the gum arabic type has led to the introduction of modified starch gums such as dextrin. Partial hydrolysis of the starch is usually brought about by heating with hydrochloric or nitric acid (0.2-0.4 per cent.) at 150° C. until the acids are volatilised; or the material is roasted at 180°-200° C. in drums provided with agitators, and the product decolourised with charcoal. A disadvantage of dextrin-coated materials is that they tend to become moist in wet weather. The addition of an equal weight of calcium chloride to dextrinised starch, free from glucose, is said to render the product non-tacky when cold (*U.S. Pat.*, 1,337,382, of 1920).

Within the last few years, a large number of processes have been evolved with the object of preparing a technically valuable vegetable glue. Most of these processes are based on the action of alkali on starch. The products are excellent adhesives, but they gradually coagulate on keeping. In one process, a cream of starch and water is gelatinised by heating and the product then treated with a base (*U.S. Pat.*, 1,396,315, of 1921). Another procedure is to treat a mixture of tapioca starches with barium hydroxide (0.1-0.25 per cent.). Alkali phenolates, persalts and sodium peroxide are also applicable—*e.g.*, a paste consisting of potato flour (100 parts), ammonium persulphate (2.5 parts) and 22° B. ammonia (1 part), gives a good adhesive after standing one hour (*Brit. Pat.*, 179,765, of 1921). To avoid the injurious action of strong alkali on materials in use, the glue may be neutralised by treatment with SO_2 or CO_2. Water-resistance can be imparted by treating the vegetable glue with zinc chloride, cuprammonium sulphate, casein, resinates or aluminates. According to the Bayer Company, a colourless adhesive, equal to animal glue, can be obtained by heating a starch solution with formaldehyde (*Ger. Pat.*, 318,957, of 1913).

Other starch adhesives are prepared by treating gelatinised starch with hexamethylenetetramine, and by heating and emulsifying starch with a mixture of water and waxes (*U.S. Pats.*, 1,287,841, of 1918, and 1,311,964, of 1919). An interesting adhesive consists of the alkali salts of starch fatty acids, prepared by the action of chlor-fatty acids on starch or dextrins in the presence of alkali (*Ger. Pat.*, 360,651, of 1920).

Adhesives from Cellulose Waste Materials.

The waste liquors from sulphite-pulp manufacture have been utilised as a source of adhesives. In one process the strongly acid liquors deposit adhesive solids on exposure to air; or the mixture is partially neutralised with lime or calcium carbonate and evaporated down (*U.S. Pats.*, 1,311,215-1,311,222, of 1919). In order to improve the colour and adhesiveness, the liquors can be evaporated under reduced pressure with the addition of lead acetate, sodium hydrosulphite or sodium phenolate; or the evaporation is carried out in the presence of organic bases, acids or aldehydes (*Ger. Pat.*, 334,870, of 1918). Water-resisting qualities can be imparted by incorporating casein or resinates. Thus, cellulose pitch (5 parts) is treated with magnesium oxide (2 parts), and the product is incorporated with casein (2.5 parts) and sodium fluoride (1 part) (*Ger. Pat.*, 353,570, of 1919).

With a view to obtaining adhesives from straw (*Ger. Pat.*, 315,536, of 1918), maize cobs (*U.S. Pats.*, 1,285,247, of 1918, and 1,317,380, of 1919, and lupin seed husks (*Ger. Pat.*, 309,650, of 1917), these materials are extracted with water or dilute alkali. The colloidal extract is then separated from the residue under pressure and concentrated or neutralised if necessary. Another patent proposes to treat finely-divided lignite with caustic soda solution for the same purpose (*Ger. Pat.*, 324,928, of 1918).

Sodium Silicate Adhesives.

The consumption of these adhesives now reaches very large proportions, especially for cartons, labels, corrugated cardboard and other paper stock products. It also finds application as an adhesive for abrasive silicate wheels, which consist of a baked mixture of abrasive, clay and sodium silicate. Commercial sodium silicate consists of a colloidal solution of SiO_2 in $Na_2O.SiO_2$ or $Na_2O.2SiO_2$ or in both. For its preparation a solution of "soluble glass" is concentrated after allowing impurities to settle out. Adhesive solutions generally contain about 20 per cent. water. Their viscosity can be regulated to suit the nature of the surface to which they are to be applied.

Solutions of high silica content, when cooled or concentrated by evaporation or absorption, gradually increase in viscosity until the point of gelation is reached, when there is a very marked rise. This sudden change to jelly occurs with a loss of only one per cent. of moisture, making the adhesive set very rapidly and allowing high-speed spreading machinery to be used. The bond is not released by warming and is of sufficient strength—that is, it is stronger than the tensile strength of paper and paper stock. To ensure good results, the temperature and relative humidity in the spreading rooms must be regulated. Owing to their high alkalinity, these adhesives tend to discolour paper and cardboard and to attack printed and coloured labels. The latter tendency can be overcome by using specially thick paper, printed with suitable colours. Silicate adhesives offer many advantages over animal and vegetable products. Thus they are uniform, relatively cheap, are supplied ready for use, can be applied without warming, and are fireproof. In addition, they are odourless, and do not decay or undergo putrefaction, qualities of particular importance in the manufacture of containers for edible products. Also no potential food materials are consumed in their manufacture.

Synthetic and Rubber Adhesives.

The condensation products of naphthalene- and phenol-sulphonic acids with formaldehyde (syntans), harden on drying, and have been proposed by the Badische Company as adhesives for glass (*Ger. Pat.*, 337,956, of 1918). By condensing dicyanodiamide with formaldehyde in the presence of sulphuric acid, adhesives of varying fluidity can be prepared, according to the proportions. Thus, with 2 parts, 30 per cent. formalin to 1 of the diamide, the product resembles gum arabic, while with less aldehyde, a more viscid product results (*Ger. Pat.*, 323,665, of 1919). As adhesives for articles made of cellulose esters, the Bayer Company propose to use adipic esters. For ethyl cellulose products, β-naphthyl amyl ether is proposed (*Ger. Pats.*, 317,412, and 322,648, of 1917).

Rubber enters into the composition of the long known marine glues. One formula for such an adhesive requires a solution of 10 parts rubber in 120 parts benzol to be incorporated with 20 parts molten asphalt.* An adhesive composition suitable for coating balloon fabrics (rubber dope), consists of cellulose acetate (60), rubber (20) and tetrachlorethane (600 parts by weight). Sulphur may also be added (*Brit. Pat.*, 129,630, of 1919). Schidrowitz has recently patented an adhesive for coating leather with rubber. It consists of alkaline latex and glue, the film having glue on one side and rubber on the other (*Brit. Pat.*, 166,731, of 1920).

THE ESTIMATION OF SULPHUR.

NEW RAPID AND ACCURATE METHOD.

An interesting method for the rapid determination of sulphur that has been proposed recently by L. Losana (*Giorn. Chim. Ind. Appl.*, April, 1922) is based on the fact that when a compound containing sulphur is heated with powdered iron in absence of air the sulphur undergoes such transformation that it is liberated completely as hydrogen sulphide when the resulting mass is subsequently treated with hydrochloric acid. The hydrogen sulphide is absorbed by zinc-acetate solution, and the sulphide thus formed titrated with iodine solution.

According to an *Analyst* abstract of Losana's paper, if the substance contains 0—5 per cent., 5—10 per cent., or more than 10 per cent. of sulphur, the amount taken for analysis is 1 gramme, 0.5 gramme, or 0.1 gramme respectively. This is mixed, in a hard glass tube, about 4 cm. long, with 2 grammes of pure powdered iron and 0.5 gramme of sodium hydrogen carbonate, the mixture being covered with a layer several mm. deep of the iron, and then heated to incandescence for a few minutes.

For the decomposition with acid, use is made of a small round-bottomed flask with a ground stopper sealed to the tube of a reflux condenser, the upper end of the tube being bent over to pass through the cork of a bulbed absorption tube containing about 150 c.c. of 2.5 per cent. zinc-acetate solution, rendered slightly acid with acetic acid. A gas delivery tube dipping into a little water in the flask is sealed horizontally through the head of the ground stopper, and ends in a vertical cross-piece to form a T-piece. The latter is connected at the top with a source of carbon dioxide, and at the bottom with a rather long rubber tube joined to a tapped funnel. The hard glass tube is allowed to cool somewhat, and is dropped, while still hot, into the flask, and thus broken by the cold water.

A rapid current of carbon dioxide, washed by permanganate solution and then by water, is passed through the flask, and hydrochloric acid introduced through the funnel. When the reaction slackens, the flask is heated gently; and when evolution of gas ceases, carbon dioxide is passed briskly through the apparatus for about five minutes. The liquid from the absorption bulbs is transferred to a beaker, diluted to 300—400 c.c., mixed with a known volume in excess of standard iodine solution, allowed to settle, and titrated with thiosulphate solution, the sulphur being calculated from the equation. $ZnS + I_2 = ZnI_2 + S$. The content of sulphur in the reagents used is checked by a blank experiment.

Tests made on flowers of sulphur and with copper, lead, barium, and cobalt sulphates yielded virtually theoretical results. The whole of the operations occupies about 40 minutes. The method is applicable also to organic compounds; but these must first be mixed with copper oxide or lead chromate and heated, in a porcelain crucible if the compound is non-volatile, or in a narrow hard glass tube and covered with a deep layer of the oxidising material if the compound is volatile.

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* The most recent proposal, however, is that of Ditmar (*Chemiker Zeitung*, August 25, 1923), who suggests utilising rubber latex directly as an adhesive. On evaporation of the water, the rubber hydrosol becomes converted into the hydrogel, a process which is irreversible by water. This rubber latex adhesive is stated to be suitable for all purposes for which sodium silicate is applied, and its absence of alkalinity is a decided advantage. Adhesives made from ordinary rubber solutions, in which the rubber remains as an organogel, are converted by any organic liquid which is either a solvent or a swelling agent for rubber, back to the state of organosol. —Ed., *C.T.J. and C.E.*

THE INSTITUTE OF METALS.

PAPERS READ AT MANCHESTER AUTUMN MEETING.

THE Autumn Meeting of the Institute of Metals was held in Manchester from September 10 to September 13. The proceedings opened at 8 p.m. on the 10th, when Lieut.-Colonel Sir Henry Fowler, K.B.E., delivered the Second Annual Autumn Lecture on subjects of practical interest to those engaged in the non-ferrous metals industry. The lecture was delivered in the Milton Hall, Deansgate, Manchester, before a crowded audience, and the subject was "The Use of Non-Ferrous Metals in Engineering."

The remainder of the proceedings were held in the Municipal College of Technology, and summaries are given below of those papers presented which are considered of most interest to chemists and chemical engineers.

Red Stains on Brass.

In this paper, presented by E. A. Bolton, M.Sc., on Tuesday, the author gave an account of work carried out to elucidate this problem. The various theories which have been from time to time put forward were reviewed and experiments described which bear upon these theories. The outstanding point is that the stains actually occur through reactions of copper oxides in the scale formed during annealing and the pickling medium. Cupric oxide, contrary to the usual opinion, was shown to be as harmful as cuprous oxide.

It was shown that oxides of copper may be present from various causes, such as careless washing after the pickling operation, resulting in the presence of acid and salts during the subsequent annealing; the presence of iron in the brass or upon its surface; the use of impure rolling oils, etc. It was concluded, however, that the main cause of the oxidation of the copper is the use of old-fashioned annealing furnaces in which the flames impinge directly upon the brass.

Brinell Hardness Numbers.

Dr. W. H. Brownsdon, M.Sc., Ph.D., F.I.C., presented a note on Brinell hardness numbers with a view to drawing attention to the desirability of authors expressing Brinell numbers for non-ferrous metals in figures that may be comparable. This is not a difficult matter, seeing that the desired result is obtained if balls and loads are used for which the ratio L/D^2 (the load in kilogrammes divided by the square of the ball diameter in millimetres) is constant. Unfortunately the numbers found with one ratio for L/D^2 are not convertible to the numbers that would be given using a different ratio. Dr. Brownsdon suggested that the choice for the large group of copper alloys with Brinell hardness numbers from about 40 to 200 should rest between the ratio 5 as standardised in the United States or the ratio 10 which is favoured in some quarters in this country.

Crystallisation Effects in Galvanised Iron Sheets.

Manufacturers of galvanised iron and steel goods have always sought to produce a zinc-covered surface having large characteristic spangles. The absence of, or the production of, only small spangles has been attributed to many causes. The quality of the steel, either the presence of sulphides and other non-metallic inclusions, or its condition produced by rolling and subsequent treatment, the pickling, either caused by impurities in the acid, by the occlusion of gas by the metal, the temperature of the bath, and the purity of the zinc, have all been blamed for the failures.

A paper by Messrs. J. Dickson Hannah and E. L. Rhead gave an account of a research to ascertain the real causes. The research shows that the metal—iron or steel—has practically no influence on the result if the temperatures are satisfactorily maintained. It was shown that pure zinc did not yield the desired large spangles, and that too high a temperature interfered by producing large quantities of a zinc-iron compound which crystallised in needles on the metal and interfered with the development of the spangle. The presence of tin or aluminium—contrary to expectation and as commonly stated—did not produce the desired result, but the addition of lead did so immediately.

Judging from the known relationships between zinc and lead the authors argued that the separation of the impure zinc forming the layer on the metal sheet into conjugate solutions—lead-rich and zinc-rich—at the dipping temperature, and the method of subsequent crystallisation, were the causes of the effects obtained. The separation is attributed, and proved by experiments, to the difference in the surface tensions of the two solutions. Proof of the hypothesis was furnished by the fact that bismuth, the only common metal that resembles lead, more or less, in its relations with zinc, produces similar effects.

Nickel in High-grade Bearing Metal.

A note by A. H. Mundey and C. C. Bissett, B.A., B.Sc., gave a brief account of a practical trial of the effect of varying small quantities of nickel upon a tough and well-reputed bearing metal. There was chosen for test the well-known alloy consisting of: Tin, 93 per cent.; antimony, 3.5 per cent.; and copper, 3.5 per cent. The results of the usual physical tests were detailed, and the authors concluded that the beneficial results of nickel in alloys of the character employed are yet to be demonstrated.

Alloys of the "Duralumin" Type.

A paper presented by Marie L. V. Gayler, M.Sc., on Wednesday, dealt with the constitution and age-hardening of the quarternary alloys of aluminium, copper, magnesium, magnesium silicide, containing up to 6 per cent. copper, 4 per cent. magnesium, and 4 per cent. magnesium silicide. The results showed that when copper, magnesium, or magnesium silicide are present in aluminium, any two of these components have a marked effect on the solubility of the third. The sum of these effects is that ultimately $CuAl_2$ and Mg_2Si are both thrown out of solution. Also, if copper and magnesium are present in a ratio greater than 12 to 5 approximately, then alloys when quenched from high temperatures age-harden at room temperature, owing to the difference in the solubility of Mg_2Si at the quenching and ageing temperature. If, however, the ratio of copper to magnesium is less than 12 to 5, then no age-hardening takes place, since there is little difference in the solubility of Mg_2Si at high and low temperatures. The age-hardening of alloys of the "Duralumin" type is due therefore primarily to Mg_2Si, and the addition of magnesium and copper is important, since both reduce the solubility of Mg_2Si at high and low temperatures and consequently reduce the maximum age-hardness due to Mg_2Si.

The Electro-Chemical Character of Corrosion.

In a paper by Ulick R. Evans, M.A., experiments were described which indicate that the corrosion of metals is mainly—probably entirely—electro-chemical in character. There are two main types. The type accompanied by evolution of hydrogen gas is characteristic of reactive metals placed in acid solutions, but the velocity varies greatly with the degree of purity of the metal. Where this type is impossible, slower corrosion can take place at a rate determined by the diffusion of oxygen to the metal, and comparatively independent of the purity. When a metal is immersed in a solution of potassium chloride, one can observe the production of alkali at the cathodic portions, the production of the chloride of the metal at the anodic portions, and the precipitation of hydroxide where these meet.

The electric current can be trapped and measured, and is found (by applying Faraday's law) to account for the greater part of the corrosion actually observed. Generally the cathodic areas are those to which air has free access, whilst the anodic areas are those protected from aeration. It is significant that corrosion usually proceeds most rapidly at the comparatively "unaerated" places—hence the intense corrosion observed in "pits" and over areas covered up by porous corrosion-products. (See page 307 for a fuller account of this paper.)

The Effect of Oxygen on Copper.

This paper, by D. Hanson, D.Sc., C. B. Marryat, B.Sc., and Grace W. Ford, B.Sc., was the first part of a comprehensive investigation of the effects of impurities on copper, and described the effect of oxygen, up to a concentration of 0.36 per cent., on the properties of pure copper. The results indicate that oxygen has a relatively small effect on the properties of copper, and is neither seriously deleterious nor remarkably beneficial. The mechanical properties are not much affected by small quantities of oxygen, and copper containing as much as 0.1 per cent. differs very slightly from pure copper. The electrical conductivity does not fall rapidly, and values exceeding 100 per cent. of the International Standard are obtained in all annealed materials containing less than 0.1 per cent. of oxygen. The relatively small effect of oxygen is without doubt due to the fact that the solubility of the oxide in solid copper is extremely low—so low, in fact, that for all practical purposes oxygen may be regarded as insoluble in solid copper. These conclusions,

however, are applicable strictly only to pure copper containing oxygen and free from other impurities. The effect of the simultaneous presence of other impurities may be very appreciable, and requires special investigation, for which the present Report furnishes a necessary basis.

Other Papers Presented.

The following papers were also presented to the meetings: "Stereotyping," by A. H. Mundey and John Cartland, M.Sc.; "The Effects of Rate of Cooling on the Density and Composition of Metals and Alloys," by R. C. Reader, Ph.D., M.Sc.; "The Measurement of the Change in Volume in Metals During Solidification," by Hikozo Endo; "Experiments with Some Copper Wire—Cohesion a Function of Both Temperature and Cold Work," by Douglas H. Ingall, M.Sc.; "Equilibrium in the System Gold-Zinc," by Professor P. Soldau; "The Behaviour of Metals Under Compressive Stresses," by H. I. Coe, M.Sc.; "Hardness Tests on Crystals of Aluminium," by Hugh O'Neill, M.Met.; and "A Dilatometric Study of the Transformations and Thermal Treatment of Light Alloys of Aluminium," by Albert M. Portevin and Pierre Chevenard.

HYDROGENATED PHENOLS AND CRESOLS.*

THEIR USE IN SOAPS AND FOR GENERAL TEXTILE PURPOSES.

BY the process first discovered by Sabatier, phenol is easily hydrogenated in the presence of nickel, and if the reaction is carried out at 180° C. yields a product consisting of cyclohexanol $C_6H_{11}OH$, about 4 to 5 per cent. of unchanged phenol and small quantities of cyclohexanone and cyclohexane as impurities. By hydrogenating this crude product (B.P. 155-165° C.) a second time at 150-170° C., purification is effected, the phenol and cyclohexanone becoming converted completely to cyclohexanol.

The Hydrogenation of the Cresols.

At a temperature of 200-220° C., orthocresol gives a yield of over 90 per cent. of ortho-methylcyclohexanol. The little ketone that is formed may be removed by means of sodium bisulphite. Under similar conditions, meta-cresol gives a mixture of the alcohol and ketone, but after a second hydrogenation gives almost pure meta-methylcyclohexanol. Working at a temperature of 200 to 230° C. para-cresol gives para-methylcyclohexanol containing traces only of ketone.

Control of Catalyst and Hydrogen Supply.

L. Brunel (*Chem. Zeit.*, 1906, p. 345), by volatilising phenol to which a little water had been added and reducing over nickel at 170-175° C., obtained a smooth reaction and almost complete conversion to cyclohexanol in one operation. The metallic nickel catalyst is made by reducing nickel oxide in hydrogen at a temperature of 250-280° C. If the temperature exceeds 350° C. the nickel formed is unsatisfactory for the hydrogenation of aromatic nuclei. The slightest traces of chlorine, bromine, or iodine in the nickel also spoil its catalytic activity. The nickel oxide used is prepared from the basic nitrate or the sulphate of the metal. The hydrogen used in the hydrogenation process must be of exceptional purity. Arseniuretted hydrogen, sulphuretted hydrogen, and other sulphur compounds, phosphine, volatile hydrocarbons, and especially carbon monoxide, are powerful catalyst poisons. Cyanogen compounds, chloroform, acetone, and free mineral acids also impair materially the activity of the catalyst.

According to Sabatier and Senderens, the nickel forms an unstable hydride which decomposes with the liberation of active monatomic hydrogen. The formation and decomposition of the nickel hydride proceed rapidly and continuously in the presence of a substance that can combine with the active hydrogen. The nickel hydride intermediate product formed according to this theory has never been isolated, but, on the other hand, none of the numerous experiments on the subject have given data incompatible with the theory.

"Hexalin" and "Methyl Hexalin."

Cyclohexanol is put on the market under the name of "hexalin," and the mixture of the three isomeric methylcyclohexanols obtained by the catalytic reduction of commercial cresol is sold as "methyl hexalin." Both materials are manufactured on the large scale by the Tetralingesellschaft m. b. H. at Rodleben, near Roszlau, Anhalt. The products are technically pure, free from the slightest traces of unchanged phenol or cresol, and have the following constants:

	D 20°	B.P.	Ignition Pt.	Refractive Index.	Acetyl Value.
Hexalin $C_6H_{11}OH$ ..	0.945-0.949	155-160° C.	68° C.	1.4680	561
Methyl hexalin $C_7H_{13}OH$	0.930	160-180° C.	68° C.	1.4635	492

The odour of these materials resembles that of menthol or camphor, and is in no way similar to that of phenol or cresol. Hexalin and methyl hexalin dissolve fats, oils, waxes, resins, mineral oils, highly-oxidised fats, linoxyn, rubber, cellulose acetate, celluloid, metal fatty acid salts, and metal resinates. With turpentine, tetralin, dekalin, benzine, benzol, aniline, chlorhydrocarbons and carbon bisulphide, hexalin and methyl hexalin are miscible in all proportions. Being alcohols of high molecular weight, they are only slightly soluble in water and aqueous solutions. The two materials are water-white, viscid, oily liquids, ressembling in appearance distilled glycerine, but possess the valuable property of forming clear mixtures with aqueous soap solutions of the usual fatty acids, which mixed solutions possess remarkable solvent or emulsifying powers for fats, fatty acids, mineral oils, or waxes.

Solubility in Aqueous Soap Solutions.

The solubility of methyl hexalin in aqueous soap solutions is somewhat lower than that of hexalin, and varies somewhat with the nature of the soap. In most cases, however, the amount of methyl hexalin or hexalin going into solution is considerably more than double the weight of the soap in the solution. According to Hueter (*Zeit. der Öl und Fett Industrie*, 1921, No. 34), a potash olein soap containing 25 per cent. of water will dissolve considerable quantities of hexalin, and even aqueous solutions of such soaps, with a soap content of 5 per cent. and under, dissolve hexalin in proportions many times that of the soap content.

Valuable Properties of Hexalin Soaps.

Hexalin and methyl hexalin, as well as their solutions in soaps, also possess the property of readily dissolving lime and magnesia soaps. In addition to their solubility in hard waters, these new soaps are also stable to dilute organic acids. Albumen emulsions, such as are present, for example, in cow's milk, are completely clarified by the addition of hexalin soaps. Blood, serum, and similar fluids loose their property of coagulating if a little hexalin soap is added, and there is thus no doubt that soap preparations which contain a greater or less amount of hydrogenated phenols possess a detergent power considerably exceeding that of the soap products usually met with in commerce. It is quite immaterial whether sodium or potassium soaps are used with the hexalin or methyl hexalin; the result—namely, the energetic washing and purifying action and the excellent solubility—differs only in degree for both classes of soaps.

The Lathering Powers of Hexalin Soaps.

The lathering power of a soap is not harmed by small amounts of hexalin or methyl hexalin, although large amounts will completely prohibit foam formation, a property possessed by alcohols in general. It is therefore advisable in cases where marked lathering power is desired to choose as the fat ingredients of the soap, a mixture of coconut oil, palm kernel oil or their fatty acids, on the one hand, and of high molecular weight fatty acids (olein, stearic acid, etc.) on the other. The lathering power of such neutral soaps containing hexalin or methyl hexalin can be still further enhanced by the addition in small quantity of any fatty acid (olein or the fatty acids of castor or coconut oils), without the solubility properties of the soap being in any way impaired.

The presence of hexalin or methyl hexalin in neutral soaps also reduces the amount of hydrolysis of such soaps in aqueous solution to very small proportions. By the addition of a hydrogenated phenol the whole character of the soap body undergoes a far-reaching change, the character of which may be best summarised by stating that the capacity of such soaps to be "salted out" is very greatly reduced. Even pure tallow soaps or soaps composed principally of hydrogenated fats undergo a change on the addition of hexalin, which brings their properties almost on a level with those of the lye soaps or of the soaps made from castor oil. Schrauth (*Zeit. der Öl u. Fett Industrie*, 1921, No. 9) points out with truth that these new soap compositions open out an almost unlimited field of application in the textile industries, especially for wool-washing purposes.

(To be continued.)

* A Report by Ing. Chem. Welwark, of Vienna. Translated and rearranged from the *Chemiker Zeitung*, Sept. 3, 1923.

MODERN METHODS OF WATER PURIFICATION.

DETAILS OF LARGE THAMES-WATER INSTALLATION.

IN a paper at the Shipping, Engineering and Machinery Exhibition, Olympia, on Friday, September 7, Mr. J. P. O'Callaghan, F.C.S. (of United Water Softeners, Ltd.), briefly reviewed the leading methods used at present for industrial water purification. During the past five years, he said, comparatively little had been written regarding the treatment of waters of various sources and character for industrial purposes.

The experience of steam users in every part of the world seemed to show that satisfactory boiler feed water as a rule could only be obtained by the use of well-designed and carefully operated purification systems, which repaid their cost in a longer or shorter period.

The leading methods used nowadays for water treatment the author summarised as follows:—(1) Sedimentation and filtration; (2) lime-soda softening by the cold process; (3) lime-soda softening by the hot process; (4) permutit softening; (5) de-concentration; (6) de-gassing; (7) evaporation; and (8) boiler compounds.

A Combined Sedimentation and Filtration Plant.

Dealing with sedimentation first, Mr. O'Callaghan described a combined sedimentation and filtration plant recently put into operation at the Beckton works of the Gas, Light and Coke Company, capable of dealing with 4,000,000 gallons of Thames water per day. The water at Beckton was tidal, and was frequently excessively turbid, so that a thoroughly efficient filtration plant was essential. The plant consisted of four large sedimentation basins, and 8 rapid sand filters of the gravity type, and was particularly interesting on account of the high degree of efficiency obtained by the primary basins. The water to be treated was raised from the river by centrifugal pumps driven by vertical spindle electric motors. The pumps were placed at about half tide level, thus being entirely submerged at high tide, and having a maximum suction lift of approximately 14ft. at extremely low tide. The delivery to the filtration plant was through two 12in. C.I. mains. The filtration plant was built on 121 reinforced concrete piles 14in. square and 38ft. long, and comprised 8 filters, housed in a suitable building, with adjoining basins for coagulation and sedimentation, together with a water tower for storage of cleansing water for washing the filter beds, air blower, pumping plant, and filtered water reservoir, from which the supply was drawn and discharged into the works' mains. The water delivered to the plant from the river was received into a chamber fitted with baffling and diaphragm partitions, then passed into a measuring channel, and overflowed 2 brass plate rectangular weirs.

Details of the Chemical Treatment.

As to chemical treatment, a definite proportion of the total incoming flow passed through the smaller weir into an automatic measuring apparatus fitted with a chemical container, and the chemical valve fixed to the latter was adjusted to deliver the exact quantity of lime to effect coagulation and precipitation of the suspended siliceous matter contained in crude Thames water. The intimate admixture of the lime with the water was obtained by its fall into a trough, and thence along distributing channels communicating with the coagulation and sedimentation tanks. These basins were of sufficient size to hold approximately 600,000 gallons of water, thus allowing for nearly four hours time period for reaction and sedimentation when the plant was working at its full rated capacity. The design of the basins permitted of speedy and efficient cleansing through the sludge valves and drain sewers. After allowing the heavier impurities and a considerable portion of the coagulated flocculent to precipitate in the sedimentation basins, the water was decanted over a trough communicating with the filter inlets.

The Filter Units.

The filter units, 8 in number, were of the open gravity type. Each was 22ft. long by 12ft. wide. When the rated flow of 4,000,000 gallons per day was being dealt with, and all the filters were working, each square foot of filtering area would pass 79 gallons of water per hour. The flow through the inlet valve of each filter passed along a system of communicating troughs placed above the surface of the same bed, and the incoming water was thus distributed over the entire filtering area by overflowing the edges of these troughs. The filtering medium employed was a specially sifted and suitably graded mined quartz sand supported on a bed of double-washed and graded gravel. Below this, a manifold system of lateral collecting tubes fitted with safety strainers was arranged, which uniformly drew off the water from the entire filter bed area. The filtered water thus collected was discharged through a central pipe and automatic rate of flow control valve into a chamber. From this it flowed out through a weir into the filtered water channel and thence to the reservoir sump, of 60,000 gallons capacity, from whence it was picked up by high lift motor-driven centrifugal pumps and discharged to the works.

Cleansing the Filter Beds.

The filter beds were cleansed with air and wash-water. The operation was performed by agitating the filtering medium with air for about two minutes at a pressure of 3 to 5lb. per sq. in. A reverse current of cleansing water was then applied to the underside of the filter bed, and in its passage upwards through the bed the impurities deposited on the sand were floated over into the collecting waste troughs and carried out through a waste pipe to the drain channel. In this manner, each filter was thoroughly cleansed and restarted to work within the space of 10 to 12 minutes. The air for the aeration of filters was obtained from a motor-driven rotary blower. The filtered water used for washing the filters was raised from the filtered water reservoir to a tower storage reservoir having a capacity of 40,000 gallons, and was drawn from there and used as required.

The water for use in the works, after treatment, was picked up by four sets of centrifugal pumps, which had their suction in the reservoir or sump constructed directly underneath the pump room, and these delivered into the Company's main at a pressure of 80lb. per sq. in. The coagulating and sedimentation tanks, filters, platforms, chemical house, inspection chambers, channelling, filtered water sump and wash water tower were of reinforced concrete construction. The floors of the pump room and the upper and lower platforms of the filter house were laid with terrazzo, and green glazed brick coping was laid around the filter tanks and platforms. The plant was one of the largest ever put to work, and, by its use, the Gas, Light and Coke Company relieved the London water supply of over a thousand million gallons per annum.

Permutit B, A Valuable New Zeolite Product.

The lecturer then dealt briefly with lime-soda softening both by the cold and the hot processes. Softening by the Permutit zeolite process was then dealt with. Another type of Permutit had recently been introduced for industrial use. This new material, named "Permutit B," differed from ordinary Permutit both in physical characteristics and molecular constitution, these differences causing a radical change in the timing of the periodic cycle of softening and regeneration, and enabling day and night continuous duty to be performed by one unit only, instead of two. In the case of ordinary Permutit a single unit was usually designed to soften continuously for a maximum period of 10 or 12 hours, and it then required an equal length of time for regeneration. In the case of Permutit B, the plant was designed to operate for periods varying from three to six hours at a time, and was then completely exhausted. The material, however, was capable of extremely rapid regeneration, and a large industrial unit could be completely regenerated and recommissioned in an hour. Although the actual base-exchange activity of the new material was somewhat less than that of the ordinary Permutit, this was amply compensated for by the more rapid action of the material in both directions—*i.e.*, during softening and regeneration. By taking advantage of this, a higher rate of flow during softening could be attained, while the reduction of the period of regeneration from 12 hours to 1 hour had become ordinary practice. A very important advantage was that a reduced salt consumption in regeneration was possible with Permutit B as compared with the older material. Again, the new material was of a hardier physical character, and, therefore, less susceptible to loss through wear and tear in general usage.

Softening Boiler Feed-water by Permutit Process.

In many respects softening boiler feed-water by means of zeolite was ideal. The method was not applicable, however, to all conditions, and careful preliminary investigation should be made of the quality of the raw water supply, the

operating conditions of the boilers, and the service to be rendered. The question could only be satisfactorily decided in the light of a reliable analysis of the water, due regard being paid to the proportions of temporary and permanent hardness, the boiler pressure, type of boiler, etc. The author had observed a number of Permutit plants softening water for boiler feed, and in no instance had any scale or sludge been deposited within the boilers fed, even after prolonged periods of steaming.

At several places combined lime-soda and Permutit systems had been installed, and were operating satisfactorily. In general, it was not usually economical to treat a water entirely by the regenerative process, where the hardness of the water was in excess of 40 grains per gallon, but this depended largely upon local conditions, as waters containing 40 grains per gallon or more were being treated successfully by this method alone.

MECHANISM OF METALLIC CORROSION.

GENERAL CONCLUSIONS AS TO ELECTRO-CHEMICAL CHARACTER.

AMONG the important papers which were read before the Institute of Metals at Manchester this week was one by Mr. Ulick R. Evans, M.A., on "The Electro-chemical Character of Corrosion." A summary of this paper appears elsewhere in this issue, but, in view of the importance of the subject, we give below, in greater detail, some of the author's general conclusions. Mr. Evans states:

If the experiments described above, dealing with eight different metals (iron, lead, copper, silver, zinc, cadmium, aluminium, and nickel), are considered as a whole, it may be claimed that each part of the electro-chemical mechanism of corrosion has been demonstrated. Where the metal is immersed in a neutral salt solution, it has been possible to show: (1) The production of a current. (2) The production of a metallic salt at the anodic portions. (3) The production of alkali at the cathodic portions. (4) The precipitation of hydroxide where they meet.

The Cathodic and Anodic Areas.

If the aëration is uniform, it is apparently the distribution of impurities that determines which portions shall act as cathodes and which as anodes. If, however, the aëration is not uniform, then—provided there is a sufficient amount of noble impurities distributed throughout the metal as a separate phase—the cathodic and anodic areas are determined by considerations of the supply of oxygen, the "aërated" areas being cathodic and the unaërated anodic. Experiments on pure cadmium and lead seem to show that some impurities are actually needed on the aërated portions to act as cathodic particles; mere selective aëration of one area will not cause it to become cathodic, unless a suitable noble impurity is present. If, however, there are noble impurities scattered throughout all parts of the metal, the machanism of selective aëration must be as follows: When one part of a piece of metal is aërated, and one is protected from aëration, the foreign particles in the protected area cannot (after the first moments) function as cathodes, because there is no supply of oxygen for the cathodic reaction. The foreign particles on the aërated portion act as cathodes, therefore, to the dominant metal in both areas; but in the aërated area the accumulation of insoluble corrosion product soon begins to interfere with the anodic function of the metal surrounding the foreign particles; and accordingly we are left with the foreign particles in the aërated area acting as cathodes, and the bright unobstructed metal of the unaërated area acting as anode. The anodic attack would be expected to be most pronounced in the portions of the unaërated area closest to the aërated area, as has been found to be the case.

Corrosion in Inaccessible and Accessible Places.

We thus obtain a rational explanation of the dangerous corrosion occurring at the bottom of pits and crannies, and other *inaccessible* places, as well as in areas covered with porous debris—a phenomenon well known to practical men. At such places, which are wholly anodic, owing to the absence of oxygen, the product of corrosion is generally a soluble metallic salt, which does not interfere with the subsequent course of corrosion. Over the *accessible* parts of the surface of a metallic article we may indeed temporarily experience electro-chemical corrosion; but here the cathodic and anodic areas are close together, and insoluble metallic hydroxide is produced close against the metallic surface and tends to protect it, and thus stop the action. The electro-chemical explanation of the intense corrosion occurring at sheltered places is the only satisfactory one.

The production of a protective film on the anodic areas of the metal often introduces a complicating factor; this is most serious in the case of aluminium. Indeed, the "influence of the corrosion product" is probably the most vital factor in determining the course of the later stages of corrosion. On the other hand, the presence of a porous, gelatinous precipitate over these areas may act as a diaphragm, allowing the current to pass, but hindering the diffusion of oxygen to those areas; this will actually favour the reaction.

The Influence of Colloidal Processes.

It may be asked, "How far do considerations of colloidal chemistry affect corrosion?" The answer is simple. Considerations of colloidal chemistry enter into the precipitation of all gelatinous hydroxides, since the gelatinous precipitate is merely an aggregation of particles of colloidal size. Under certain circumstances, the hydroxide may remain in the state of colloidal solution for some time; under other conditions, precipitation may occur quickly. There is, however, no justification in adopting a view that corrosion in its early stages is a colloidal phenomenon in a sense other than ordinary precipitation is a colloidal phenomenon. In the later stages of corrosion, colloidal processes enter into consideration in another way. The "loosening" effect of certain salts, notably chlorides, on the corrosion product is probably akin to peptisation. If Bancroft's theory of peptisation is accepted, this means that complex colloid particles are formed by the union of metallic ions with the insoluble corrosion product.

Effect of Differential Aëration on the Total Corrosion.

It has been proved that the unequal aëration of a metallic surface tends to produce intense corrosion at certain points—namely, those parts of the unaërated area which are most close to the aërated area. An important question, however, remains to be decided: Is differential aëration actually a necessary factor for corrosion, or does it merely cause the corrosion which would otherwise be distributed over the whole area to be concentrated at certain points? Experiments were conducted to settle this matter.

A glass desiccator vessel of the familiar form (but without the zinc grid) was filled with 1½ litres of potassium-chloride solution, and before the experiment air was bubbled through the solution. Numerous pieces of metal, previously weighed, were placed in the solution and kept there for some days. Some were placed flat on the annular glass shelf around the vessel, while others were supported at the same level by being placed across two very fine glass threads which extended across the centre of the vessel. The latter specimens were exposed to the action of diffusing oxygen over their whole surface, the area covered up by the glass thread at the points of support being negligible. The specimens placed flat on the shelf, on the other hand, were protected from oxygen on their lower surface. They showed—when the specimens were examined before and during removal—all the phenomena typical of differential aëration. Around the lower edge of each specimen was a quantity of metallic hydroxide, formed where the metallic salt from the lower (anodic) area had intermingled with the alkali from the upper (cathodic) area. After rubbing, washing, and drying, the specimens were reweighed.

The results show very clearly that differential aëration is *not* needed for corrosion; the specimens supported on the glass threads were in general corroded more quickly than those placed on the glass bottom. If the corrosion rate is determined by the diffusion of oxygen to the surface, this is indeed to be expected.

Apparently, therefore, the effect of restricting the access of oxygen to one part is not to increase the *total* corrosion of the specimen (at least during the early stages of corrosion), but to concentrate on the non-aërated area the corrosion which would otherwise be spread over the whole surface. Therein lies the danger of unequal aëration. An amount of corrosion which would be quite harmless if spread evenly over the surface of an article may become serious if confined to one particular area; while if it is concentrated within one single pit, it may quickly cause perforation of the article in question.

PHENOLS IN COAL-TAR OILS.

RAPID METHOD OF ACCURATE ESTIMATION.

FROM time to time a great many methods have been advocated for determination of actual phenols or tar acids in coal-tar oil, such as creosote oil, dip oil, etc., and in crude carbolic acid. Where only a rough determination has been required, almost any of these methods is suitable. A demand for a greater accuracy of determination and closer check between producer and consumer is, however, frequently made, and it was to meet this demand that an investigation of some of the existing methods has been made by J. Bennett Hill, of The Barrett Company, New York (*Industrial and Engineering Chemistry*, August, 1923).

The "Contraction" and "Liberation" Methods.

The successful methods for determination of phenols in oils and crude acids are all based on their solubility in soda and their extraction from the oils with a solution of sodium hydroxide. They may be divided into two main classes—first, those which use the contraction in the volume of the oil or the increase in the volume of aqueous soda as the measure of the phenols; and second, those which liberate the phenols from the carbolate solution obtained and measured the volume of liberated acids. The first class may be called the "contraction" methods, and the second class the "liberation" methods. Among the detailed methods belonging to the first class may be mentioned those of Weiss and of Chapin. Weiss uses a simple repeated extraction of the distilled oil in a specially graduated separating funnel, and takes the contraction in volume of the oil as the volume of phenols contained in it. The method of Chapin consists of steam distillation of the original oil, a somewhat elaborate procedure for concentrating the phenols in the steam distillate into a small quantity of benzene, and final measurement by shaking with caustic soda solution and measuring the increase in volume, multiplying the result by a factor empirically determined, which happens to be the reciprocal of the specific gravity of the phenols.

Among the liberation methods are included those of Weiss, Allen, and most of the methods in use by various industrial laboratories. The methods in general differ only in detail, the liberation method of Weiss differing also from the others in that the phenols after liberation are dissolved in refined coal-tar naphtha before measurement.

It has been generally believed that the contraction method gave results higher than the correct values, and the liberation methods results lower than the actual, but much closer than those obtained by the contraction methods. Mr. Bennett Hill's experience has failed to bear out this impression, however, and it was therefore hoped that the present work would throw real light on the relative accuracies of the various methods.

Analyses of Synthetic Mixtures.

The first part of the investigation consisted of the analyses of synthetic mixtures by the various methods. For the preparation of these mixtures a neutral coal-tar oil was used from which the phenols and pyridine bases had been completely removed by extractions with soda and with sulphuric acid. The phenols consisted of a mixture of specially purified, oil-free phenol, *o*-cresol, and *m*-*p*-cresol in proportions to approximate their natural occurrence. Mixtures of the oil and phenols were made up by volume with great care. In order to determine the effect of a less careful purification of the oil used in the mixtures, two mixtures were made from oil in which the pyridine bases were not extracted and the tar acids only roughly extracted. This showed a pyridine-base content of 4 per cent. and a tar-acid content of 0.3 per cent., the tar acids being determined by a liberation method, and being, therefore, actually isolated and identified as phenols. All these mixtures were analysed by the modified Weiss contraction method, and some by the modified Weiss liberation method. The results appear in Table I.

TABLE I.—ANALYSES OF SYNTHETIC MIXTURE.

Sample.	Phenols Present Volume, Per Cent.	Phenols Found Volume Per Cent.		Remarks.
		Contraction Method.	Liberation Method.	
1	3·0	3·0	—	—
2	20·0	20·0	20·3	—
		19·8	20·2	—
		20·2	—	—
3	25·0	25·0	—	—
4	25·0	25·2	—	Pyridine not extracted.
5	25·2	25·2	25·9	Pyridine not extracted.
		25·3	26·0	Pyridine not extracted.
		25·5	—	Pyridine not extracted.
6	95·26	95·2	—	—
		95·6	—	—

It will be noted from the table that the results with the contraction method are slightly higher than the theoretical, while the results with the liberation method are still higher. The incomplete extraction of the oil used in the mixtures appears to have very little effect on the contraction method at least.

Analysis of Commercial Oil.

The fact that the contraction method gives good results on a synthetic mixture of a purified oil and a purified tar-acid mixture, does not necessarily show that it gives equally as good results on a natural coal-tar oil which has not been extracted. Accordingly, determinations were made by both the contraction and liberation methods on two samples of commercial dip oils. The results given in Table II. show a good check between the two methods.

TABLE II.—ANALYSES OF COMMERCIAL OILS.

Sample.	Phenols Found, Volume Per Cent.		
	Contraction Method.		Liberation Method.
7	11·8	....	15·0
	15·0	....	15·0
8	25·6	....	25·1
	25·6	....	25·2
	25·3	....	—

It was noticed in the course of the work on the liberation method that in general the lower the volume of carbolate, the higher the final result. For example, in the results on Sample 5 in Table I., where results were obtained which are comparatively the highest, the lowest volume of carbolate was obtained. If this method is to be used, the volume and strength of carbolate to be obtained, together with the quantity of sulphuric acid to neutralise, should be standardised.

Details of Recommended Method.

The results of this work tend to establish the accuracy of the simple contraction method for determination of tar acids in oils and crude carbolic acid. The method recommended by Mr. Hill for general use on coal-tar oils and crude carbolic acids is in the following form:—

Apparatus.—Tar-acid funnel, 200-c.c. distilling flask; 100-c.c. standardised pipette; condenser

Reagents.—Sodium hydroxide, 10 per cent. solution.

Procedure.—A 100-c.c. sample of the oil at 25° C. is measured into the distilling flask and distilled to decomposition, the distillate being collected in the tar-acid funnel. The volume of the distillate is carefully read at 25° C., and, if no solids have separated, is extracted with three successive portions of 100 c.c., each of 10 per cent. caustic soda solution. In each case after the soda is added to the oil the whole is thoroughly shaken and is then allowed to settle completely before drawing off the soda layer. The volume of the residual oil after complete settling is carefully noted at 25° C. The decrease from the volume of the distilled oil before extraction to the volume after extraction is the per cent. by volume of phenols.

In the case of samples containing so much naphthalene as to show separated solids at 25° C., the temperature of the three measurements may be raised to 40°, or even 60° C., extraction being made also at the same temperature.

If the sample contains over 35 per cent. tar acids, the quantity taken for distillation should be cut to 50 c.c. or 25 c.c. so as to give not more than 35 c.c. of tar acids. Before distillation the material should be made up to 100 c.c. with clean, dry kerosene. The result obtained should be multiplied by 2 or 4.

Where the sample to be tested contains water it should be removed by catching the first few cubic centimetres of distillate in a small separating funnel containing a little saturated salt solution, separating the water and adding the oil to the rest of the distillate in the tar-acid funnel.

If no diminution in volume takes place on extraction, a trace of tar acids may be detected by acidifying the soda drawn off and noting the odour.

COMMERCIAL ETHYLATIONS.

THE USE OF DIETHYL SULPHATE.

ALTHOUGH dimethyl sulphate has been long known and widely used commercially for methylation purposes, the use of its ethyl homologue has not been developed to anything approaching the same extent. This state of affairs has been brought about by two main reasons. Firstly, the neutral ethyl ester of sulphuric acid has not been available for use in large quantities and in a pure state until recently; and, secondly, the information compiled by the earlier workers on the physical, chemical, and physiological properties of the ester has been rather inaccurate and misleading. Mr. Arthur S. Cade, who holds a Fellowship at the Mellon Institute of Industrial Research, sustained by the Carbide and Carbon Chemicals Corporation, of New York, has undertaken work to correlate the many loose individual facts and data already available on diethyl sulphate. His work has included not only a reinvestigation of all the fundamental properties of the material, but an examination of a wide range of type reactions to find out the best conditions for commercial ethylation in each individual case. The results so far obtained by Mr. Cade have been published in *Chemical and Metallurgical Engineering*, August 20, 1923. The following particulars are abstracted from this account:—

Physical and Chemical Properties.

Diethyl sulphate is, when pure, a colourless liquid with a pleasant though faint ethereal odour. It boils without decomposition at 96° C. at 15mm. pressure, and at 120.5° C. at 45mm. pressure. At temperatures above 150° C. it begins to decompose slowly, and at 208° C. it boils with considerable decomposition; the true boiling point probably lies several degrees higher. It has a density $D\ \frac{19}{4}$ of 1.1837. On cooling it forms crystals which melt at −24.5° C. This liquid is entirely neutral in reaction. It is nonmiscible with cold water; with warm water it is slowly hydrolysed, and on boiling it yields eventually 2 mols of ethyl alcohol and 1 mol of sulphuric acid. Diethyl sulphate is non-flammable.

Diethyl sulphate possesses several valuable natural advantages, chief among which are ease of manipulation, low working pressures, intensity of reaction, and ready availability. It is non-toxic, non-flammable, and non-corrosive. Having such a low vapour tension, due to its relatively high boiling point, it is possible to work with diethyl sulphate in vessels provided with an ordinary reflux apparatus.

Diethyl Sulphate, Non-Poisonous.

No toxic effects, similar to those noted and reported for dimethyl sulphate, are produced in the handling of diethyl sulphate. This is contrary to some incorrect statements which have appeared in the literature, and has been substantiated by Mr. Cade and others who have worked with the material over a long period of time. Closely observed, large-scale operations with diethyl sulphate over a period of years have failed to indicate the slightest danger attending its use. All that is necessary is to observe the ordinary precautions that should be observed in the use of any organic substance.

In general, the reaction of the first ethyl group in diethyl sulphate is extremely rapid even at room temperatures, and temperatures around 50° to 55° C. In some cases a slightly higher temperature of 110° C. is required to bring about complete reaction in the shortest time. A still higher temperature of about 145° C. and a longer time of heating are required for the second ethyl group to react efficiently as an ethylating agent. In other words, one ethyl group of diethyl sulphate reacts spontaneously and vigorously, while the other ethyl group reacts like the ethyl in sodium ethyl sulphate.

Experiments have been conducted to test the applicability of diethyl sulphate in a variety of compounds, amplifying the data given by previous workers. General types of compounds were chosen with which to form the alkylated derivatives. These include ethers, esters, amines, and imides. For this work a commercial grade (94 to 96 per cent.) and a practically 100 per cent. diethyl sulphate were used. This material was entirely free from foreign aliphatic radicals, thus insuring that only ethyl derivatives would be produced.

As a result of this investigation, the following general and specific conclusions have been drawn:—

Ethylation of Type Compounds.

1. Diethyl sulphate has reacted under various conditions as a most satisfactory general ethylating agent for the preparation of ethyl ethers, esters, amines, and imides.

2. Diethyl sulphate reacts best, utilising both ethyl groups, with dry reagents, but absolute dryness is not a necessity.

3. Diethyl sulphate reacts in the presence of large amounts of water to the extent of one ethyl group reacting completely, whereas the efficiency of the second ethyl group is somewhat impaired under these conditions.

4. One ethyl group in diethyl sulphate reacts easily and completely at room temperatures under many conditions, but a temperature of about 110° C. has been found more favourable for the most efficient utilisation of this one ethyl group, while a temperature of about 145° C. and a prolonged heating for 3 to 5 hours is essential for the utilisation of the second ethyl group as an ethylating agent.

5. Ethers, both aromatic and aliphatic, are prepared readily in practically theoretical yields, utilising both ethyl groups, by the heating of the corresponding alcohol or phenol in the presence of an alkali. Small amounts of water present are not harmful. When large amounts are present only one ethyl group reacts.

6. Diethyl sulphate reacts vigorously with amines at room temperatures, yielding a mixture of mono- and di-ethylated products, depending upon the conditions of the reaction. Only one ethyl group reacts, the other being transferred to an ethyl hydrogen sulphate molecule, which combines with the ethylated amine to form a water soluble salt therewith. By the use of hydrated lime and heating for a time at temperatures between 140° and 145° C. the second ethyl group may also be utilised to ethylate the amine.

7. Diethyl sulphate reacts favourably to form the ethylated imides, by merely mixing the former in the dry or in a suitable solvent with the alkali imide salt.

8. Many acids, preferably their alkali salts, react readily with diethyl sulphate to form the respective ethyl esters. Yields nearing the quantitative are obtainable in most cases, provided a suitable means is applied to remove the ester as formed and to prevent its hydrolysis. The use of potassium salts gives better efficiency than that of sodium salts.

POTASSIUM PERMANGANATE IN VOLUMETRIC ANALYSIS.

TREATMENT AND CONTROL OF SOLUTIONS.

IN the *Chemiker Zeitung* of July 19, G. Bruhns contributes a lengthy article dealing with the results of his experience in the use of potassium-permanganate solutions for purposes of accurate volumetric analysis. The following summary of his recommendations appears in the *Journal of the Society of Chemical Industry* (September 7, 1923):

Finely crystalline oxalic acid is best used in standardising permanganate solutions, as it occludes no mother liquor and does not effloresce, even over calcium chloride. Large crystals of permanganate were found to be purer than small ones, and the solutions made with them kept better. Bottles and flasks intended for storing standard solutions of permanganate should be first allowed to stand for a few weeks filled with a moderately dilute solution of permanganate before being used for the standard solution. The distilled water used for making up the solution should not decolourise more than 0.7 c.c. of $N/100$ permanganate per 100 c.c. of water.

The solution should not be accurately standardised for about one week after being made up, or alternatively the solution should be heated for several hours on the water bath before standardisation. Precautions to be taken in the use of permanganate for accurate titrations are fully described. Owing to the reducing impurities present in the air of most laboratories, accurate work with permanganate solutions demands the greatest attention to details. If proper care is taken, the standard solutions will keep for years unaltered, even at a dilution of $N/100$. The slight deposit of manganese dioxide which forms in stock bottles may introduce small errors, as it takes as long as 7 hrs. to settle after being disturbed. Permanganate solutions cannot be filtered, even through ignited asbestos, without change in concentration. The purest crystals of potassium permanganate have a bronze colour, the violet and steel blue colours being an indication of incipient surface decomposition. In titrating oxalic acid, the reaction may be started by adding a little manganese sulphate, and warming may be dispensed with.

NOTES ON THE ITALIAN CHEMICAL INDUSTRY.

(From Our Own Correspondent.)

Genoa, August 31.

General News. One hundred thousand workpeople are employed in Italy in 430 chemical works, but at present the activity of the Italian chemical industry is much below the productive capacity of the works. The citrate of lime industry, that has its headquarters in Sicily and in Calabria, and which represents about one-half of the total production of the world, merits special attention. At Messina two new citric acid works—namely, the Sada and Isac works—have been erected. The latter, however, has not yet been able to commence production.

From August 16 the unloading and loading tariffs at Genoa for nitrate of soda have been increased by 50 per cent. The loading tariff for china-clay has been fixed at 3.70 lire per ton, and the unloading tariff at 3.70 lire. For phosphates, the new loading tariff is 3.50 lire, and the unloading tariff 3.20 lire; for superphosphates, the loading tariff has been fixed at 3 lire, and the unloading tariff at 3.20 lire.

Italian Overseas Chemical Trade.—During the latter half of July imports into Genoa included 800 tons of manganese, 240 tons of tallow, 3,400 tons of phosphates, 65 tons of castor oil, 200 tons of cellulose, 3,390 tons of lubricating oils and fats, 1,180 tons of unspecified chemicals, 115 tons of colours and varnishes, 126 tons of sulphur, 469 tons of salt, 2,100 tons of naphtha, and 319 tons of caustic soda.

During the first three months of this year Italy imported 2,067,942 tons of coal, against 1,740,420 tons in the same period of 1922; 41,383 tons of residues from the distillation of mineral oils, against 41,068 tons in 1922; 28,880 tons of petroleum, against 21,930 tons in 1922; 14,874 tons of benzine, against 22,410 tons in 1922; and 13,400 tons of mineral lubricating oils, against 18,892 tons in 1922. Some of the exports were as follows: Sulphur, 56,339 tons, against 36,434 tons in 1922; and essential oils and essences, 299,617 kilos., against 235,989 kilos. in 1922.

Italian Production Statistics.—During 1922 Italy produced 630 tons of aluminium, against 740 tons in 1921, 1,715 tons in 1918, 904 tons in 1915, and 824 tons in 1912; 6,700 kilos. of ingot silver, against 6,878 kilos. in 1921, 10,115 kilos. in 1918, 15,361 kilos. in 1915, and 14,363 kilos. in 1912. During the period 1921-1922 the production of methylated spirits was 76,735 hectolitres, against 63,753 hectolitres in 1920-1921; 40,179 hectolitres in 1918-1919, 93,503 hectolitres in 1915-1916, 123,981 hectolitres in 1912-1913, and 94,732 hectolitres in 1909-1910. Of absolute alcohol (100°), 442,359 hectolitres were produced, against 428,644 hectolitres in 1920-1921, 299,912 hectolitres in 1917-1918, 297,964 hectolitres in 1914-1915, 260,632 hectolitres in 1911-1912, and 418,921 hectolitres in 1909-1910.

Petroleum News.—Negotiations are in progress for the concession to an Italian-Belgian company of 8,000 hectares of virgin petroliferous territory in Russian Georgia. The expenditure incurred by the Italian State in the search for petroleum in Italian territory during the period July, 1918, to May, 1923, reached a total of 10,783,553 lire. The investigations have been confined to the Ripi zone in Frusinate. The oil produced during the period of Government control of Ripi totals 400,000 litres. Attempts are now being made to transfer the operations to the hands of private companies, who will meet all the expenses, the Government supplying only the boring plant. In case of success, the private companies will have the option of acquiring the complete rights over the deposits. The Government will leave a number of other zones completely to private initiative.

American Loans.—An American financial corporation, the Mantell Investment Company of New York, has forwarded to various public corporations in Italy a circular in which it offers to finance the development of the civic and other social services. The loans proposed will be from five to fifty years' duration, and will be granted mainly on mortgage, and the borrowers will pay a yearly interest of 6 per cent. The loans will be made in dollars, and their repayment can be also in dollars, or in Italian lire, at a determined exchange rate of 19.50 lire to the dollar.

Company News.—At Leghorn, the firm of Fabbrica Italiana Magnesiaci De Amici, Jori e Parlanti, has been formed, with a capital of 60,000 lire, for the production of and trade in magnesium compounds. The "Industria Chimica Subalpina" was formed at Chieri, with a capital of 60,000 lire, for the production of and trade in general chemicals. The "Stabilimenti Estratti Tannici Società Anonima" has been established at Cividale (Veneto), with a capital of 700,000 lire, for the production on a large scale of tanning extracts, and especially of chestnut extract. The "Società Esercizio Oleifici" is a new Milan company, with a capital of 10,000,000 lire, for trading in olive-oil products. At an extraordinary meeting the "Società Anonima per la Distillazione del Legno," of Milan, decided to reduce its capital from 600,000 lire to 6,000 lire. At an extraordinary meeting of the important Società Anonima Raffineria di Olii Minerali, of Fiume, increase of the capital from 5,000,000 lire to 15,000,000 lire was considered. During the past financial year of the Industria Siciliana Acido Citrico, of Messina, a loss of 1,115,845 lire was recorded. The Società Solfifera Siciliana, of Milan, has decided to reduce its capital to 3,200,000 lire from 8,000,000 lire.

CASEIN IN THE PAINTS INDUSTRY.

USE AS A BINDER IN DISTEMPERS.

(*Concluded from page 252.*)

THE preparation of paints from casein dry colours is simple enough, though a little care is required. A mixer provided with a mechanical agitator is advisable, and the operation of mixing is commenced by placing the colour powder into the vessel. To every 50 kilogrammes of powder there is added gradually 25 litres of water, with constant agitation. The mixing is continued until an absolutely homogeneous paste is obtained. The stirrer is then stopped, and a layer of water about 1 centimetre deep is run on to the top of the paste. The whole is left undisturbed for one hour, and then the mixing recommenced, with the gradual addition of further water, until the resultant product has the consistency of average oil paint.

In the use of casein paints there is one point that must not be overlooked. When once prepared, they begin after 12 hours to lose their adhesiveness, and a quantity greater than is intended to be used in the course of a day should never be prepared.

When applied efficiently, the coating of casein paint dries rapidly, and after 48 hours they are usually quite hard and can be washed over with water. They are sufficiently flexible and elastic to be varnished over. The surface of the paint is matte, but can be brightened for purposes of interior decoration by spraying over it a solution of 10kilos. of pale carnauba wax and 5kilos. of bleached beeswax in 110kilos. of turpentine.

Addition of Magnesium Silicate.

For exterior painting it has been found that the addition of magnesium silicate to the casein paint gives coatings almost as resistant to atmospheric conditions as oil paints. A typical base formula for this purpose would be:—

Soluble casein	15kilos.
Hydrated lime	20kilos.
Precipitated chalk	10kilos.
Sodium borate	0.15kilo.
Magnesium silicate	110kilos.

The preparation of this paint is similar to that of those described above, and it is applied in the same manner. The coatings obtained are fast to water, hard as enamel, and can be washed over or varnished 48 hours after application. The use of this type of magnesium silicate casein water paint is particularly advisable for covering large surfaces, such as public halls, railway stations, theatres, churches, and hospitals upon all materials such as wood, cement, stone, and brick, but not iron or other metals.

The majority of casein paints contain also a certain amount of antiseptic, added not only to preserve the paint itself before application, but also to preserve it when coated over damp surfaces or in places where considerable humidity prevails.

FRENCH ARTIFICIAL SILK INDUSTRY.

NEW SCHEMES FOR EXPANSION.

IN spite of the rapid growth in recent years of the French artificial silk industry, the output, which is estimated at 1,500 tons yearly, is far below the consumption, and lately the excess of imports over exports has been steadily increasing. At present the "viscose" artificial silk appears to be more favoured than "Chardonnet" silk, states a correspondent of the *Times* (Trade Supplement). Hitherto most of the artificial silk mills were situated in the South of France, mainly in the Rhône Valley—Albi, Besancon, Chavanoz (Isère), Flaviac (Ardèche), Vals-les-Bains (Ardèche), Voult-sur-Rhône (Ardèche), Arques-la-Bataille (Seine-Inférieure). The building of a new mill at Castres (Tarn) is nearly finished, and the erection of two mills in Normandy is contemplated. Further, the Société Borvisk Française has just been formed with a capital of 10,000,000f. for the purpose of manufacturing artificial silk and all cellulose products. In addition to these new enterprises, there is a movement in favour of the extension of the artificial silk industry in the North of France, where, up to now, this branch of French activity has been very little developed. In fact the Nord and Pas-de-Calais departments contain all sections of the textile industry with the exception of artificial silk, although it is used largely in their factories. The netmakers of Caudry, the lacemakers and embroiderers of Calais and Saint Quentin, are bound to follow the requirements of fashion, and are using artificial silk in increasing quantities. This material is bought either in other departments of France or in Belgium. By establishing additional mills, not only in the neighbourhood of Lyons, but also in Northern France, it is hoped to bring prices down. Three companies are now engaged in preliminary work, which, if successful, will result in the establishment in the Nord region within two years of three viscose mills. One would be built at Valenciennes by Roubaix manufacturers. The Société Tubize, Belgian manufacturers of Chardonnet silk, are now looking for a town in Northern France where sufficient labour could be found to operate a new viscose silk mill. A viscose silk factory is also to be built at Gauchey (Aisne).

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Alseveor China Clay Company, Ltd., St. Austell.—Registered August 24, deb., to Lloyds Bank, Ltd., securing all moneys due or to become due to the Bank.

Aluminium Corporation, Ltd., London, S.W.—Registered August 23, £300, mort., to G. Williams, Regent House, Talybont.

Austin and Son (Nechells), Ltd., chemists, etc.—Registered August 23, £669, 17s, deb., to A. J. Corrall, 395, Nechells Park Road, Birmingham.

Mordle (F. Dare) and Co., Ltd., Nottingham, starch manufacturers.—Registered August 27 (by order on terms), transfer of mort. dated February 22, 1922, securing £4,000., to H. J. Hallam, Low Pavement, Nottingham.

Needwood Plaster and Cement Company, Ltd., Burton-on-Trent.—Registered August 28, £1,800, debs.

Taylors' Drug Company, Ltd., Leeds.—Registered August 27, £800, mort., to Mrs. E. Speight, 101, Harrogate Road, Leeds, and others.

Welsh Drug Houses, Ltd., Mountain Ash.—Registered August 27, £600, debs.

SATISFACTIONS.

Carter (John J.) and Sons, Ltd., Southampton, dyers, etc.—Satisfaction registered August 22, £100., part of amount outstanding July 1, 1908.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Goddon and Co., Ltd., London, W.C., manufacturing chemists.—J. W. Dodds, Boxmoor House, Boxmoor, apopinted receiver August 23.

North of Ireland Chemical Company, Ltd.—Claims to H. Bell, 2, Wellington Place, Belfast, liquidator, by October 12.

Veglene Oil Refinery and Chemical Works, Ltd., Cardiff.—E. S. Foden, 15-16, Merchants Exchange, Docks, Cardiff, appointed receiver. August 27.

BANKRUPTCY INFORMATION.

Keene, Irving A., described in R.O. as the Keene Company, 52, Gray's Inn Road, London, manufacturing chemists. 1st and final dividend, 3s. 6½d., at 28, Kimberley House, Holborn Viaduct, London, September 12.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Blunt, W. H., and Son, 79, Snow Hill, Birmingham; manufacturing chemists; £16. 11s. 9d., July 17; and £10. 13s. 10d., July 25.

Tomlinson, Herbert, 7, Alexander Terrace, Undercliffe, Bradford; analytical chemist; £20. 11s. 6d. July 26.

Wenyon, Conrad G., 58, Bankfield Road, Huddersfield; analytical chemist; £15. 10s. 6d. June 29.

SOUTH WALES NOTES.

[Specially Contributed.]

Business in the tinplate trade remains very steady, and there is a slight increase in the orders coming in from the Far Eastern markets. The general position of the industry, in the opinion of merchants, warrants further reductions in prices, and they are holding back before finally signing contracts for over the current quarter. On Tuesday the Joint Stabilisation Committee decided, however, to make no change in the prices. The steelworks have not anything like the number of orders for all the works to operate to their full strength, and in some districts there is only partial employment. The Briton Ferry steelworks have stopped operating, in order to put in a more modern plant, which will take some six or eight weeks to instal. Generally, the patent-fuel trade is none too active. The decline in values of pitch is having some effect, but as yet manufacturers are not disposed to relax their prices any further. Cokes are more plentiful, and with a lessened inquiry stocks are slowly accumulating. The outlook in copper is now much brighter, and there are important sales noted for Continental purchasers. Nickel makers are fairly well employed. Manufacturers of heavy chemicals report better conditions, and employment at the oil works has strengthened.

Among the week's imports to Swansea were 4,000 tons zinc concentrates from Port Pirie and 13 tons calcium carbide from Rotterdam; to Cardiff, 15 tons lithopone from Antwerp, and 1,160 tons asphalt from Trinidad. Exports included 2,000 tons creosote to Savannah from Cardiff, and three tons zinc chloride from Newport to Calcutta.

NEW COMPANIES.

Cyanamid Products, Ltd.—Private company. Capital £5,000., £100. shares. Manufacturers, refiners, and dealers in cyanamide and other chemical products, etc. Office: 232, Salisbury House, London Wall, London, E.C.

H. Edward Hope and Co., Ltd.—Private company. Capital £7,600., £1. shares (6,000 5 per cent. cumulative preference and 1,000 ordinary). Paint and varnish manufacturers, etc. Office: 21, Lower Mall, Hammersmith, W.

H. Edwin Coley, Ltd.—Private company. Capital £21,500., in 30,000 A ordinary shares of 1s., and 40,000 B ordinary and 10,000 10 per cent. participating preference shares of £1. Mineralogists, metallurgists, etc. Office: 6, Bury Court, St. Mary Axe, London, E.C. 3.

Pharmaceutical Supply Company, Ltd.—Private company. Capital £3,000., in 2,985 6 per cent. cumulative preference shares of £1, and 300 ordinary of 1s. Solicitors: Cohn, Seligman and Bax, 52, New Broad Street, London, E.C.

Industrial Products, Ltd.—Private company. Capital £5,000. Manufacturers of electrical compounds and special paints. Office: 17, Herschell Street, Anniesland, Glasgow.

Jamaica Sugar Syndicate, Ltd.—Private company. Capital £35,000. Office: 116, Hope Street, Glasgow.

ITEMS OF INTEREST.

Safety in Mines.—The first general Report of the Safety in Mines Research Board has been published and is now on sale, price 9d.

Change of Address.—The Rosario Nitrate Company, Ltd., announce that the registered office of the company is now 145, Dashwood House, New Broad Street, London, E.C. 2.

Obituary.—We regret to record the death of Mr. A. E. Rice, on August 26, at Yellowstone, U.S.A. He was president of the Pennsylvania Salt Manufacturing Company, with which he had been connected since 1888.

German Dyestuff Production in July.—According to an American Consular Report, the production of coal-tar dyestuffs in Germany for the month of July totalled 9,032,286lb., including 366,855lb. of alizarin red and 236,677lb. of vat colours.

Middlesbrough Steelworks Fatality.—Five men lost their lives and several others were seriously injured in an accident on Saturday last at the North-Eastern Steel Works, Middlesbrough. A rope attached to a ladle broke, and the men working near were caught under a shower of molten metal and slag.

Disposal of Belgian Reparation Dyestuffs.—We are informed that the Société Anonyme de Couleurs d'Aniline et Produits Chimiques S.A.C.A., 60, Rue de Mérode, Brussels, have been appointed by the Belgian Government, sole distributors of the aniline dyes seized in the German factories as reparations.

American Chemical Exposition.—The forthcoming exposition, to be held from September 17 to 22, will be the last annual event, exhibitors having expressed a preference for a biennial exhibition. The new one will take place in 1925. It is stated that these annual expositions have never fully met the expectations of some of the early promoters.

Trade Mission to South America.—An important commercial mission has been arranged by the Federation of British Industries to South America, headed by Mr. G. H. Locock, an assistant director of the Federation. The itinerary embraces Brazil, Uruguay, Argentina, Chile, Bolivia, Peru, Ecuador, Colombia, Venezuela, Panama, and Cuba.

American Cyanamid Progress.—The American Cyanamid Company reports for July that at the New Jersey plant the production of ammo-phos was at the rate of 20 per cent. of capacity, and, in addition, there was continued the manufacture of certain secondary products. At the phosphate mines in Florida operations were at a rate somewhat less than capacity, while at the Niagara Falls plant operations were upon the basis of full capacity.

August Trade Returns.—The Board of Trade figures for August show imports at £88,743,000, against £76,818,000, in July and £82,616,000, for August, 1922. British exports totalled £69,103,000, compared with £59,504,000, in July and £60,032,000, in August last year. The figure for re-exports at £6,129,000, was the lowest since before 1921. Imports of chemicals amounted to £1,315,825., an increase of £190,804, compared with last year; exports were lower at £1,645,856, by £16,753.

Cochineal Insects Check Prickly Pear. — Imported cochineal insects are reported to have made some headway in checking the prickly pear invasion of Australia. Since the plant was first introduced 60 years ago, it has spread over 40 million acres of fertile lands in Queensland and New South Wales. Industrial use of the weed and Government bonuses for clearing it from the land have had little effect in staying its progress. Insect control is sought as a last resort, but with a risk that a new pest will be established.

Dyestuffs Applications During August. — The total number of applications received by the Dyestuffs Advisory Licensing Committee during August was 391, of which 269 were from merchants or importers. To these should be added the 29 cases outstanding on August 1, making a total for the month of 420. These were dealt with as follows:—Granted—282 (of which 248 were dealt with within seven days of receipt). Referred to British makers of similar products—74 (of which 63 were dealt with within seven days of receipt). Referred to Reparation supplies available—30 (all dealt with within two days of receipt). Outstanding on August 31—34. Of the total of 420 applications received 341, or 81 per cent. were dealt with within seven days of receipt.

Mining and Metallurgy Congress.—The Prince of Wales has consented to become Honorary President of the forthcoming Empire Mining and Metallurgical Congress, which will be held at the British Empire Exhibition in London during the first week in June next.

British Coal Output.—The coal output for the mines of Great Britain during the week ended September 1 was 5,280,600 tons, compared with 5,163,800 during the previous week and 5,203,600 tons during the corresponding week last year.

Canadian Output of Salt and Gypsum.—According to the Dominion Bureau of Statistics, the output of salt from all sources in Canada during 1922 totalled 183,438 tons. The total output of gypsum rock during the year amounted to 484,629 tons, of which quantity 145,954 tons, or 30 per cent., was calcined.

Explosion in New Jersey.—Four people were killed and twenty-seven injured, fifteen probably fatally, states *Reuter*, in a series of explosions of a thousand cases of smokeless powder, which were being transferred from barges to railway wagons. The first explosion was due to a fire originating in one of the barges.

Congress of Industrial Chemistry.—The Société de Chimie Industrielle has invited members of the American Chemical Society to attend the third Congress of Industrial Chemistry to be held at Paris, October 21 to 26. The American chemists are also invited to contribute papers and to take part in the discussions.

The U.S. Coal Strike.—The representatives of the miners and mine-owners in the anthracite fields of Pennsylvania have signed a two-year contract embodying a ten per cent. increase in wages, and the eight-hour day. The contract is subject to the approval of the Miners' Convention, to be held on the 17th inst. The men's leaders are confident that operations will be resumed on the 19th.

Synthetic Jewels.—There are several factories in Switzerland turning out large quantities of synthetic precious stones—rubies—for watches, electric meters, measuring instruments, etc. The possible annual production has been put at 125,000,000 carats, but in fact production, limited by demand, is much lower. Owing to hardness and uniformity of structure it is stated that 90 per cent. of all watch stones and 50 per cent. of stones for meters, etc., are made of synthetic material. The average price of synthetic rubies is about £10. per kilogramme—unworked—and £150. when cut. Synthetic blue sapphires cost £24. uncut and £400. cut.

U.S. Commerce Bureau.—In the 11 years which have elapsed since the organisation of the American Bureau of Foreign and Domestic Commerce its personnel has increased from 89 to 935, its appropriations for regular work from 363,000 dollars for 1913 to 2,076,000 dollars for 1924, and the number of trade inquiries from a few thousand in 1913 to 974,000 in 1923. A notable addition to the Bureau's publications during the current fiscal year will be the first issue of a new annual Commerce Yearbook, preparation of which is now nearing completion. This volume will present a comprehensive survey of trade and industry during 1922 and the first six months of 1923 in the United States and in foreign countries.

Acetic Acid in British Malaya.—In 1921, Canada furnished almost 50 per cent. of the acetic acid imported into British Malaya, but by 1923 she altogether ceased to compete in the market. The bulk of the acid is now supplied by European continental countries. Details as to the respective quantities exported by the different countries of the Continent in 1922 and 1923 are not yet available, but in 1921 the Netherlands and Germany were the only two European continental countries exporting the acid to Malaya. The following table gives the value of acetic acid imported into British Malaya in 1921, 1922, and the first half of 1923, showing countries of origin:

	1921	1922	1923 (6 months)
	£	£	£
United Kingdom	390	7,920	4,792
British Possessions	11,332	540	—
Continent of Europe	3,819	80,347	52,213
U.S.A.	5,565	751	1,017
Japan	2,366	29,121	4,450
Other Countries	—	245	—
Total	£23,472	118,924	62,472

Biological Chemistry in America. — The American Chemical Society announces that a trust fund for establishing a Fellowship in biological chemistry in the College of Physicians and Surgeons, Columbia University, to be named in honour of the founder, Professor W. J. Gies, will be presented at the twenty-fifth anniversary of that department on October 1.

Tariff Notes. — Certain rebates on the Customs duties leviable on salt, turpentine, eucalyptus, pine, and certain other oils, soya bean oil, citronella and mirbane oil, various waxes, and linseed oil have been allowed on importation into South Africa. — Oil-shale distillation machinery and apparatus, except mining machinery, may be imported into Esthonia free of duty from September 1, 1923, until February 1, 1924, under certificates of the Esthonian Ministry of Trade and Industry.

British Unemployment Increasing.—The number of persons on September 3 recorded on the live registers of the Employment Exchanges in Great Britain as wholly unemployed was 1,233,300. This was 5,130 more than in the preceding week, but 252,578 less than the figure recorded on January 1, 1923. The number working short-time and drawing benefit for intervals of unemployment was 72,800 on September 3, as compared with 67,993 on August 27, and 56,261 on January 1, 1923.

Oil Separator for the Clyde.—To meet the provisions of the Oil in Navigable Waters Act, which recently came into operation, the Clyde Navigation Trust have followed the lead of other port authorities in England, notably the Port of London Authority, and decided to instal a floating oil separator. Smith's Dock Company, of the Tyne and Tees, who have carried out contracts at home and abroad for their special oil separating barge, have secured the contract, which will be put in hand immediately.

Detecting Subterranean Water and Minerals.—A considerable amount of investigation has been carried out recently in the Laboratory of the Science Museum, South Kensington, on a remarkable instrument known as the Eötvös Torsion Balance. This instrument is fundamentally a very delicate apparatus for measuring minute differences in gravity pull at different points on the earth's surface. It is believed that the instrument will be of great practical value in detecting oil, water, or minerals many feet below the earth's surface.

Personal.—Dr. Andrew Balfour, for the past ten years Director-in-Chief of the Wellcome Bureau of Scientific Research, London, resigns that position on October 31. He will be succeeded by Dr. C. M. Wenyon, who for the past nine years has been Director of Research in the Tropics at the Wellcome Bureau of Scientific Research.—Dr. Alfred Rée has been elected this week a vice-president of the Manchester Chamber of Commerce in succession to Sir Edward Rhodes. Dr. Rée is a past president of the Society of Dyers and Colourists.

Inquest on Rubber-Mixer's Death.—At an inquest held in Manchester this week on the death of Patrick Hanley, a rubber mixer employed at W. T. Glover's works in Trafford Park, a verdict of "death from natural causes" was returned, the immediate cause of death being found to be cancer of the stomach. Interest attached to the case since the deceased had employed for some time in his work an aqueous paste of "accelerene" (the proprietary name of para-nitroso-dimethylaniline—a rubber vulcanisation accelerator), and it was thought that the toxicity of this material might have been a contributory cause to the man's death.

Electrolytic Fur-Dyeing Process.—According to the *Deutsche Farber Zeitung*, a new method of electrolytic oxidation of dyestuffs in the dyeing of furs has been introduced in Germany. Ordinarily, the compounds sold and used under the names "Nako" "Ursol," "Furrol," and so on, are oxidised in the dyer's bath with peroxide of hydrogen. With the electrolytic process, furs can be dyed with aniline salts without the usual damage to the skin from the chlorates used in developing aniline black. The electrolytical oxidation of the aniline black produces a deep black without green shading, superior to any other fur black in lustre and durability. In seal dyeing particularly favourable results obtain, the skin remaining soft and pliable and the fur having a fine lustre. The colour is fast and highly resistant to alkalis and acids. Much time is saved in the new process, which is also cheap and easily controlled.—*Oil, Paint, and Drug Reporter* (New York).

Iron Ore in Ontario.—The special committee appointed by the Ontario Government to investigate the iron ore industry of the province recommends that the industry be encouraged and developed by a bounty for ten years, half to be paid by the province and half by the Dominion; also that a properly qualified geologist be permanently assigned to the work of studying and reporting on Ontario iron ore deposits. The committee recommends that the section of the Mining Act prohibiting the export of iron ore be repealed in order to encourage the entrance of foreign capital for developing this industry.

Carbon Black Production in America. — The quantity of carbon black produced from natural gas in the United States in 1922 amounted to 67,795,000 pounds, over 13 per cent. more than in 1921, according to a statement issued by the Department of the Interior through the Geological Survey. Increased demand for carbon black during the latter half of the year, especially by the rubber industry, required practically all the product of the year, and, in addition, between 12 and 15 million pounds that had been held in storage. Increased demand was reflected by a rise in spot prices. The reported average price realised for the year at works was 8.6 cents a pound.

The Toxicity of Arsenical Insecticides. — A thorough investigation of a number of commercial arsenicals and laboratory preparations is described by F. C. Cook and N. E. McIndoo (U.S. Dept. Agric. Bull. No. 1147, 1923), together with analyses, toxicity tests, compatibility of mixtures, etc. Acid lead arsenate was found to have a greater toxicity than "basic" lead arsenate. Samples of calcium arsenate varied considerably. The addition of lime or Bordeaux mixture considerably lowered the toxicity of arsenates. Acid lead arsenate and zinc arsenite were the most adhesive to potato foliage, and Paris Green the least adhesive. Paris Green and zinc arsenite were more toxic than acid lead arsenate, which in turn was more toxic than the arsenates of other metals. The percentage of water-soluble arsenic in arsenical insecticides had little influence on their toxicity, except in the case of freely soluble ones. Chemical analysis alone is considered insufficient to determine the insecticidal value of arsenicals; direct toxicity tests should be made in addition. —*J.S.C.I.*

COMING EVENTS.

British Association. — Annual meeting, **September 12-19,** at Liverpool. On **Friday, September 14,** presidential address to Chemistry Section: "The Physical Chemistry of Interfaces," by Professor F. G. Donnan. Papers before Chemistry Section: "The Quantum Theory in Chemistry," by Professor G. N. Lewis; "The Bohr Atom and the Periodic Law," by Dr. N. V. Sidgwick; "On High Frequency Spectra and the Theory of Atomic Structure," by Dr. D. Coster; "The Activation of Hydrogen in Organic Compounds," by Miss Usherwood; "The Nature of Hevea Rubber," by Professor G. S. Whitby. On **Monday, September 17,** "Enzymes," by Dr. E. F. Armstrong; "Relation of Certain Enzymes to Tissue Differentiation and Tumour Growth," by Dr. K. G. Falk; "Catalytic Actions in Presence of Copper," by W. G. Palmer; "Aluminosilicates," by Professor W. Vernadsky; "The Chemistry of Hafnium," by Dr. Hevesy. On **Tuesday, September 18,** "The Utilisation of Volcanic Steam," by Senatore G. Conti; "The Biochemical Effect of Polarised Light," by Miss Semmens; "Cotton Wax," by Dr. R. G. Fargher; "The Absorption of Methylene Blue by Cotton," by Dr. D. A. Clibbens; "The Sulphonation and Nitration of Naphthalene," by Professor H. E. Fierz. Visits to the works of Prices Patent Candle Company, the British Oxygen Company at Bootle, and Joseph Crosfield and Sons have been arranged for Friday, Monday, and Tuesday afternoons respectively.

Institution of the Rubber Industry.—Meeting, **Monday, September 17,** at **8 p.m.,** at the Engineers' Club, Coventry Street, London, W. Paper: "Rubber Floors and Rubber Roadways," by E. J. Edwards

Iron and Steel Institute.—Autumn meeting, **Monday and Tuesday, September 17** and **18,** at Milan.

National Gas Exhibition.—From **September 17** to **October 3,** at Birmingham.

Chemists' Exhibition.—From **September 17** to **September 22,** at St. Andrew's Hall, Glasgow.

REPORTS OF COMPANIES.

Calico Printers' Association, Ltd.

The accounts show that the profits for the year to June 30 last, after providing £597,305. for maintenance, depreciation, repairs, renewals and upkeep, and £128,000. for debenture interest, amount to £800,208.; add amount brought forward from last account, £237,371., making £1,037,579. The directors recommend that this balance should be appropriated in the following manner:—To payment of a dividend at the rate of 5 per cent. per annum on the preference shares for the year ended June 30, against which the directors have declared and distributed an interim dividend on March 31 for the half-year ended December 31, 1922, £150,805.; to payment of a dividend on the ordinary shares for the year ended June 30 at the rate of 10 per cent. per annum, £201,073.; to payment of a bonus on the ordinary shares for the year ended June 30 at the rate of 2½ per cent., £50,268.; to reserve account, £150,000.; to reserve for equalisation of dividends, £150,000.; to employees' benefit fund, £100,000., leaving a balance to be carried forward of £235 432.

Burt, Boulton and Haywood, Ltd.

Report for half-year to June 30 states that the past six months have more than maintained the improvement in the company's affairs since the great slump. The board have decided to issue to the shareholders the balance of the unissued capital of the company, and the terms on which these shares will be offered will be communicated to them in due course. The net profit earned during the six months, after writing off £10,000. to depreciation, amounts to £43,720., to which amount must be added £2,398. brought forward. From this total £246. must be deducted to provide payment in respect of workers' certificates. The shareholders will be asked to vote £14,960. for the payment of 4 per cent. dividend, free of tax, on the ordinary shares, making 8 per cent. free of tax for the company's year from July 1, 1922, to June 30, 1923, and to sanction the carrying of £20,000. to reserve, leaving £10,162. to be carried forward.

Nobel Industries, Ltd.

The gross profits for the year ended December 31 last were £1,157,137. (as compared with £809,242. in 1921). After providing £176,999. interest (less tax) paid and accrued to December 31, 1922, upon the eight per cent. seven year secured notes, the balance was £980,138. There is deducted £37,236. to write off the cost of note issue, leaving a net profit of £942,901. (against £604,264). The balance brought forward was £463,349. After allowing for the preference dividend for the year it is proposed to pay a dividend of 7 per cent. on the ordinary shares (against 5 per cent.), less tax, to write off the balance of "cost of eight per cent. note issue," the notes having been repaid in May, 1923, £148,945., and to carry to reserve £50,000. (against £350,000.). The credit balance carried forward is £509,018.

Elliott's Metal Company, Ltd.

The report for the year ended August 4 states that after paying debenture interest and providing for corporation tax there remains a profit of £85,553., to which is added £26,865., the balance from 1922, making a total of £112,418. The directors propose to pay a dividend at the rate of 3s. per share on the ordinary shares, less tax (of which an interim dividend amounting to £22,149. has already been paid); to write off balance of expenses of fusion with Muntz's Metal Company, £1,805.; and carry forward £32,904.

DIVIDENDS.

Aberthaw and Bristol Channel Portland Cement Co., Ltd.—The directors have decided to pay interim dividends of 3¾ per cent. on the 7½ per cent. preference shares and 7½ per cent. on the ordinary shares (both less tax), in respect to the year ending December 31.

Broken Hill (South), Limited.—Net profits for the past year were £322,000., and appropriation for new land and developments £80,000.

North Broken Hill Company, Ltd.—To the dividend of 2s. per share, declared in August, there is to be added 1.56d. per share, being balance of relief in respect of Dominion tax applicable to dividend paid June 27, thus making a net distribution of 1s. 9.72d. per share.

Zinc Corporation, Ltd.—Dividend of 2s. per share on preference, being first half of fixed preferential dividend of 20 per cent. for 1923.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The resumption of operations at the Whitehaven collieries and coking plants at the termination of a dispute which has lasted seventeen weeks comes at a time when all the industries of the district—iron, steel, iron-ore and coal-are in a depressed condition. There is little information available as to the likelihood of steel makers receiving sufficient orders to put their rail mills into full or even partial operation, although it is stated this week that the outlook is a little more hopeful. Other outlets for the disposal of the make of iron are not large. Neither Continental nor home consumers are buying more iron than they need, and then from hand to mouth, and in the southern portion of the district stocks are accumulating so quickly that a decision will soon have to be taken as to whether all the furnaces now blowing can be kept in blast. Should output have to be diminished then a material increase in the Continental demand for coke will have to be experienced if the native make is to be marketed. The damping down of a furnace or two in the Furness district would clearly deprive the Whitehaven ovens of their ordinary outlet. The West Cumberland ovens send the greater part of their production to the Workington and Cleator Moor furnaces, and in the West Cumberland district the number of furnaces in draught is at present seven. There is no change in prices, local smelters paying from 29s. to 33s. per ton according to carbon content, while the Continent is paying from 34s. to 37s. per ton. It is hoped that the Continental outlet will become more important in the autumn and winter, and it is stated that shipments will presently be on a more substantial scale. The depression in the iron and steel industries is affecting the demand for industrial fuel, and this market is rather slack. Best steam, however, still commands 30s. per ton delivered and washed steam 29s. per ton delivered. There is a big Irish demand for house nuts at 26s. and for washed nuts at 23s. 6d., but these classes of coal and smalls are being in the main reserved for the coking plants. Residuals are all being marketed. The tar is going to the chemical works, and the make of crude benzol and sulphate of ammonia is being absorbed. Chemical products are a fair trade. East Coast coke supplies this week are 8,100 tons.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," September 15, 1888.)

The Innocents Abroad.—In numerous instances the statues in the hall of the Brunner Free Library, Northwich, have been taken by inhabitants of the Emerald Isle, and in some cases by English people, too, for Northwich worthies and other persons quite different from those whom they are supposed to represent. Especially is this the case with respect to the central figure—a life-size representation in marble of England's greatest bard, Shakespeare,—who is very frequently taken for the donor of the handsome institution. The remarks passed by such visitors when in the hall are very amusing, but a description which was given of the statues on Wednesday evening is the best we have heard of. An Irishman who has been in Northwich for some years was showing two recent importations from the sister isle the various figures and describing them, when he proceeded to enlighten his two companions upon Shakespeare as follows: "Ah, this is the gintleman. I've worked for him thirteen or fourteen years, and he's a gintleman. I know him well, and, faith, it's a good likeness, too." One of the others replied, "God bless him, and is that Mr. Brunner?" These ardent admirers of the member for Warrington then turned their attention to "The Two Wrestlers" on the left of the entrance going in, whom their guide informed them were Cain and Abel. "This man has got his head down, looking at his thick leg," was the description given of "The Dying Gladiator"; and "Mercury" was "the great slave driver, a relation of King Herod, that ordered all the small children to be destroyed. His arm was struck off when slaughtering the children." This interesting native of Erin, however, gave the most amusing description when he said "Jupiter" was Mr. Brunner's partner, Mr. Mond. The credulity of these innocent Irishmen stands out in bold contrast to the tactics adopted by Mark Twain and his friends with respect to their guides. Evidently, the schoolmaster was very far abroad when these Irishmen were boys.

FERTILISER NEWS.

Nitrate of Soda.—The shipments from Chile during the month of August totalled 212,000 tons, of which 130,000 tons to Europe and Egypt, 69,000 tons to the United States, and 13,000 tons to Japan and other countries. When compared with 1922 and 1921, these figures show a considerable increase, but the large stocks of nitrate in the consuming centres during these years did not allow of large shipments so early in the season. While exports are large, however, the market has lately been very dull, although it is stated that there has been a revival during the past few days. Sales have assumed larger proportions, and the total amount of nitrate sold for shipment after July 1 last is now given as about 944,000 tons. The few thousand tons of second-half November delivery which were available at the end of August at the Association's price of 20s. 7d. per metric quintal have since been sold, so that the cheapest material on offer at first hand is for December delivery at 20s. 9d. per quintal. As was forecasted in this column last week, the estimated production during August has been considerably modified, and the cabled figure as quoted by one of the leading brokers, amounts to 165,000 tons. On this basis, and allowing for the alteration in the export figures, the total visible supply of Chilean nitrate at August 31 amounts to 1,426,000 tons, of which 939,000 tons are on the West Coast, 310,000 tons in or en route for Europe and Egypt, 140,000 tons for the United States, and 37,000 tons for other countries. On Monday last, the regretted death occurred of Mr. George A. Lockett, a well-known figure in the nitrate industry. Born in Liverpool 68 years ago, he was the fourth son of the late Mr. Richard Lockett, who, with Colonel J. T. North, and Sir Robert Harvey, was one of the pioneers of the industry. He had a first-hand knowledge of nitrate trading conditions, having frequently visited the Chilean nitrate grounds.

Sulphate of Ammonia.—The home market for this fertiliser continues to be very quiet, and although there is a little business passing, it is of such small dimensions as to arouse little comment. Of interest, now, unfortunately, mainly historical, is a report received this week from our Japanese correspondent at Osaka, under date of August 15. He states that at the time of writing there was something in the nature of a slump in the price of sulphate. In the early part of the year, heavy commitments were entered into with British exporters, and it is said that many of these purchases were of a speculative character. The demand, in the face of very unfavourable weather conditions during July and August which have had an adverse effect on the crops, has been considerably delayed. Consequently, importers have been reducing prices to a certain extent in order to encourage consumers. Dealers who had indulged in speculative purchases, contracted for at about yen 200 per ton, have been endeavouring to get rid of the material at prices as low as yen 140 per ton for immediate delivery. The market, therefore, at the time of writing, was in a very low condition, with little prospect of early recovery. It is impossible, of course, to forecast what effect the recent disaster in Japan will have upon the industrial and agricultural life of the country. Yokohama, the chief port, has, according to the information available, been completely destroyed, and although stocks of sulphate in Osaka and Kobe at August 15 were over 6,000 tons, it is not known how much sulphate was stored at Yokohama. Up to the end of July, the total amount of sulphate despatched from this country to the Japanese market amounted to 28,664 tons, while shipments during August account for a further large tonnage. Reports from the United States announce that the miners' strike has been settled, and that a speedy resumption of work is anticipated. The success of the British producers of sulphate in the markets of the world has caused some concern to the American exporters. Vague talk about the control of a "trust" which would be "considered illegal" in the States, and the "undercutting" in prices, indicates the feeling which exists, and the implication of all this grumbling is that Great Britain has secured an unfair advantage. It is probably nearer the mark, however, to infer that the American merchants and producers, having forced domestic prices up to a very high level—about £18. per ton—find it difficult to lower their prices for such export material as is available in case it should arouse unfavourable comment, and action, amongst the home consumers.

American Fertiliser Exports in 1923.—Exports of fertilisers and fertiliser materials during the period January 1 to June 30, 1923, amounted to 550,953 tons valued at 11,382,529 dollars, which compares with 496,801 tons, valued at 9,423,504 dollars in the corresponding period of 1922. Sulphate of ammonia exports decreased by 3 per cent. in quantity, but increased by 21 per cent. in value, largely due to the shortage and consequent raising of prices. This shortage was particularly acute during the first quarter of 1923. The Far East, including Japan—which took nearly two-thirds of the total shipments—offered the best market, while much of the remainder was taken by Cuba, a comparatively near market. In addition to sulphate, some 19,050 tons of other nitrogenous fertilisers, valued at 968,014 dollars were exported during the six months. In spite of the unsettled conditions prevailing in the phosphate market the 396,642 tons, worth 2,951,058 dollars of phosphate rock which were exported to foreign countries during the first half of 1923 represented an increase of 7 per cent. in tonnage, but a decrease of 8 per cent. in value, as compared with the corresponding period in 1922. Only 113 tons, worth 8,385 dollars, of superphosphates were exported in June, 1923, while in April the shipments equalled 10,718 tons, 184,542 dollars, and the total exports for the six months were 18,742 tons, 338,965 dollars. Prepared fertiliser mixtures failed to reach the figure of 9,204 tons, 469,366 dollars, for the previous year by 398 tons, 87,102 dollars, the total exports during the first six months of 1923 having amounted to 8,806 tons, 382,264 dollars.

The Use of Compound Manures.—At the British Association meeting, now being held at Liverpool, Dr. C. Crowther, in his presidential address to the Agriculture Section on Thursday, September 13, dealt with "Science and the Agricultural Crisis." Touching very briefly on the fertiliser question, Dr. Crowther mentioned the inadequate and improper manuring still widely prevalent. A considerable part of this wastage, he said, is due to the widespread use of proprietary compound fertilisers, more often than not compounded without any special reference to the soils upon which they are to be used, or even without intelligent adaptation to the special needs of the crops for which they are supplied. It is not uncommon, indeed, to find mixtures of identical composition offered for the most diverse crops. In far too many cases also the prices charged are extravagantly disproportionate to the intrinsic value of the ingredients of the mixture, and in all these various ways costs of production are made higher than they need be. In claiming that improved manuring achieved through extended advisory guidance might effect a sensible alleviation of the present difficulties of the arable farmer, Dr. Crowther said he was not unmindful of the fact that even the best practice may result in loss when the value of produce sinks to the low levels recently touched by many crops, and the best manuring will not make it possible, for example, to grow potatoes profitably under present conditions for sale at 30s. per ton. Where loss is inevitable, however, this will usually be lowest at a level of production involving the reasonable and intelligent use of fertilisers.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Italy.

H.M. Commercial Secretary at Rome reports that a firm in Venice are open to entertain proposals from British firms for the installation of plant for the extraction of oil of maize. (Ref. D.O.T. 20,441/F.W./C.C./2.)

Netherland East Indies.

A merchant in the Netherland East Indies is desirous of obtaining the representation of a British manufacturer of a medium quality washing soap. (Ref. No. 286.)

Australia.

The Victorian Railways Commissioners are calling for tenders to be presented before October 17, 1923, for the supply of 15 tons of sodium acetate (commercial). (Ref. No. 12,039/E.D./C.P.)

Bulgaria.

The Bulgarian State Railways are desirous of receiving tenders for the supply of 500 tons of creosote to the approximate value of 3,5000,000 leva. A public adjudication of tenders will be held on September 28, 1923. (Ref. No. 11,456/F.E./C.C./2.)

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

August 27 to September 1 (inclusive).

Printing-ink. Bawtree, A. E.; and Gill, E. F. 21,644.
Reduction of Metal Oxides. Bruzac, A.; and Constant, G. 21,927.
Liquid Air or Liquid Oxygen Explosives. De Wendel et Cie, Les Petits Fils de F. 21,682.
Pitch for Briquettes. Garbe, J. B. 21,655.
Varnishes. Griffiths, M. E.; Nobel's Explosives Co., Ltd.; and Picton, N. 21,933.
Catalytic Treatment of Hydrocarbons. Hydrocarbons, Ltd.; and Porter, G. F. 22,081.
Oxygenated Organic Compounds. Johnson, J. Y. (*Badische Anilin and Soda-Fabrik*). 21,753.
Rotary Filter. Mennell, J. L. 21,811.
Metaphenylene-diamine. Pellegrini, G.; and Poma, G. 21,659.
Alphanaphthylamine. Pellegrini, G.; and Poma, G. 21,660.
Destructive Fermentation of Organic Residues. Pico, L. Boggiano-. 21,916.
White Lead. Plaueln, R.; and Rascher, M. 22,004.
Cement. Rigby, T. 22,059.
Anthraquinone Sulphonic Acids. Scottish Dyes, Ltd.; and Thomas, J. 22,029.
Fertilisers. Soc. d'Etudes Chimiques pour l'Industrie. 22,076.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. *in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.*

1922.

Recovering Liquid Solutes from Non-aqueous Solutions. Silica Gel Corporation. 5,232. **175,987**
Iron-chromium Alloys. Saltrick, W. A. 5,385. **202,664**
Reduction of Ores. Girouard, Sir E. P. C.; and Jones, F. W. S. 5,962. **202,667**
Dehydrating Process. Cheshire Kitchens, Inc. 11,131. **195,335**
Sodium Compound. Cocksedge, H. E. 11,325. **202,678**
Soap Manufacture. Weltes, A. 14,325. **202,710**
Zinc Oxide. New Jersey Zinc Company. 14,619. **180,680**
Vat Dyestuffs. Sokal, S. (*Kalle and Co. Akt.-Ges.*). 14,726. **202,734**
Condensation Products from Urea and Formaldehyde. Pollak, Dr. F. 15,218. **181,014**
Treatment of Fibres in the Application of Vat Dyes. Morton, J.; and Wood, K. R. 15,402. **202,757**
Drying Process. Rigby, T. 17,498. **202,793**
Extracting Volatile Oil from Gases. Ikeda, K.; Isobe, H.; and Okazawa, T. 17,708. **202,795**
Electrolytic Apparatus. Scott, J. P. 28,947. **202,882**

1923.

Drying Substances. Glent, K. M. 8,821. **202,925**
Thermo-electric Pyrometers. Daynes, H. A.; and Cambridge and Paul Instrument Co., Ltd. 11,216. **202,928**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Rustless Iron and Steel. Berlin, D. W. 5,705. **202,952**
Reduction of Metal Oxides with Continuous Regeneration of the Reducing-gas Employed. Constant, G.; and Bruzac, A. 19,592. **202,970**
Aromatic Sulphonic Acids. Rheinische Kampfer Fabrik Ges. 19,981. **202,975**
Producing Fast Tints on the Fibre. Soc. of Chemical Industry in Basle. 21,078. **202,984**
Durable Compounds Containing Active Oxygen. Noll, Dr. F. 21,099. **202,985**
Giving to Gases a Definite Moisture Content. Obermiller, Dr. J. 21,273. **202,993**
Continuous Analysis of Mixed Gases. Piccard, A. 21,289. **202,994**
Elevator for Liquids. Detaint, E. 21,399. **202,996**
Viscous or Resinous Products. Chemische Fabrik auf Actien vorm E. Schering. 21,412. **202,997**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Sulphur Chloride in Lead Metallurgy. E. A. Ashcroft, London. British Patent, **200,701**, of 1922.

Lead-zinc sulphide ores and the like are treated with sulphur chloride at temperatures much below 500° C. such as 50-150° C. or even 250° C. so as to chlorinate the lead and silver selectively, the bulk of the zinc sulphide being unchanged. The sulphur chloride after the chlorination of the ore contains dissolved sulphur derived from the ore and from the sulphur chloride, and sulphur may be crystallised from it. The residue after the separation of the sulphur chloride consists of gangue, unchanged zinc sulphide, and chlorides of lead and silver. The chlorides are removed by washing with hot zinc-chloride solution, or lead chloride may be removed by hot water. Or the residues may be treated with fused zinc chloride with or without an alkali chloride to dissolve the chlorides and the solution is then electrolysed.

Electrolytic Diaphragms. R. Pechkranz, Geneva. British Patent, **200,584**, of 1922.

In water-decomposing apparatus of the filter press type, thin sheet metal electrodes are arranged between frames carrying partitions of metal as thin as paper and perforated with holes as fine as a hair, a small part of the partitions at the upper parts being left solid. The partitions may be of nickel or a metal belonging to the nickel group. The electrodes may project beyond the frames for the purpose of cooling the electrolyte. The frames are of insulating material such as pressed asbestos cement. They are supported by lugs on a frame and are each provided with a groove in which a compressible material such as rubber is laid as packing for the electrodes. The frames are provided with coacting apertures, forming passages for the gases and electrolyte.

Tanning Materials. W. Moeller, Hamburg, Germany. British Patent, **200,262**, of 1922.

The injurious effect of free acid in vegetable, mineral, or synthetic tanning agents is eliminated by means of ammonia or an organic base, which serves to neutralise the acid, or by means of an ammonium salt, which retards the hydrolysing action of the acid on the hide substance. The treatment may be applied directly to the tanning agents or to hides tanned therewith. Suitable organic bases are the amines or amino-acids, which may be employed in an impure condition as occurring, for example, in the crude mixture of pyridine and quinoline bases obtained in the purification of coal tar, or in the mixture of amino-acids resulting from the hydrolysis of proteid materials. In treating tanning agents, the agent and the determined quantity of base required for neutralisation are heated together at 80–100° C. In the case of tanning agents containing free sulphonic-acid groups, the process results in an enlargement of the tanstuff molecule, and it is stated that the added base takes part in the tanning action of the final product. Examples are given describing the treatment of synthetic tanning agents of known type with aniline oil, crude pyridine bases, glycine, and with pyridine under pressure; the treatment of sulphited quebracho extract with naphthylamine and with the hydrolysis products of gelatine; the production of a tanning solution by hydrolysing glue with phenol, condensing the product with formaldehyde, sulphonating, and finally neutralising with an organic base; and the treatment of leather with quinoline bases, glycine, and a crude mixture of amino-acids. Reference has been directed by the Comptroller to Specifications 131,772, 157,855, and 175,362.

Cellulose Acetates. J. O. Zdanowich, London. British Patent, **200,186**, of 1922.

Solutions obtained in the acetylation of cellulose and suitable for spinning directly into artificial silk, etc., or for making films, are rendered stable against changes in viscosity by the addition of an aqueous solution of formaldehyde or other aldehyde, or by the addition of tetrachlorethane. In the preferred process, 150grms. of cellulose are mixed with 900 c.c. of glacial acetic acid, 420 c.c. of acetic anhydride, chlorine being passed in until the cellulose disintegrates, whereupon 0.75grms. to 1.5grms. of sulphuric acid are added and the reaction continued until solution occurs; to the solution 100 c.c. of commercial formaldehyde solution are added. Filaments, films, etc., are manufactured from this solution by direct extrusion into a suitable coagulating bath. Specifications 139,232, 190,732, and 196,641 are referred to.

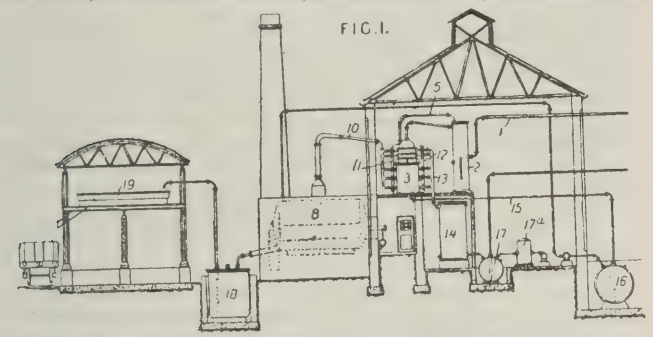
Halogenated Phenols. British Dyestuffs Corporation, Ltd., London; and H. H. Hodgson, Bradford. British Patent, **200,714**, of 1922.

m-Chlor-, *m*-brom, and *m*-iodo-phenol are prepared from the corresponding *m*-halogenated anilines by diazotising and decomposing the nitrous-acid-free diazo solution under such conditions that the *m*-halogenphenol is removed from the reaction liquid by steam distillation with such rapidity that combination with more diazo compound is prevented. In an example a cold paste of *m*-chloraniline sulphate crystals is diazotised, leaving part thereof unchanged, stirred for about two hours and filtered from the excess amine sulphate; the diazo solution is then dropped into a vessel containing boil-

ing dilute sulphuric acid, or even water, through which steam is blown to distil off the *m*-chlorphenol as it is formed. Specifications 7233/97 and 9675/04 are referred to.

Dehydrating and Distilling Tar. Coke and Gas Ovens, Ltd., London. (G. Still, Westphalia, Germany.) British Patent, **200,651**, of 1922.

Apparatus for dehydrating and distilling tar comprises a dehydrator so arranged that it may be used either for dehydration only or for pre-heating the tar flowing to a still, the apparatus being heated either by the heavy vapours of subsequent distillation of the tar or by steam. Crude tar is fed by a pipe 1 to a condenser 2 where it is preheated before entering the dehydrator 3 by the oil and water vapours leaving the dehydrator by a pipe 5. The tar gravitates through vertical tubes 6 and over horizontal coils 7, and these tubes and coils may be heated either by oil vapours leaving the still 8 by a pipe 10 or by steam from a pipe 11, each coil and the casing surrounding each nest being connected by a separate branch union both to the pipe 10 and to the steam supply pipe 11, so that each coil and tube nest may be heated either by steam or oil vapours selectively



and independently of the other nests and coils. An exhaust steam pipe 12 is provided and a pipe 13 for conveying the vapours to a condenser 14 discharging into a receiver 17 connected to a vacuum pump 17a whereby the distilling operation is carried out in a vacuum. The tar passes by gravity through a pipe 15 to a collector 16 from which it is pumped to the still 8. The pitch from the still 8 is run into a receiver 18 and transferred to pitch bays 19 arranged in the manner described in Specification 200,460.

Tar-wells. W. Allen, London. British Patent, **200,416**, of 1922.

The internal surface of the bottom of a tar-well is inclined towards the centre by increasing gradually the thickness from the centre outwards to the periphery, so that a minimum amount of liquid may be left in the apparatus when the liquor is pumped out through a vertical centrally disposed pipe. The external surface of the bottom is flat and rests on the ground, while a flat is preferably formed on the internal surface below the pipe.

Handling Pitch. Coke and Gas Ovens, Ltd., London. (C. Still, Westphalia, Germany.) British Patent, **200,460**, of 1922.

Pitch from a tar still passes to a sunken receiver from which it is forced by compressed air to raised pitch bays, so that when the pitch is solidified it may be shovelled down to a truck. The pitch bays may have flexible walls connected at their upper edges by chains with a turnbuckle arrangement, these chains being tensioned when the molten pitch is admitted but released when the pitch has solidified, so that the walls will return to their normal positions leaving gaps into which the breaking up tools can be inserted.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Organic Acid Chlorides. Farbwerke vorm. Meister, Lucius and Brüning, Hoechst-on-Main, Germany. British Patent, **200,511**. Convention date, July 6, 1922.

Carboxylic acid chlorides are produced by treating a free carboxylic acid with a sulphochloride in the presence of a solid diluent, which may comprise an inorganic salt such as alkali chloride, neutral sulphate, and pyrosulphate, or a dry powdered indifferent body, such as kaolin and sand. Preferably at least two molecular proportions of the sulphochloride, which includes alkali chlorosulphonates and aryl sulphochlorides, are used for each molecular proportion of the carboxylic acid. According to the examples: (1) one molecular proportion of glacial acetic acid is slowly added with continued stirring to a heated mixture of two molecular proportions each of sodium chlorosulphonate and sodium chloride; acetyl chloride distils off and is collected in a series of condensers. (2) two molecular proportions of both *p*-toluenesulphochloride and common salt are heated together, and one molecular proportion of glacial acetic acid is added with continual stirring; acetyl chloride distils off and is collected; the residue contains *p*-toluenesulphonic acid anhydride; benzenesulphochloride may replace the *p*-toluenesulphochloride. In the examples, potassium salts may replace the sodium salts, and by using chloroacetic acid, propionic acid or butyric acid in place of the acetic acid, chloroacetyl chloride, propionyl chloride and butyryl chloride are obtained. Specification 24255/02 is referred to.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. WEDNESDAY.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals. — One or two products have again declined in value, but the market is generally fairly steady. Business, although still rather limited in bulk, has been a little better this week. **Acetic Acid,** 80% technical, £47.; 80% pure, £51.; 98% glacial, £60. in casks and £73. in glass demijohns, ex wharf London; the spot position is fully maintained, with supplies limited; inquiry is well sustained. **Acetone,** British Government specification, £125. to £127. per ton, in drums; little is available on spot, and the general outlook is for still higher values in the future. **Alum,** lump, in casks, £10. per ton; dealers are offering Continental material at about this price, with business slow and small. **Arsenic,** Cornish white powdered, about £70. per ton, spot; offers of foreign material are coming to hand at lower prices. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; practically no inquiry about; dealers' prices are easy as quoted. **Barium Chloride,** 98—100%, about £15. per ton; the market is still on the slow side; dealers' prices are unaltered. **Bleaching Powder,** 35—37%, about £10. per ton; importers are quoting Continental material at about this figure, with the demand poor. **Borax,** commercial, granulated £24. 10s., crystals £25., powdered £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to station in Great Britain; British makers' prices are unchanged at these levels. Dealers are quoting under similar conditions as to packing and delivery at: Commercial, granulated £23. 10s., powdered £25. per ton, for home trade only. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers are offering for home trade only at these rates, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid in Great Britain; British makers are quoting for home trade only at these rates; dealers are offering some grades at competitive rates. **Cream of Tartar,** 99—100%, about 88s. to 90s. per cwt., less 2½%, for one-ton lots; at these prices, which were reduced last week, the market seems fairly steady, and some fair business has been done. **Citric Acid,** B.P., about 1s. 6d. per lb., less 5%; spot material is being freely offered at under this market quotation, but there is very little being taken up. **Epsom Salts,**

commercial quality, about £5. per ton, in bags; dealers find business very slow and small. **Formaldehyde,** 40%, on spot nominal at £95. per ton; forward, about £75. per ton; a fair inquiry is being received for material to arrive. **Glauber's Salt,** commercial quality, £3. 15s. to £4. per ton, in bags; spot offers at these rates are slow in being taken up. **Lead Acetate,** brown, about £40. to £41.; white, about £42. per ton; little business has been done; the market is rather weak. **Litharge,** about £35. 10s. to £36. per ton; dealers in imported material are doing a little business at these levels. **Lithopone,** 30% Continental red seal, £22. 10s. to £23. per ton; the demand has been fair, and prices as quoted seem very steady. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; supplies are offering on spot, but are rather slow in moving off. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers quoting at these rates. **Oxalic Acid,** about 6d. per lb.; there has been no improvement in inquiry; values as quoted seem just a little weak. **Carbonate of Potash,** 90—92%, about £26. 10s. to £27.; 96—98%, £30. to £31. per ton; the tone on the spot seems steady, but business is not at all brisk. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; there is very little business doing with dealers. **Caustic Potash,** 88—92%, on spot, about £30. per ton, in drums; dealers are quoting at about this figure, and some limited business has been done. **Permanganate of Potash,** commercial quality, about 9½d. per lb.; some few inquiries are on the market, with quoted rates unchanged. **Prussiate of Potash,** yellow, about 1s. per lb.; a further drop in values is recorded here, with business still far from good. **Sulphate of Potash,** 90%, £11. 10s. per ton, ex ship; there is no change. **Mercury,** about £9. per bottle of 75—76lb.; this market remains rather quiet, and the tone is not at all steady. **Red Lead,** imported, about £35. 10s. to £36. per ton; importers offer at about these levels, with occasional business coming to hand. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49.; medium, £43. to £44.; fine white crystals, £25. to £26. per ton; stocks are offering on spot, with business rather slow and limited; prices seem quite steady. **Saltcake,** ground and unground, home trade, about £4.; export, about £5. 5s. per ton, f.o.b.; inquiry is good, with prices very steady. **Acetate of Soda,** about £24. 10s. to £25. per ton; a fair business has been done here, with prices steady. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags; British makers quoting at this rate, for home trade only, packages free, carriage paid in Great Britain; their prices for export vary as to destination. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers are quoting at these prices, with not much business about. British makers' prices, for home trade only, on contract, are: 70—72%, £16. 17s. 6d.; 76—77%, £18. 7s. 6d. per ton, in drums, carriage paid to destination; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers offering for home trade only at this price, carriage paid to destination. **Bichromate of Soda,** home trade, about 4½d. per lb.; British makers' prices are unchanged, with business quiet. **Cyanide of Soda,** 98—100%, export, 8½d. to 9d. per lb.; British makers' prices are unchanged on the week. **Hyposulphite of Soda,** pea crystals, about £13. 10s. per ton, in 1cwt. kegs; commercial quality, about £8. 10s. to £9. per ton, in casks; dealers are offering at these slightly easier prices, with business rather limited. **Nitrate of Soda,** 96%, about £13. 7s. 6d. per ton, f.o.r. or f.o.b.; the market is rather easy at this rate. **Nitrite of Soda,** 100%, £26. 10s. per ton; the firm tone reported last week is well maintained. **Prussiate of Soda,** about 6d. per lb.; dealers find business very slow and small, and their quoted prices recently reduced are still rather weak. **Sodium Sulphide,** 60—62%, solid, about £14.; ditto, broken, about £15. 5s. per ton, in drums; 60—65% concentrated, about £15. per ton, in casks, some few small inquiries have been dealt with this week. **Sulphate of Copper,** £26. per ton; British makers continue to quote at about this figure for home and export, but Continental prices appear to be lower. **Tin Crystals,** 1s. 4d. per lb.; the market shows no change on the week. **Tartaric Acid,** B.P., crystals, about 1s. 2d. per lb., less 5%; business has again been poor this week, and the quoted price is by no means steady. **White Lead,** imported, about £42. to £43. per ton; prices are a shade easier this week, with little doing. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers' prices are returned at these unchanged values.

Pharmaceutical Chemicals.—There has been a little more inquiry on the market, and business, although confined to small lots, has been fairly good. Prices are keeping steady. **Acetanilid,** crystals and powder, 1s. 6d. to 1s. 7d. per lb.; at these slightly better rates the market keeps very steady. **Acetyl-Salicylic Acid,** B.P., about 3s. 1d. per lb.; spot supplies of good brands are quoted steadily at this improved rate. **Benzoic Acid,** B.P., 2s. 3d. to 2s. 6d. per lb.; dealers are offering at these prices, with inquiry very small. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. per lb.; prices for spot supplies are steady on a quiet market. **Salicylic Acid,** B.P., about 2s. 2d. to 2s. 3d. per lb.; the market is now very steady, and fairly active at these lower levels. **Tannic Acid,** leviss, 3s. 3d. per lb.; some occasional inquiry, with market steady. **Amidopyrin,** about 14s. 6d. per lb.; there has been little doing here, and quoted rates are unaltered. **Ammonium Bromide,** about 7d. to 7½d. per lb.; the demand for supplies offering is limited; values a little steadier. **Benzonaphthol,** about 5s. per lb.; this market has been inactive. **Betanaphthol,** resublimed, about 1s. 10d. per lb.; a quiet tone continues here, with values as quoted easy. **Benzaldehyde 03,** about 3s. per lb.; slightly less is mentioned for quantities. **Calcium Lactate,** about 1s. 9d. per lb.; 1s. 9d. to 1s. 10d. per lb.; these values are well sustained, with fair business about. **Chloral Hydrate,** duty paid, about 4s. per lb.; spot supplies are fairly steady at this level. **Creosote, B.P.,** about 2s. 6d. per lb.; the market has been quiet, but prices quoted are well maintained. **Creosote Carbonate,** about 8s 6d. per lb.; this market is firmer, with a tendency to advance. **Guaiacol Carbonate,** about 8s. 3d. per lb.; the market has been idle, with quoted values unchanged. **Hexamine,** about 3s. 6d. to 3s. 9d. per lb.; at these slightly easier rates the market is firm, and has been fairly active. **Hydroquinone,** about 3s. 2d. to 3s. 4d. per lb.; easier prices are again quoted here, with the market still dull. **Methyl Salicylate,** 2s. 6d. to 2s. 7d. per lb.; this market is very healthy, and some fair business has been done. **Methyl Sulphonal,** about 15s. per lb.; hardly any inquiry about; quoted values unchanged. **Paraformaldehyde,** 3s. 6d. to 3s. 8d. per lb.; spot holders are quoting at these levels, but business is slow. **Paraldehyde,** 1s. 5d. to 1s. 6d. per lb.; the demand on spot has been small; quoted rates are rather easy. **Phenacetin,** 5s. 10d. to 6s. per lb.; the lower price quoted is for large quantities. **Phenazone,** 7s. 3d. to 7s. 6d. per lb.; at these rates the market keeps very steady, with limited business passing. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; these high values are well maintained on spot. **Potassium Bromide,** B.P., crystals and granular, 6d. to 7d. per lb.; little change in the position can be recorded; market quiet; values unsteady. **Potassium Permanganate,** B.P., about 10d. per lb.; there has been fair demand, with quoted rates steadily maintained. **Potassium Sulphoguaiacolate,** 5s. 6d. to 6s. per lb.; there has been hardly any inquiry; values nominal. **Sodium Benzoate,** about 2s. 6d. per lb., nominal; market idle during the week. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; the market holds up to this figure, but there is little business about. **Sodium Bromide,** B.P., crystals and granular, about 7d. to 7½d. per lb.; the spot position is unchanged on the week, with business slow and small. **Sodium Salicylate,** B.P., powder, about 2s. 6d. per lb.; crystals, about 2s. 8d. to 2s. 9d. per lb.; spot supplies are rather short, and the market is very steady. **Sulphonal,** about 14s. 6d. per lb.; market dull; prices quite steady. **Terpin Hydrate,** 1s. 9d. per lb.; business has been small, but the market keeps very steady. **Thymol,** about 15s. per lb.; dealers offering spot material at this price. **Vanillin,** 100%, 23s. 3d. to 23s. 6d. per lb.; the market has been quiet.

Coal-tar Products, Intermediates, Etc.—This market has been quiet, and in some directions prices are at easier rates. The general tone is rather unsteady. **Aniline Oil,** 9d. to 9½d. per lb., drums free; quoted rates are unchanged on the week, with the market steady. **Aniline Salt,** 9½d. to 10d. per lb., casks free; the market is quiet. **Betanaphthol,** 1s. 1d. to 1s. 2d. per gallon; there is little inquiry about; quoted values unaltered. **Benzol,** 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; the quoted price is steady, but business is very slow and limited. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; quoted prices are level on the week, with business

slow. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; this market has been dull, and is rather unsteady. **Naphtha,** about 1s. 4d. per gallon; this unchanged rate is quoted, but the tendency is towards slightly easier rates. **Solvent Naphtha,** 90/160, 1s. 3d. per gallon, drums extra; a further reduction in price is recorded, with still but little movement in the market. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; with inquiry still poor, a further fall in value is recorded here. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; there is no change to record here. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; the market is quiet, but the tone keeps steady. **Creosote Oil,** about 9½d. per gallon, f.o.b.; dealers are quoting at this unchanged price, but there is little doing. **Carbolic Acid,** crystals, 1s. 2d. per lb., f.o.b.; the recovery in this market recorded last week seems to be well maintained. **Naphthalene,** about £19. to £20. per ton; the market is quiet and easier; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; tablets, £28.; candles, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; market quiet; values unchanged. **Pyridine,** 20s. per gallon; this article keeps very firm on spot, with supplies scarce. **Hexamethylene,** about 3s. 9d. per gallon; the market is fairly steady, but there is little doing at present. **Pure Methyl Alcohol,** £100. per ton, ex wharf London; dealers' prices are well maintained at about this level. **Pitch,** about 135s. per ton, East Coast; during the past week business has been very poor, but matters should liven up shortly; quoted rates are unchanged. **Sulphate of Ammonia,** home trade, 25¾%, £14. 10s. per ton, ex works.

ITALIAN CHEMICAL MARKET.

Genoa, Aug. 31.

August was, on the whole, a poor month for the Italian chemical market. The continual variations in the foreign exchange rendered importation very difficult. The demand for sulphate of copper improved but little, in spite of the prevalence of disease among the vines. Quotations during the month were as follows, prices being per 100kilogs. at Milan, unless otherwise stated:—**Caustic Soda,** 70—72%, Italian, 185 lire; American, 76—78%, 210 lire; English, 190 lire; French, 190 lire. **Carbonate of Soda,** 98—100%, Italian, rose from 80 to 85 lire (Genoa); English, 85 lire (Genoa); American, 85 lire (Genoa); demand fairly strong. **Soda Crystals,** 50 lire; in good demand. **Alum,** crystals, 85 lire; in very fair demand. **Bicarbonate of Soda,** powder, kegs, rose from 162 to 185 lire (Genoa). **Bichromate of Soda,** 445 lire (Genoa). **Bichromate of Potash,** crystals, 590 lire. **Borax Crystals,** 99%, in kegs, fell from 425 to 400 lire. **Carbonate of Ammonia,** lump, 430 lire; powder, 370 lire; still in good demand. **Carbonate of Magnesia,** pure, 430 lire; in little request. **Chlorate of Potash,** crystals, in fair demand at 310 lire. **Acetone,** pure, 98—99%, 1,250 lire. **Glacial Acetic Acid,** 99%, low demand at 1,200 lire. **Boric Acid,** crystals, 800 lire. **Lactic Acid,** 80%, in fair request at 300 lire. **Bisulphite of Soda,** crystals, 350 lire. **Formaldehyde,** 40%, in good call at 880 lire. **Phosphate of Soda,** 160 lire; little demand. **Hyposulphite of Soda,** crystals, 120 lire. **Metabisulphite of Potash,** 400 lire. **Nitrite of Soda,** 96—98%, demand quiet at 290 lire. **Permanganate of Potash,** crystals, in little call at 800 lire. **Sulphate of Alumina,** crystals, 18%, 100 lire. **Sulphate of Zinc,** quiet at 180 lire. **Citric Acid,** crystals, in good call at 1,900 lire. **Sulphate of Iron,** slow at 50 lire. **Hydrofluoric Acid,** 50%, in limited demand at 600 lire. **Oxalic Acid,** crystals, moderate trade at 660 lire. **Tartaric Acid,** crystals, in fair call at 1,350 lire. **Chloride of Ammonia,** lump, 98—100%, in little call at 600 lire (Milan); powder, 95—96%, in good demand at 280 lire (Genoa). **Chloride of Calcium,** 75—80%, in stronger demand at 70 lire. **Bleaching Powder,** in fair call; French, 110—115%, 90 lire; electrolytic, 100 lire. **Cream of Tartar,** 98—99%, powder, steady at 930 lire. **Yellow Prussiate of Potash,** crystals, dull at 2,000 lire. **Yellow Prussiate of Soda,** crystals, 1,400 lire; better handled. **Silicate of Soda,** Italian, 38—45%, 65 lire; crystals, 85 lire; English, 140° Tw., 100 lire. **Sulphate of Soda,** crystals, 43 lire; powder fell from 70 to 65 lire. **Sulphate of Magnesia,** crystals, 50 lire. **Chloride of Magnesia,** solid, fell from 75 to 70 lire, with hardly any business. **Hydrochloric Acid,** 20—21° Bé., 25 lire. **Sulphuric Acid,** 50° Bé., 20 lire; 66° Bé., 45 lire. **Nitric Acid,** 36° Bé., 155 lire; 42° Bé., 190 lire. **Benzaldehyde,** 3,500 lire. **Tannic Acid,** 80%, 2,000 lire. **Aluminium Acetate,** quiet at 160 lire. **Lead Acetate,** brown, 560 lire; white, 570 lire. **Betanaphthol,** 2,800 lire; in good demand. **Barium Peroxide,** 1,000 lire. **Sodium Peroxide,** in brisker demand at 1,800 lire. **Red Prussiate of Potash,** not much doing at 3,150 lire. **Caustic Potash,** 88—92%, 380 lire. **Tartar Emetic,** powder, 1,200 lire. **Mineral Superphosphate** fell from 28 to 27 lire. **Bone Superphosphate,** in smaller demand, fell from 53 to 52 lire. **Basic Slag,** 16—18%, in little call at 37 lire. **Nitrate of Soda,** 15—16%, in fair demand at 142 lire. **Nitrate of Ammonia,** in little call, fell from 120 to 115 lire. **Nitrate of Lime,** 12—13%, in dull demand at 110 lire. **Sulphate of Ammonia,** 20—21%, quotations reduced from 163 to 162 lire, with limited request. **Sulphate of Copper,** 98—99%, Italian, 225 lire; foreign, 226 lire. **Chloride of Potash,** in fair demand at 78 lire. **Sulphate of Potash,** in fair request at 100 lire. **Calcium Cyanamide,** 15—16%, in low demand, fell from 105 to 98 lire. **Sulphur,** refined, in blocks, 53 lire (Catania, Sicily), 70 lire (Milan). **Sulphur,** sublimed, 70 lire (Catania, Sicily); 77 lire (Genoa). **Crude Tartar,** quotations reduced from 310 to 281 lire.

LONDON METAL MARKET.

Wednesday.

Copper: Standard brands, £63. 5s. to £63. 7s. 6d., cash; £64. to £64. 2s. 6d., three months; electrolytic, £69. to £69. 10s. **Tin:** Standard, £199 5s. to £199. 10s., cash; £200. to £200. 5s., three months; Straits, £203. 5s.; English, £200. **Lead,** soft foreign, £25. 15s., prompt; English, £27.; chemical sheet, 34s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 15s.; hard, £27. 15s. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £8. 15s. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. 6d. to 12s. 9d. per unit, c.i.f. United Kingdom or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45.

MANCHESTER CHEMICAL MARKET.

Wednesday.

The demand for heavy chemicals generally during the past week has again shown signs of improvement, but buyers, meantime, are only covering for spot and near requirements, and quotations all round still show a downward tendency. Prices for alkali products are fairly steady at the recent reduction, and fair business is reported on home and export account. **Bleaching Powder,** softwoods, quiet at £11. 5s., makers' works. **Roasted Saltcake** is only in small request for home trade, but there is a fair demand from abroad, and prices are maintained. **Chlorates** and **Bichromates** are unchanged. Imported American **Sulphur,** firm at £5. 5s. on rails. The demand for **Sulphate of Copper** continues slack, and quotations nominal at £25. 10s. to £26., f.o.b. There is little or no inquiry for **Phosphate** and **Commercial Hyposulphite of Soda,** and prices are weak. Concentrated **Sodium Sulphide,** lower at £14., net, carriage paid in quantity; crystals steady at £9. per ton. **Nitrite of Soda,** in fair request at £26. 10s., ex store. White powdered **Arsenic** continues easy at £69., delivered North of England, for Cornish make. **Yellow Prussiates** continue weak—**Potash** at 1s. 1d., **Soda** 6d., per lb., carriage paid. American grey **Acetate of Lime,** firmer at £22. per ton; brown scarce and dear at £11. 10s., carriage paid. Miscible **Wood Naphtha,** 6s. 6d. per gallon. **Acetone,** £130. per ton. Values of **Acetate of Soda** and **Acetic Acid** are well maintained, but there is not much business passing meantime. **Lead Salts** have a firmer tendency; foreign white **Acetate** at £42., brown £43.; and **Lead Nitrate** £42., delivered. **Barium Chloride** unchanged at £14. 10s., on rails. **Oxalic Acid** is only moving off slowly, but price is steady at 5¾d. to 6d. per lb. **Permanganate of Potash,** easy at 9¾d. per lb.

SWANSEA MARKET REPORT.

Wednesday.

There was a steady demand for **Tinplates,** and quotations were slightly easier than the basis price of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets** in fair demand, and some business transacted at higher prices, based on £18. 12s. 6d. **Copper** fairly active, with an upward tendency; prompt £63. 17s. 6d. per ton, and three months £64. 7s. 6d. **Tin** prices were irregular, and consumers held

off the market; prompt £198. 17s. 6d. per ton, and three months £200. 2s. 6d. **Lead** very active, with early delivery demand stronger; prompt £25. 17s. 6d., and three months £25. 12s. 6d. per ton; English, £27. **Spelter** very firm, with consumers anxious to place contracts over current quarter; prompt £33. 7s. 6d., three months £33. 2s. 6d. per ton. **Zinc Sheets** in active demand at £39. 7s. 6d. per ton at makers' works. **Sulphate of Ammonia** very dull. **Nitrate of Soda,** slow at £13. 12s. 6d. per ton, in 1cwt. bags. **Bone Meal** dull; Indian, prompt, £9. 2s. 6d. **Sulphate of Copper** steady, with quiet trade at £25. 17s. 6d. per ton, less 5%. **Oxalic Acid,** better sale at 6¼d. per lb., f.o.r. **Arsenic** met with moderate inquiry, with white powdered at £68. 2s. 6d. per ton, f.o.b. **Pitch** must easier, with best grades at £6. 12s. 6d. per ton. **Sulphuric Acid** in good demand, with unchanged quotations. **Benzol** met with less demand at 1s. 4d. per gallon. **Creosote Oil,** in good demand at 9¾d. per gallon, f.o.b. **Copperas** rather slow at £2. per ton, including delivery London or equal for 4-ton lots. **Seed Oils** firmly held, with raw **Linseed,** prompt, at £2. 4s. 6d.; and boiled £2. 6s. 6d. per cwt. **Cottonseed Oil,** common edible £2. 2s. 6d., and deodorised £2. 5s. 6d. per cwt. **Coconut Oil** firm, with Ceylon at £2. 3s. 3d. **Olive Oil** quiet, but steady at £66. 7s. 6d. per ton. **Palm Oil** very firm, with a dearer tendency; Lagos, prompt, £36. 2s. 6d.; softs, £35. 12s. 6d.; mediums, £36. 15s. 6d.; hards, £36. 2s. 6d. prompt, and £36. 7s. 6d. forward. There was not so much activity in the **Coal** market, and sellers had plenty of stocks on hand, and were enabled to offer concessions for immediate buying: Best Admiralty smokeless £1. 8s. 6d., seconds £1. 7s., ordinaries £1. 6s.; Monmouthshire black vein, £1. 8s. per ton, f.o.b. **Anthracite** less active: Best large £2. 9s. 6d., seconds £1. 19s. 6d. Paris nuts, £2. 19s. 9d., all per ton, f.o.b. **Patent Fuel** quiet, with unchanged quotations. **Cokes** less active, with export qualities at £2. 2s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton at ovens.

LIVERPOOL CHEMICAL MARKET. Wednesday.

The demand for chemicals of the heavier class for use by the home trade has been very fair, the tendency appearing to be towards an improved condition. In the export branch shipments have been moderately active and steady. **Bleaching Powder** has been in fair request; for the home trade £10. 5s. to £10. 7s. 6d. per ton is quoted, and for export £11. 5s. to £11. 17s. 6d. per ton. **Chloride of Calcium** has been in quietly steady demand, and is £5. 12s. 6d. per ton. **Caustic Soda** has been rather more in request for use in the United Kingdom, and has had a moderate shipment for export; it is £19. to £20. per ton for 76%, carriage paid, for the home trade. **Bicarbonate of Soda** has had a steady inquiry for use in the United Kingdom, and is £10. 10s. per ton, carriage paid, to home-trade users. **Soda Crystals** have been in very fair request for use in the United Kingdom, and are £5. 5s. per ton, carriage paid, for the home trade. **Nitrate of Soda** has had a limited inquiry, and is £13. 5s. to £13. 10s. per ton. **Borax** has been rather more in demand; commercial crystals are £25. per ton, and powdered £26.; higher-grade crystals are £29. per ton, powdered £30., and superfine £31. per ton. **Saltcake** has been more in demand, and is £4. 10s. to £5. per ton, for use in the United Kingdom, and £5. to £6. per ton for export. **Bichromate of Soda** has been in somewhat freer request, and is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has been in good request for use in the United Kingdom, and has had a rather active shipment for export; it is £7. 12s. 6d. per ton for the United Kingdom, and £8. per ton for export; price varying according to destination. **Hyposulphite of Soda** has had a moderate inquiry, and is £10. to £10. 10s. per ton, in 2cwt. bags, for commercial; and £15. to £17. per ton for crystals and photographic quality, in 1cwt. kegs, according to quantity. **Sulphide of Soda** has been but little in request; solid is £14. 10s. to £15. per ton, and crystals £8. 10s. to £9. per ton. **Chlorate of Soda** has been very quiet, and is 3d. to 3¼d. per lb. **Phosphate of Soda** has moved but slowly, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has had a limited inquiry, and is 6½d. per lb. **Yellow Prussiate of Potash** has been in fair demand, and is 1s. 1d. to 1s. 2d. per lb. **Red Prussiate** has had a small sale, and is 3s. per lb. **Carbonate of Potash** has been more inquired for, and prices are somewhat lower; they are £25. to £31. per ton, according to quality. **Nitrate of Potash** has been steadily called for, and is £30. to £32. per ton for refined. **Chlorate of Potash** has had a moderate inquiry, and is 3½d. to 4d. per lb. **Caustic Potash** has been rather more in request, and is £30. to £31. per ton. **Permanganate of Potash** has been in good demand, and is 9¾d. to 10d. per lb. **Bichromate of Potash** has been in fair request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been but little called for; first quality is £63. per ton, second quality £60., and third £57. **Sulphate of Ammonia** continues quiet for the home trade, but has had a fairly large shipment for export; it is £14. 10s. per ton for neutral of 25¾%, and £13. 7s. per ton for ordinary of 25¼%, for use in the United Kingdom. **Carbonate of Ammonia** continues to meet with a steady inquiry, and is 4d. per lb. **Muriate of Ammonia** has been but little in request, and is £32. to £33. per ton. **Magnesia** has again been in very fair demand; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has had a moderate inquiry; it is £12. per ton for home-trade uses, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been quiet, and is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been steadily called for; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s., and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has been in rather good demand, and is 1s. 2d. to 1s. 2½d. per lb. **Cream of Tartar** has again been in very fair request, and is £4. 10s. to £4. 15s. per cwt. **Boric Acid** has been in quietly steady demand; commercial crystals are £48. per ton, and powdered £51. per ton, in bags, and £2. per ton more if in casks. **Citric Acid** has had a moderate sale, and is 1s. 8d. to 1s. 8½d. per lb. **Oxalic Acid** has been but little in demand, and is 6¼d. to 6½d. per lb. **White Acetate of Lead** moved but slowly, and is £42. to £43. per ton. **Sulphate of Copper** has been very quiet for the home trade and for export; it is £25. 15s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been quiet, and is £68. to £70. per ton for white powdered.

WEST OF SCOTLAND CHEMICALS. Wednesday.

Business continues fairly steady, with a fair day-to-day demand for chemicals on home-trade account, though volume is small on account of the depression in the chemical-consuming industries. Export trade is still very quiet, with little doing beyond the fulfilment of contracts. New business is scarce, and eagerly looked for. Prices generally are steady, but citric and tartaric acids are easier. Quotations, at Glasgow, are as follows:—**Alum** quiet, and in small demand; prices steady at £12. 5s. for lump, and ground £12. per ton. **Arsenic** continues in short request, and supplies are still very scarce; the quotation is £1. lower at £73. per ton, net, on spot. **Barium Chloride** remains very quiet, despite the recent reduction to £15. per ton. **Bleaching Powder** does not show much movement, and the quotation is maintained at £11. 7s. 6d. **Boric Acid** and **Borax Crystals** are little sought for though prices have been reduced, and for the former stand at £48. per ton, and £25. per ton for the latter. **Borax,** granulated, is on offer at £24. 10s. per ton, net, in 2cwt. bags. **Calcium Chloride,** 70—75%, solid, £5. 12s. 6d. per ton. **Citric Acid** is a quieter market, with the price steady at 1s. 6¼d. per lb., less 5%. **Copper Sulphate** is but little in request at £27. per ton, less 5%, at Liverpool. **Cream of Tartar** quieter, with smaller inquiry at £4. 5s. per cwt. for 99%, at Glasgow. **Lead Acetate** is in fair request; brown rather better at £42. 10s. per ton, net; and white steady at £41. 10s. per ton, net. The market for **Magnesium Chloride** is slow, with quiet business at £3. 10s. for spot. **Oxalic Acid** is 6¼d. per lb. **Paraffin Wax** experiences a quietly steady trade at 2½d. per lb. **Potash Salts** remain generally steady, with **Bichromate** at 5¾d.; **Chlorate** in request at 4d.; and **Prussiate** rather dull at 1s. 3d.; all per lb. at Glasgow. **Salammoniac** indicates only quiet business at £60. and £57. for first and second lump respectively; crystals steady at £48. 10s. per ton. **Saltpetre** is £1. 9s. per cwt., but business is nominal at this reduced figure. **Sodium Bichromate** remains steady, with business on the basis of 4½d. per lb. **Chlorate** is quieter at 3½d., while **Prussiate** continues in steady demand at 10½d. per lb. **Bicarbonate of Soda** is in good supply at £9. 15s. per ton, in 2cwt. bags; and £11. 10s. in 1cwt. kegs. **Tartar Emetic,** 43—44%, rather easier, and inclined to be dull at 1s. 1d. per lb. **Tartaric Acid** still shows a quiet tendency at 1s. 2d. per lb., less 5%, Glasgow.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending September 8.

ACETIC ACID—
Hamburg, 24 cks.

BARYTES—
Antwerp, 100 bgs.: Bremen, 69 cks.; Hamburg, 210 crts.

CHEMICALS (*otherwise undescribed*)
Bremen, 4 cs.

CHROME ORE—
Madras, 890 t.; Karachi, qty.; Paagoumene, 2,700 t. and 75 bgs.

DISINFECTANTS (*otherwise undes.*)
Marseilles, 1 crt.

FERTILISERS (*otherwise undes.*)—
Ghent, 8,250 bgs.

GLUCOSE—
Ghent, 200 bgs.

KIESELGUHR—
Bremen, 1,494 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 90 drms.

PHOSPHORIC ACID—
Bremen, 17 crbys.

PLUMBAGO—
Antwerp, 9 cs.

POTASSIUM CARBONATE—
Antwerp, 27 kgs.

POTASSIUM PERCHLORATE—
Rouen, 200 cks.

POTASSIUM SULPHATE—
Hamburg, 2,000 bgs.

SALT—
Bremen, qty.
Hamburg, 2 cs., 300 bgs.

SOAP—
Marseilles, 225 cs.

SODA—
Marseilles, 75 cs.

SODIUM BICARBONATE—
Antwerp, 20 kgs.

SODIUM HYPOSULPHITE—
Hamburg, 47 cks.

SODIUM SULPHATE—
Hamburg, 250 bgs.

TALLOW—
Buenos Aires, 4 cks.

TANNING MATERIALS—
Quebracho
Buenos Aires, 11,326 bgs.

TARTAR EMETIC—
Hamburg, 10 cks.
Rouen, 10 cs.

TARTARIC ACID—
Bremen, 10 cks.

WHITE LEAD—
Hamburg, 20 cks.

ZINC OXIDE—
Antwerp, 44 brls.

GOOLE.

Week ending September 8.

CHEMICALS (*otherwise undescribed*)
Antwerp, 3 brls.

FORMIC ACID—
Hamburg, 220 crbys.

LITHOPONE—
Rotterdam, 20 cks.

MAGNESITE—
Amsterdam, 100 bgs.

WHITE LEAD—
Antwerp, 28 brls., 60 drms.

GRANGEMOUTH.

Week ending September 8.

CALCIUM CARBIDE—
Norway, 300 bxs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 1 ck.

FERRO SILICON—
Antwerp, 68 brls.
Norway, 328 cs.

GLUE—
Rotterdam, 40 bgs.

HYDROGEN PEROXIDE—
Antwerp, 96 crbys.

LITHOPONE—
Rotterdam, 50 cks.

SALT—
Rotterdam, 50 cks.

SODIUM NITRATE—
Norway, 18 cks.

TALLOW—
Norway, 6 brls.

ZINC DUST—
Antwerp, 5 cks.

ZINC OXIDE—
Antwerp, 20 brls.
Rotterdam, 51 cks.

GRIMSBY.

Week ending September 8.

ARSENIC—
Antwerp, 4 brls.

CALCIUM CARBIDE—
Christiania, 440 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 1 cs.

COAL TAR PRODUCTS—
Tar
Esbjerg, 1 ck.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 2 pts.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Dieppe, 2 cks.

FORMALDEHYDE—
Hamburg, 10 cks.

GLUE—
Antwerp, 37 bls.

NITRIC ACID—
Christiania, 300 drms.

ZINC WHITE—
Antwerp, 53 cs.

HULL.

Week ending September 8.

CALCIUM CARBIDE—
Antwerp, 20 t.

CAUSTIC POTASH—
Hamburg, 5 t. 6 c.

CHEMICALS (*otherwise undescribed*)
Antwerp, 9 t. 10 c.; Bari, 5 t.; Catania, 33 t. 16 c.; Christiania, 9 t.; Melbourne, 21 t.; Rotterdam, a qty.

COAL TAR PRODUCTS—
Naphthalene
Antwerp, 1 t.
Pitch
Uleaborg, 13 t. 17 c.

DEXTRINE—
Harlingen, 1 t. 19 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 894 lb.

FERRO SILICON—
Christiania, 55 t.

MINERAL WAX—
Hamburg, 10 c.

PARAFFIN WAX—
Baltimore, 25 t. 5 c.

PHOSPHATE (*otherwise undes.*)
Tunis, 2,000 t.

SALT—
Hamburg, 3 t.

SALTPETRE—
Rotterdam, 2 t.

SOAP—
Philadelphia, 20 t.

SULPHUR—
Catania, 60 t.
Empedocole, 4,100 t.

SUPERPHOSPHATE OF LIME—
Antwerp, qty.

TALLOW—
Christiania, 45 t.

TANNING MATERIALS—
Myrabolans
Calcutta, 860 t.

TAR (WOOD)—
Gothenburg, 6 t. 19 c.

TURPENTINE—
Iggesund, 10 c.

LEITH.

Week ending September 8.

ACETIC ACID—
Hamburg, 16 blns.
Rotterdam, 15 cks.

ACETONE—
Hamburg, 9 drms.

AMMONIUM CHLORIDE—
Hamburg, 48 brls.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 56 cks.

BARYTES—
Hamburg, 25 dble bgs.

CALCIUM CARBIDE—
Amsterdam, 800 drms.
Hamburg, 450 drms.

CREAM OF TARTAR—
Amsterdam, 114 kgs., 28 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 4 cks.

LITHOPONE—
Rotterdam, 40 cks.

MAGNESITE—
Amsterdam, 50 bgs.

METHYL ALCOHOL—
Baltimore, 43 drms.

OCHRE—
Baltimore, 859 bgs.

PHOSPHATE (*otherwise undes.*)
Amsterdam, 89 cks.

ROSIN—
Bremen, 600 brls.

SALT—
Hamburg, 1,000 bgs.

SILVER SALTS (*otherwise undes.*)—
Hamburg, 200 bgs.

SOAP—
Copenhagen, 4 cs.
Iceland and Faroes, 583 pkgs.

SODIUM PRUSSIATE—
Rotterdam, 17 cks.

LIVERPOOL.

Week ending September 8.

ACETONE—
Austria, 25 drms.

ALUNITE—
Australia, 320 t.

ANTIMONY OXIDE—
China, 100 bgs.

ARSENIC—
Germany, 3 drms.; Japan, 152 cs.; U.S., 400 cs.

BARYTES—
Germany, 40 cks.

BEESWAX—
Chile, 1 t. and 80 bgs.; U.S., 5 c.; W. C. Africa, 11 t.

BISMUTH ORE—
China, 2 t. 8 c.

BLEACHING POWDER—
Germany, 39 cks.

CARBON (DECOLOURISING)—
Holland, 20 bgs.

CARBON BLACK—
U.S., 555 cs.

CAUSTIC POTASH—
Belgium, 31 drms.

CHEMICALS (*otherwise undescribed*)
U.S., 1 cs., £21.

COAL TAR PRODUCTS—
Carbolic Acid
France, 8 drms.

CREAM OF TARTAR—
France, 50 kgs.
Spain, 40 kgs.

DYESTUFFS (NATURAL)—
Cochineal
Canaries, 40 bgs.
Cutch
East Indies, 500 cs.

FERRO SILICON—
Switzerland, 26 cs.

GELATINE—
Belgium, 27 bls.

GLUE—
France, 20 cs.
U.S., 15 brls.

IRON OXIDE—
France, 20 cks.
Spain, 20 brls.

KIESELGUHR—
Algeria, 333 bgs.
Belgium, 100 bgs.

LEAD ORE—
Peru, 44 t.

LITHOPONE—
Holland, 80 cks.
Spain, 50 cks.

MAGNESIUM CHLORIDE—
Germany, 180 drms.

MANGANESE ORE—
East Indies, 3,083 t.
Japan, 10 t.

METHYL ALCOHOL—
Germany, 23 drms.

PARAFFIN SCALE—
U.S., 2,245 brls.

PARAFFIN WAX—
East Indies, 160 bgs.
U.S., 400 bgs.

PHOSPHATE OF LIME—
Belgium, 500 bgs.

PLUMBAGO—
France, 10 t.

POTASSIUM CARBONATE—
Germany, 31 cks.
Turkey, 268 brls.

POTASSIUM CHLORATE—
Switzerland, 500 cs.

PYRITES—
Spain, 3,475 t.

ROSIN—
Portugal, 18 cks.
U.S., 900 brls.

SALAMMONIAC—
Belgium, 5 cks.

SALT—
Germany, 10 t.

SALTPETRE—
Germany, 20 kgs.

SELENIUM—
U.S., 10 cs.

SOAP—
France, 120 cs.
U.S., 280 brls., 687 cs., 20 kgs.

SODIUM CHLORATE—
Spain, 100 brls.

SODIUM PRUSSIATE—
U.S., 51 cks.

STEARINE—
Denmark, 140 cs.
Germany, 27 bgs.
United States, 95 brls.

SULPHUR—
Italy, 100 bgs.

TALLOW—
Argentine, 288 tcs.: Holland, 21 brls.; Norway, 533 brls.; U.S., 1,340 brls., 260 pkgs., 400 tcs.

TANNING MATERIALS—
Chestnut
France, 100 cks.
Italy, 55 cks.
Gall Nut
China, 200 cs.
Gambier
East Indies, 683 cs.

TANNING MATERIALS—
Mimosa
Germany, 79 cks.
Myrabolans
East Indies, 374 bgs., 1,000 pkts.
Oak
Italy, 100 cks.
Quebracho
Argentine, 8,826 bgs.
Sumac
Italy, 200 bgs.
Spain, 10 bgs.
Wattle
S. Africa, 1,425 bls.

VEGETABLE WAX—
U.S., 66 drms.

WHITE LEAD—
Belgium, 24 kgs.

ZINC ASHES—
U.S., 300 t. 3 c.

ZINC OXIDE—
Belgium, 40 cks.

LONDON.

OFFICIAL AMENDMENT.

Return for week ending May 25.

GELATINE—
Holland, £95. Burton, Smart & Orford

should read

GELATINE—
Holland, £401.

Week ending September 8.

ACETIC ACID—
Austria, 42 brls. Zimmermann
France, 10 cks. W. H. Muller
Germany, 50 crbys. T. Boehm

ACETONE—
Austria, 24 t. 2 c. V. Blagden
Czecho-Slovakia, 18 10 Greeff
Germany, 3 16

AMMONIUM CHLORIDE—
Germany, 6 cks. Bush, Beach & Gent

ANTIMONY—
China, 25 t. H. Wheeler

ARGOLS—
France, 167 pkgs.
,, 537 bgs.
Italy, 53 cks.
Spain, 195 pkgs.

ARSENIC—
Japan, 8 t. 13 c.

ARSENIOUS OXIDE—
Straits Setts., 25 t.

BARYTES—
Germany, 24 cks. H. Smart
,, 22 Taylor &
,, 50 bgs. Cox
,, 39 cks. Dexters
,, 50 Greeff
,, 114 Pallister, Luck
,, 170 W. Harrison
,, 700 bgs. ,,
Italy, 100 brls. Dexters
Spain, 140 bgs. MacAndrew

BORATE OF LIME—
Chile, 418 t. 10 c. Borax Consol.

BORIC ACID—
U.S.A., 6 brls. C. S. Lovell

CALCIUM CARBIDE—
Austria, 77 t.
Norway, 15 J. Spurling
,, 100 C. J. Quirk
Sweden, 51 Acetylene Corpn.
Switzerland, 300 drms.

CALCIUM CHLORIDE—
Germany, 9 t. 16 c. W. Connell

CAMPHOR—
Japan, 25 cs. Weber, Smith & Hoare

CARBON BISULPHIDE—
Germany, £187. Allen Craig

CARBON BLACK—
Belgium, 22 cks. O. Murray
Germany, 42 cks. F. W. Taylor
Canada, 75 cs.
U.S.A., 300 cs. Binney & Smith
,, 272 cs.
,, 20 cks. J. Murray

CARBON TETRACHLORIDE—*
——— £348.

CARNAUBA WAX—
Brazil, 284 bgs.
,, 429 Weber, Smith & Hoare
France, 35
U.S.A., 20

CASEIN—
Argentine Rep. £1,000. Duche
,, £1,275.
France, £1,800. Guesdon
,, £750. Brit. Xylonite
,, £85. Compagnie Com. du Nord
,, £85. W. Hamsher

CAUSTIC SODA—
U.S.A., 1 cs. J. B. Ballantyne

CHEMICALS (*otherwise undescribed*)
Belgium, £45.
France, £30. R. & J. Park
,, £21.
Germany, £11. Reitmayer, Calburn & Kindersley
,, £16. W. Connell
,, £18. F. Boehm
,, £149. H. W. Winter
,, £9. J. Schnurmann
,, £10. J. Bailey
,, £18. K. B. Mavlankar
,, £36. Scheuer
U.S.A., £48.
,, £496. Wingate & Johnston
,, £38.

CHEMICALS (*otherwise undes.*)—*
——— £3,211.

COAL TAR PRODUCTS—
Anthracene
France, £472. Sender
Creosote
France, £600. Sender
Sweden, £94. J. B. Ballantyne
Naphthalene
Belgium, £180. H. H. Poole
,, £20. Jessop
Pitch
U.S.A., 1 cs. J. B. Ballantyne
Tar
Sweden, 200 brls.
Tar Oil
Russia, 2 brls. White Sea & Baltic
Sweden, 20 cks. Stromwall

COBALT OXIDE—
Canada, £1,250.
,, £1,575. E. A. Kimpton

COBALT SALTS (*otherwise undes.*)—
Canada, £1,696. A. Kimpton

COBALT SULPHATE—
Canada, £648. A. Kimpton

COCAINE HYDROCHLORIDE—*
——— £234.

CREAM OF TARTAR—
France, 120 pkgs.
Spain, 23 MacAndrews

DEXTRINE—
Germany, 18 t. H. Keller
,, 4 6 c.
Holland, 1 Gough, Kidston
,, 12 16 K. J. Mulder
,, 2 F. G. Angel
,, 5 18
,, 2 10 R. Windmuller

DISINFECTANTS (*otherwise undes.*)
U.S.A., £319. H. C. Hackney

DYESTUFFS (ARTIFICIAL)—
Alizarine
Germany, 1 ck. Stott & Hotopf
Unspecified
Brit. India, £9. Gray, Dawes
Germany, £723.
,, 18 kgs. Stott &
4 cs. Hotopf

DYESTUFFT (ARTIFICIAL)—
Unspecified
Holland, £145. Van Geelkerken

DYESTUFFS (NATURAL)—
Annatto
Java, 100 pkgs.
U.S.A., 10 Leach
Cutch
Brit. India, 500 pkgs. Leach
Burmah, 30 ,,
,, 250
Indigo
Brit. India, 6 chts.

FERTILISERS (*otherwise undes.*)—
Belgium, 250 t. C. S. Lovell
Germany, 175 W. Cory
Holland, 5 Lactine
Norway, 25 Hollingshurst
U.S.A., 3,000 W. Fraser

FUSEL OIL—
Belgium, 1 drm. Honeywill

GELATINE—
Belgium, £1,740. Duche
France, £1,881. Soc. des Prod. Chim.
Germany, £31. W. A. J. Tilleray
,, £10
,, £248. E. Friedlander
Holland, £19. Weigel Leygonio
Switzerl'd £780. Europ. & Gen. Exp.
Uruguay, £45.

GLUE—
Austria, £757.
Belgium, £6. Van Oppen
France, £60. Mory
,, £407. Symons
,, £278. Soc. des Prod. Chim.
,, £78. Greathed & Humbert
,, £48. P. Le Brun
,, £50. S. Murray
Holland, £5.
,, £220. H. Smart
,, £149. P. Ingenlath
Hungary, £750.
U.S.A., £57. Union Glue & Gel.

GLYCERINE—
Holland, £45.

IODINE (RESIDUE)—
Straits Setts. £90. J. D. Hewett

ISINGLASS—
Brazil, 13 pkgs.
,, 3 cs. S. Figgis
,, 5 W. M. Smith
,, 2 pkgs. ,,
Japan, 10 bls.
,, 20 pkgs.
Strait Setts. 13 cs. Edwards
Venezuela, 50 pkgs.
,, 43 bls.

KETONE (*otherwise undescribed*)—
Germany, £180. Chance & Hunt

KIESELGUHR—
Algeria, 25 t.
,, 20 Cook
Spain, 5 MacAndrews
,, 20
U.S.A., 8 19 c. Martineaus

LEAD ACETATE—
Germany, £370. H. Smart

LITHARGE—
Italy, £310.

LITHOPONE—
Germany, 40 cks. E. W. Taylor
Holland, 20 F. T. H. Nye
,, 20 M. Ashby
Spain, 100 Jones, Moore

LITMUS—
Holland, £89. Johnson

MAGNESITE—
Germany, £13.
Holland, £42. W. H. Muller
,, £138. Beck & Pollitzer
,, £28.

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slovakia, 26 pkgs.
Germany, 20 bgs.
Italy, 4 brls. Pinchin, Johnson
Spain, 20 cks. Lavington
,, 33 brls. Burrell
,, 3 cks. Wilkinson, Heywood & Clark
,, 22 brls. S.
,, 290 bgs. Bramwell
,, 72 cks. Brit. Anti-Foul. Comp. & Pnt.

NICOTINE SULPHATE—
U.S.A., £2,600. J. B. Ballantyne

OCHRE—
U.S.A., 21 brls. J. Johnson

PARAFFIN WAX—
France, 12 c.
Poland, 50 t. Gerhard & Hey
U.S.A., 30
,, 127 17 c. Prices Pat. Candle
,, 56 11 Anglo-Amer. Oil
,, 16 7 A. C. E. Garnham

PITCH (*otherwise undescribed*)—
France, 40 brls. G. Elliott
Finland, 100 Smith & Moeller

PLUMBAGO—
Ceylon, 31 brls. Litchfield & Saundy
Germany, 18 G. G. Hems
,, 56 bgs. ,,
Japan, 6 cks. Hoare, Wilson
,, 150 Morgan Crucible
Madag'car, 6,089 bgs. ,,
U.S.A., 62 cks. H. Johnson

POTASSIUM CARBONATE—
Belgium, 112 cks. H. H. Poole
Germany, 18 Hollingshurst
Russia, 88 Russian Prod.

POTASSIUM NITRATE—
Belgium, 40 cks. Hollingshurst
Germany, 1,467 pkgs. Nobel Industries
,, 4,014 bgs.

POTASSIUM PRUSSIATE—
Holland, 4 cks.

PRUSSIAN BLUE—
France, 13 cks. H. H. Poole
Holland, 11 H. Keller
Saar, 11 Stephens

RED LEAD—
Germany, 6 cks. W. H. Muller
Italy, 61 brls.
,, 48 cks. A. W. Page

ROSIN—
France, 50 cks. Rosin & Turp. Imp.
,, 52 Langley, Smith
,, 75 Lowden, Connell
,, 50
Portugal, 69 H. J. Hughes
U.S.A., 50 brls. Fairclough, Dodd & Jones
,, 1,500 Rosin & Turps. Imp.
,, 1,252
,, 500 Fox, Stockell
,, 500 Langley, Smith

SALT—
Germany, 5 t. Burton, Baker
,, 50 Typke & King
,, 30

SHELLAC—
Brit. India, 7 t. 10 c. J. W. Cook

SOAP—
Belgium, £44.
,, £64. S. Kalisky
Canada, £6,332. Gerhard & Hey
Denmark, £13.
,, £42. Beck & Pollitzer
France, £400. E. A. Kimpton
,, £761. P. Le Brun
Germany, £64.
Italy, £1,474. Carter Paterson
Norway, £125. N. Anstreng

* Entered under the Safeguarding of Industries Act.

SOAP—
S. Australia, £160.
U.S.A., £392. H. C. Hackney
,, £402. Knight & Morris
Victoria, £1,800. L. F. Smith

SODIUM NITRATE—
Germany, 5 t. Stott & Hotopf
,, 5 Greeff

SODIUM NITRITE—
Germany, 10 t. Stott & Hotopf

SODIUM SALTS (*otherwise undes.*)
Germany, 10 t. J. Bailey

STEARINE—
Holland, 44 bgs.

SULPHUR—
Italy, £8. Van Oppen

SULPHUR DIOXIDE—
Germany, £26. S. C. Gobey

TALLOW—
France, 30 cks. Symons
N.Z., 3 t.
U.S.A., 50 Co-op. W'sale

TANNING MATERIALS—
Sumac
Spain, 495 pkgs. MacAndrews
Unspecified
Natal, 15 t.
,, 103 t. Leach

TAR (*otherwise undescribed*)—
Sweden, 100 brls.

TURPENTINE—
Holland, 118 pkgs. White Sea & Baltic
U.S.A., 200 brls. Lowden, Connell
,, 250 Langley, Smith
,, 200 Bigland & Jeffries
,, 3,925 Fairclough, Dodd & Jones
,, 2,395
,, 15 drms.
,, 1,122 brls. Goodlake & Nutter

ULTRAMARINE—
U.S.A., 8 brls. Pinchin, Johnson

WHITE LEAD—
Germany, 16 cks. H. Smart
Holland, 8 Chance & Hunt
,, 9 brls. Scheuer
U.S.A., 46 cks. Greeff

ZINC OXIDE—
Belgium, 148 cks. M. Ashby
Germany, 9 t. 17 c. Greeff
,, 120 cks. G. T. Symons
Holland, 75 M. Ashby
U.S.A., 249 brls. ,,

ZINC WHITE—
Holland, 25 brls. Scheuer

MANCHESTER.

Week ending September 8.

ACETIC ACID—
Hamburg, 53 cks., 200 crbys.

AMMONIUM CHLORIDE—
Hamburg, 200 cks.

ANTIMONY SALTS (*otherwise undescribed*)—
Hamburg, 2 cks.

BARIUM CHLORIDE—
Hamburg, 14 brls.

BARIUM SULPHIDE—
Hamburg, 15 cks.

BARYTES—
Hamburg, 50 bgs., 35 cks.

CALCIUM CHLORIDE—
Hamburg, 33 drms.

CARBON (DECOLOURISING)—
Amsterdam, 97 bgs.

CAUSTIC POTASH—
Hamburg, 40 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 111 cks.

COAL TAR PRODUCTS—
Naphthalene
Antwerp, 50 cs.
Hamburg, 30 crts.

CREAM OF TARTAR—
Hamburg, 22 cks.

DEXTRINE—
Hamburg, 600 bgs.

DYESTUFFS (ARTIFICIAL)—
Sulphur Colours
Boston, 3 kgs.
Unspecified
Hamburg, 27 cks.

FORMALDEHYDE—
Antwerp, 20 drms.; Hamburg, 47 cks.; Montreal, 112 brls.

FORMIC ACID—
Hamburg, 90 crbys.

GLUE—
Antwerp, 80 bgs.

LEAD ACETATE—
Hamburg, 43 cks.

LITHOPONE—
Rotterdam, 220 cks.

MAGNESIUM CHLORIDE—
Hamburg, 238 drms.

PHOSPHORUS—
Montreal, 188 drms.

POTASH ALUM—
Hamburg, 28 cks.

POTASSIUM PRUSSIATE—
Rotterdam, 17 cks.

SALTPETRE—
Hamburg, 20 bgs.

SOAP—
Valencia, 60 cs.

SODIUM ACETATE—
Hamburg, 52 brls.

SODIUM NITRATE—
Hamburg, 25 cks.

SODIUM PHOSPHATE—
Antwerp, 13 cks.
Hamburg, 45 cks.

SODIUM SULPHATE—
Hamburg, 61 drms., 300 bgs.

STEARINE—
Antwerp, 76 bgs.
Rotterdam, 32 bgs.

SULPHUROUS ACID—
Antwerp, 30 cylds.

TANNIC ACID—
Hamburg, 18 cks.

TANNING MATERIALS—
Unspecified
Hamburg, 5 cks., 25 brls.

TARTARIC ACID—
Amsterdam, 2 kgs., 12 brls.

TIN OXIDE—
Hamburg, 10 brls., 10 cks.

TURPENTINE—
Hamburg, 11 drms.

ULTRAMARINE BLUE—
Antwerp, 40 cks.

WAX (*otherwise undescribed*)—
Hamburg, 13 cs.

WHITE LEAD—
Antwerp, 40 drms., 24 pkgs.

ZINC OXIDE—
Antwerp, 20 brls.

Week ending September 1.

AMMONIUM PRUSSIATE—
Rotterdam, 52 cks.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 9 cks.

BARYTES—
Bremen, 31 cks., 150 bgs.

CALCIUM CARBIDE—
Rotterdam, 350 drms.

CARBON (DECOLOURISING)—
Amsterdam, 5 bgs.

CAUSTIC POTASH—
Hamburg, 17 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 5 cs., 1 ck.

DYESTUFFS (NATURAL)—
Unspecified
Antwerp, 5 cks.

FERRO SILICON—
Sarpsborg, 174 brls.

FORMALDEHYDE—
Hamburg, 47 cks., 12 crbys.

FORMIC ACID—
Rotterdam, 10 cks.

GLUCOSE—
Amsterdam, 5 cks.

GLUE—
Antwerp, 73 bls.

MAGNESITE—
Amsterdam, 200 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 438 drms.

MAGNESIUM SULPHATE—
Antwerp, 100 bgs.

OXALIC ACID—
Rotterdam, 11 cks.

POTASSIUM CARBONATE—
Antwerp, 25 cks.
Hamburg, 43 brls.

SALTPETRE—
Antwerp, 20 bgs.

SODA—
Antwerp, 36 cks.

SODIUM CARBONATE—
Antwerp, 7 cks.

SODIUM SULPHATE—
Hamburg, 350 bgs.

STEARINE—
Antwerp, 39 bgs.
Rotterdam, 2 bgs.

TALLOW—
Fredriksstad, 780 brls.

ZINC DUST—
Antwerp, 150 cks.

ZINC OXIDE—
Antwerp, 80 cks.

NEWCASTLE-ON-TYNE

Week ending September 8.

BARYTES—
Antwerp, 100 bgs.

CALCIUM CARBIDE—
Christiania, 490 drms.

GLUCOSE—
New York, 300 brls.

GLUE—
Antwerp, 30 bls.

IRON OXIDE—
Malaga, 33 brls.

OXIDE (*otherwise undescribed*)—
Rotterdam, 100 cks.

PARAFFIN WAX—
New York, 597 brls.

SODIUM HYPOSULPHITE—
Antwerp, 100 bgs.

STEARINE—
Antwerp, 13 bgs.

TALLOW—
New York, 300 brls.

N. & S. SHIELDS.

Week ending September 8.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending September

ALUMINIUM SULPHATE—
Botwood, N.F., 1,500 bgs.

CHEMICALS (*otherwise undescribed*)
Boston, 315 pkgs.; Brisbane, 37 pkgs.; Calcutta, 28 pkgs.; Hong Kong, 576 pkgs.; Kobe, 4,925 pkgs.; Melbourne, 142 pkgs.; New York, 574 pkgs.; Penang, 20 pkgs.; Philadelphia, 40 pkgs.; Rangoon, 100 pkgs.; Rio de Janeiro, 150 pkgs.; San Antonio, 444 pkgs.; Santos, 20 pkgs.; Singapore, 797 pkgs.; Suez, 20 pkgs.; Sydney, 185 pkgs.; Tasmania, 14 pkgs.

COAL TAR PRODUCTS—
Creosote
Boston, 8,000 galls.
Manilla, 5 t. 10 c.
Pitch
Hamburg, 4 t. 12 c.; Penang, 22 t. 18 c.; Pt. Swettenham, 3 t. 18 c.
Tar
Rangoon, 6 t. 13 c.

COAL TAR PRODUCTS—
Unspecified
Gothenburg, 9 t. 10 c.
Singapore, 5 t. 4 c.

DISINFECTANTS (*otherwise undes.*)
Penang, 1 t. 3 c.
Pt. Swettenham, 4 c.

GLUE—
Shanghai, 2 t. 10 c.

MAGNESIUM CHLORIDE—
Rangoon, 1 t. 4 c.

PARAFFIN WAX—
Melbourne, 7 t.

POTASSIUM BICHROMATE—
Bombay, 6 t.; Kobe, 5 t.; Yokohama, 40 t. 18 c.

SHEEP DIP—
Bahia Blanca, £135.

SOAP—
Calcutta, 14 c.; Philadelphia, 2 t. 6 c.; Pt. Swettenham, 1 t. 4 c.; Rangoon, 8 t. 8 c.; Shanghai, 10 c.; Singapore, 13 c.; Tasmania, 4 c.

SODA CRYSTALS—
Calcutta, 17 c.

SODIUM BICHROMATE—
Bombay, 1 t. 5 c.; Calcutta, 2 t.

WAX (*otherwise undescribed*)—
Hamburg, 1 t. 5 c.

GRANGEMOUTH.

Week ending September 8.

AMMONIUM CARBONATE—
Christiania, 5 c.

COAL TAR PRODUCTS—
Creosote Oil
Rotterdam, 221 galls.

PARAFFIN WAX—
Christiania, 15 t. 5 c.; Rouen, 10 t.; Stockholm, 1 t. 10 c.

POTASSIUM BICHROMATE—
Antwerp, 2 t. 2 c.

ROSIN OIL—
Stockholm, 4 c.

SODIUM BICHROMATE—
Antwerp, 1 t.

HULL.

Week ending September 4.

BARYTES—
Christiania, 25 cks.

CASEIN—
Hamburg, 40 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 21 cs., 40 drms.; Antwerp, 428 drms.; Copenhagen, 11 pkgs., 7 cs., 254 cks., 31 drms.; Christiania, 6 pkgs., 29 cs., 21 cks., 100 drms.; Danzig, 14 cks.; Gothenburg, 10 pkgs., 100 drms.; Hamburg, 22 cs., 6 cks., 24 drms.; Malmo, 1 cs., 8 cks.; Rotterdam, 810 bgs.; Riga, 1 cs.

COAL TAR PRODUCTS—
Pitch
Montreal, 2 brls.
Tar
Copenhagen, 10 cks.; Christinaia, 5 cks.; Hamburg, 2 drms.

GELATINE—
Montreal, 70 bgs.

GLUE—
Copenhagen, 58 bgs.; Gothenburg, 40 bgs.; Montreal, 20 bgs.; Riga, 60 bgs.

MINERAL WHITE—
Montreal, 50 bgs.

RED LEAD—
Piraeus, 5 kgs.

SOAP—
Copenhagen, 3 cks.
Christiania, 2,159 cs.
Danzig, 3 cks.

TALLOW—
Reval, 15 brls.

TURPENTINE—
Amsterdam, 3 cks.
Antwerp, 15 cks.
Rotterdam, 3 cks.

LEITH.

Week ending September 8.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Copenhagen, 3 kgs.

IODINE—
Dunkirk, 2 cks.

POTASSIUM BICHROMATE—
Copenhagen, 6 cks.
Dunkirk, 37 cks.

SOAP—
Reykjavik, 20 cs., 12 kgs.
Thorshavn, 3 cs.

TALLOW OIL—
Copenhagen, 50 tcs.

LIVERPOOL.

Week ending August 31.

ANTIMONY SULPHIDE—
Para, 6 cks.

BASIC SLAG—
Brisbane, 24 t.

CAUSTIC SODA—
Abo, 150 drms.; Auckland, 9 drms.; Bahia, 300 drms.; Batavia, 95 drms.; Bombay, 400 drms.; Buenos Aires, 70 drms.; Copenhagen, 10 drms.; Dunedin, 40 drms.; Durban, 9 drms.; Fremantle, 38 drms.; Karachi, 387 drms.; Kobe, 1,252 drms.; Lisbon, 20 drms.; Lyttleton, 30 drms.; Mauritius, 20 drms.; Melbourne, 12 drms.; Monte Video, 200 drms.; Padang, 35 drms.; Penang, 20 drms.; Samarang, 30 drms.; Shanghai, 356 drms.; Singapore, 10 drms.; Sourabaya, 75 drms.; Sydney, 33 drms.; Tampico, 230 drms.; Trieste, 29 drms.; Varna, 100 drms.; Wellington, 49 pkgs.; Wasa, 10 drms.; Yokkaichi, 282 drms.

FATTY ACIDS—
Amsterdam, 18 brls.

FERRO CARBON TITANIUM—
Bordeaux, 1 t.

FERRO MANGANESE—
New Orleans, 250 t.

GLUE, SIZE, AND GELATINE—
Calcutta, 1 cs.; Havre, 100 bgs.; La Guaira, 40 bgs.; Madras 6 cks.; New York, 5 cks.; Riga, 40 bgs.

PARAFFIN WAX—
San Jose Gerat, 80 bgs.
Valparaiso, 134 bgs.

SALT—
Abonema, 20 t.; Brisbane, 14 t.; Hadersley, 14 t.; Iddo, 120 t.; Montreal, 276 t.; Nakskov, 6 t.; Odense, 134 t.; Opobo, 10 t.; Pt. Elizabeth, 8 c.; Pt. Harcourt, 86 t.; Pt. Moresby, 1 t.; Pt. Sudan, 14 t.; Riga, 49 t.; Rio de Janeiro, 34 t.; Rudkjobing, 5 t.; St. John's, N.F., 13 t.; Sapele, 1 t.; Sekondi, 34 t.; Sierra Leone, 98 t.; Shanghai, 3 t.; Sourabaya, 4 t.; Svendborg, 10 t.; Sydney, 220 t.; Valparaiso, 2 t.; Victoria, B.C., 15 t.; Wellington, 145 t.; Warri, 16 t.

SALTCAKE—
Auckland, 4 pkgs.

SOAP—
Montreal, 2 bxs.; Pto. Colombia, 2 cs.; St. John's, N.F., 1 bx.; Sierra Leone, 9 cs.; Shanghai, 87 bxs.; Singapore, 1,000 bxs., 77 cs.; Sydney, 2 cs.

SOAP—
Va-paraiso, 10 cs.; Wellington, 7 pkgs.; Warri, 255 cs.; Winnebah, 300 cs.; Zanzibar, 12 bxs.

SODA ASH—
Auckland, 638 bgs.; Bombay, 1,250 bgs.; Colombo, 800 pkgs.; Kobe, 3,182 pkgs.; Lyttleton, 62 pkgs.; Maranham, 58 cks.; Melbourne, 20 cks.; St. John's, N.F., 5 pkgs.; San Francisco, 300 bgs.; Samarang, 100 bgs.; Shanghai, 4,331 pkgs.; Singapore, 100 pkgs.; Sourabaya, 100 bgs.; Sydney, 521 cks., 20 kgs.; Tampico, 50 bgs.; Tientsin, 4,378 bgs.; Yokkaichi, 1,190 bgs.; Yokohama, 3,308 bgs.

SODA CRYSTALS—
Mauritius, 40 pkgs.; Penang, 20 pkgs.; Punta Arenas, 5 pkgs.; Rangoon, 40 pkgs.

SODIUM BICARBONATE—
Antwerp, 708 pkgs.; Auckland, 337 pkgs.; Bourgas, 60 kgs.; Bombay, 100 drms.; Brisbane, 34 kgs.; Cape Town, 60 pkgs.; Copenhagen, 35 pkgs.; Dunedin, 100 pkgs.; Lyttleton, 55 pkgs.; Melbourne, 145 kgs.; Newcastle, 7 kgs.; Pt. Said, 20 pkgs.; St. John's, N.F., 20 pkgs.; Salonika, 80 drms.; Sydney, 547 pkgs.; Varna, 40 pkgs.; Yokkaichi, 969 bgs.; Yokohama, 5,384 kgs.

SODIUM BISULPHITE—
Singapore, 25 drms.

SODIUM HYDROSULPHITE—
Sydney, 30 kgs.

SODIUM HYPOSULPHITE—
Hamburg, 480 pkgs.

SODIUM SILICATE—
Lyttleton, 10 pkgs.; Puerto Cabello, 1 pkg.; Shanghai, 173 pkgs.; Singapore, 65 pkgs.

SODIUM SULPHITE—
Pt. Elizabeth, 11 cks.

STEARINE—
Rotterdam, 62 brls.; Shanghai, 10 cs.; Singapore, 25 bgs.

TALLOW—
Copenhagen, 41 brls.
Shanghai, 14 cks.

VEGETABLE WAX—
New York, 3 cs.

ZINC DUST—
Hobart, 57 t.

Week ending September 6.

ACETIC ACID—
Durban, 2 c., £11.

ALUM—
Buenos Aires, 10 c., £12.

ALUMINIUM SULPHATE—
Amsterdam, 1 t., £10.
Bergen, 5 t., £400.

AMMONIA—
Rio de Janeiro, 6 c., £35.

AMMONIUM CARBONATE—
Alexandria, 1 t., £37.; Bilbao, 1 t., £30.; Christiania, 2 t., £64.; Cartagena, Sp., 1 t., £35.; Fremantle, 1 t., £33.; Hamburg, 7 t. 9 c., £186.; Melbourne, 1 t., £38.; Madras, 15 c., £30.; Marseilles, 1 t., £29.; New York, 4 t. 9 c., £135.; Sydney, 2 t. 10 c., £94.

AMMONIUM CHLORIDE—
Adelaide, 10 c., £17.; Aden, 10 c., £23.; Auckland, 8 t., £360.; Alexandria, 7 t. 17 c., £337.; Bourgas, 1 t., £42.; Christchurch 5 t., £225.; Calcutta, 10 c., £18.; Colombo, 5 c., £10.; Dunedin, 5 t., £225.; Melbourne, 16 c., £27.; Marseilles, 1 t., £32.; Sydney, 1 t., £36.; Wellington, 12 t., £540.; Yokohama, 20 t., £588.

AMMONIUM SULPHATE—
Hong Kong, 75 t., £1,280.; Kobe, 700 t. 6 c., £10,554.; Kingston, 7 t., £105.; Las Palmas, 115 t., £1,748.; Takao, 750 t., £11,500.; Teneriffe, 45 t., £740.

AMMONIUM NITRATE—
Shanghai, 10 t. 2 c., £201.

ANTIFOULING PAINT—
Alexandria, 7 c., £35.; Bombay, 5 t., £445.; Calcutta, 2 t. 10 c., £205.; Rio de Janeiro, 11 t. 1 c., £38.; Singapore, 4 t. 10 c., £292.; Valparaiso, 8 c., £29.

ANTIMONY SULPHIDE—
Kobe, 5 t. 2 c., £290.

ARSENIC—
Christiania, 16 c., £59.

BARIUM CARBONATE—
Bombay, 2 t., £22.

BARIUM CHLORIDE—
Calcutta, 1 t., £18.; East London, 1 t., £17.; Montreal, 5 t., £371.

BARIUM SULPHATE—
Hong Kong, 3 c., £14.

BARIUM SULPHIDE—
Melbourne, 1 t., £50.

BITUMEN—
Buenos Aires, 10 qrs., £29.

BLEACHING POWDER—
Beira, 3 t., £43.; Calcutta, 49 t. 1 c., £1,097.; Callao, 1 t., £12.; Christiania, 35 t., £259.; Gothenburg, 7 c., £10.; Karachi, 4 t., £48.; Montreal, 13 t. 4 c., £123.; Oporto, 2 t., £21.; Singapore, 10 c., £16.; Sourabaya, 1 t. 9 c., £18.; Wellington, 1 t. 1 c., £11.

BOILER COMPOSITION—
Madras, 1 c., £31.

BORAX—
Barcelona, 2 t. 19 c., £75.; Cartagena, Col., 4 c., £21.; Rangoon, 1 qr., £5.; Rio de Janeiro, 2 t. 19 c., £80.; Sekondi, 9 c., £35.; Santiago, 4 c., £5.; Sydney, 3 c., £5.; Sao Paulo, 10 t. 1 c., £281.; Thames, N.Z., 1 c., £1. 5s.

BORAX GLASS—
Rio de Janeiro, 2 c., £8. 15s.

CALCIUM CARBIDE—
Lome, 10 c., £10.; Pt. Harcourt, 19 c., £20.; Sekondi, 1 t. 9 c., £30.

CALCIUM CHLORIDE—
Adelaide, 5 t. 5 c., £33.; Buenos Aires, 105 t. 2 c., £557.; Brisbane, 5 t. 4 c., £32.; Harve, 13 t. 4 c., £70.; Montreal, 30 t. 1 c., £139.; Nantes, 10 t. 1 c., £49.

CARBONATE OF LIME—
Barcelona, 1 t. 1 c., £19.

CHEMICALS (*otherwise undescribed*)
Adelaide, 1 t., £28.; Amsterdam, 2 t. 16 c., £90.; Bangkok, 3 qrs., £10.; Bilbao, 1 t. 10 c., £54.; Buenos Aires, 5 t. 3 qrs., £60.; Brisbane, 2 t., £56.; Calcutta, 3 t., £33.; Fremantle, 9 t. 2 c., £237.; Hong Kong, 18 c., £7.; Melbourne, 21 t. 6 c., £1,607.; New York, 3 t., £310.; Rio de Janeiro, 5 qrs., £28.; Sydney, 16 t. 9 c., £463.; Vera Cruz, 3 t., £81.

CHLORINE—
Bombay, 13 c., £17.
Durban, 7 c., £14.

CITRIC ACID—
Barcelona, 10 c., £79.
Dunedin, 10 c., £86.
Sydney, 10 c., £86.

COAL TAR PRODUCTS—
Carbolic Acid
Antwerp, 1 t. 5 c., £162.; Calcutta, 10 qrs., £80.; Hamburg, 74 t. 17 c., £9,658.; Lyttleton, 2 c., £16.; Montreal, 22 qrs., £42.; Rotterdam, 10 t., £1,680.; Wellington, 10 qrs., £24.

Creosote
Melbourne, 12 c. 2 q., £20.
Sydney, 18 c. 2 q., £41.

Creosote Oil
Bombay, 10 t., £106.

Mirbane Oil
Sydney, 10 c., £30.

Pyridine
Hamburg, 1 t., £152.

COAL TAR PRODUCTS—
Tar
Sierra Leone, 2 t., £20.

Unspecified
Calcutta, 1 c., £14.; Rotterdam, 25 t. 5 c., £2,993.; Yokohama, 10 t., £1,548.

COBALT CHLORIDE—
Kobe, 10 qrs., £87.

COBALT OXIDE—
Hong Kong, 2 c., £100.; Kobe, 1 t. 16 c., £1,803.; Yokohama, 1 c. 2 q., £73.

COPPER OXIDE—
Antwerp, 10 c., £35.

COPPER SULPHATE—
Auckland, 1 t., £27.; Beira, 5 c., £14.; Cape Town, 10 c., £13.; Kilindini, 5 c., £7.

CREAM OF TARTAR—
Auckland, 1 t., £92.; Dunedin, 1 t., £92.; Hobart, 2 t. 5 c., £208.; Launceston, 10 c., £46.

DISINFECTANTS (*otherwise undes.*)
Amsterdam, 5 c., £129.; Accra, 18 qrs., £14.; Bombay, 11 c., £26.; Cape Town, 2 t., £31.; Callao, 1 c., £11.; Colombo, 14 qrs., £38.; Durban, 1 t. 1 c., £18.; Genoa, 1 t. 2 c., £30.; Halmstad, 10 c., £24.; Las Palmas, 1 t. 2 c., £29.; Lome, 13 qrs., £10.; Montreal, 1 t. 2 c., £42.; New York, 35 t., £1,341.; Pt. Harcourt, 7 c., £21.; Pt. Swettenham, 22 qrs., £15.; Singapore, 2 t. 7 c., £61.; Sydney, 1 t. 15 c., £52.; Sekondi, 10 qrs., £14.; Singapore, 1 t. 2 c., £71.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 50 t., £7,477.
Madras, 20 t. 10 c., £3,022.

Indigo
Melbourne, 4 t. 6 c., £666.
Sydney, 5 t., £794.

Methylene Blue
Shanghai, 10 c., £266.

Unspecified
Brisbane, 10 c., 2 qrs., £125.; Bordeaux, 9 c., £94.; Durban, 1 t. 1 c., £528.; Dunedin, 1 t. 2 c., £326.; Hamburg, 5 t., £620.; Hong Kong, 7 qrs., £58.; Lyttleton, 3 c., £24.; Melbourne, 3 t. 10 c., £1,124.; Montreal, 19 c., £176.; New York, 12 c. 2 qrs., £84.; Oporto, 5 c., £82.; Rangoon, 3 c., £65.; Santos, 21 qrs., £53.; Sydney, 2 t. 4 c., £813.; Sydney, 1 c., £16.

DYESTUFFS (NATURAL)—
Cudbear
New York, 12 c., £32.

FERTILISER (NITROGENOUS)—
Charleston, S.C., 200 t., £1,500.

GLYCERINE—
Aalborg, 19 c., £66.; Cheribon, 1 t., £100.; Copenhagen, 1 t. 19 c., £140.; Cape Town, 169 t. 7 c., £8,046.; Durban, 1 t. 8 c., £88.; Helsingfors, 1 t. 9 c., £111.; Kobe, 10 t. 1 c., £705.; Rangoon, 2 c., £9.; Riga, 4 c., £20.; Yokohama, 4 t. 16 c., £353.

IODOFORM—
Degama, 38 qrs., £12. 10s.

LACTIC ACID—
East London, 1 t. 3 c., £25.

LEAD NITRATE—
Calcutta, 3 t., £123.
Melbourne, 1 t., £44.

MAGNESIA—
Bahia, 5 c., £49.

MAGNESIA (CALCINED)—
San Juan, 5 c., £44.

MAGNESIUM CARBONATE—
Boston, 50 t., £1,650.

MAGNESIUM SULPHATE—
Accra, 3 c., £7. 5s.; Cape Coast, 3 c., £4. 5s.; East London, 2 c., £3.; Grand Basa, 3 qrs., £1. 5s.; Pt. Swettenham, 4 c., £6; Sierra Leone, 16 c., £22.; Saltpond, 2 c., 2 qrs., £3. 5s.; Sinoe, 2 qrs., £1.; Winnebah, 3 c., £5. 10s.

MANGANESE DIOXIDE—
Beira, 2 t., £48.

MANGANESE OXIDE—
Madras, 17 c., £29.

PHOSPHORUS (AMORPHOUS)—
Christiania, 1 c., £12.
Trinidad, 11 qrs., £32.

PICRIC ACID—
Sydney, 1 c., £13.

POTASSIUM BICARBONATE—
Melbourne, 5 c., £14.

POTASSIUM BICHROMATE—
Alexandria, 2 t. 7 c., £121.

POTASSIUM IODIDE—
Degama, 19 lb., £20.; Grand Bassam, 9 lb., £10.; Hong Kong, 2 qrs., £50.; Maranham, 22 lb., £22.; Pt. Harcourt, 1584 lb., £159.

POTASSIUM PRUSSIATE—
New York, 1 t., £233.

SALAMMONIAC—
Calcutta, 1 t. 10 c., £83.; Madras, 1 t. 1 c., £58.; Montreal, 25 t., £755.

SALICYLIC ACID—
Antwerp, 5 t. 2 c., £844.

SALTCAKE—
Buenos Aires, 50 t., £338.
Gothenburg, 754 t., £3,770.

SHEEP DIP—
Belize, 14 qrs., £11.; Bluff Harbour, 8 t., £584.; Buenos Aires, 63 t. 6 c., £2,070.; Beira, 1 t. 14 c., £124.; Blenheim, N.Z., 1 t. 19 c., £70.; Constantinople, 14 qrs., £14.; Calcutta, 6 qrs., £24.; Durban, 7 t. 8 c., £527.; Delagoa Bay, 10 t. 4 c., £749.; Dunedin, 21 t. 12 c., £822.; Invercargill, 11 t. 1 c., £489.; Nelson, N.Z., 5 t. 5 c., £449.; Oamaru, N.Z., 7 t. 8 c., £512.; Puerto Deseado, 11 t. 9 c., £437.; Santa Cruz, 34 t., £1,312.; Timaru, 4 t. 10 c., £166.; Wellington, 20 t. 4 c., £1,384.

SODIUM HYPOSULPHITE—
Mossel Bay, 3 t. 8 c., £33.

SULPHUR CHLORIDE—
Melbourne, 13 c., £22.

SULPHURIC ACID—
Antofagasta, 14 t. 17 c., £259.; Bombay, 7 c., £13.; Buenos Aires, 4 t. 2 c., £133.; Calcutta, 8 c., £22.; Durban, 1 qr., £15.; Santos, 1 t. 1 c., £38.

TANNING MATERIALS—
Unspecified
Antwerp, 2 t. 5 c., £18.; Alexandria, 1 t., £25.; Bergen, 5 t. 15 c., £48.; Calcutta, 4 t., £193.; Christiania, 11 t. 12 c., £168.; Durban, 2 t. 10 c., £50.; Melbourne, 1 t. 4 c., £21.; Sydney, 12 t. 1 c., £265.

TARTARIC ACID—
Melbourne, 1 t., £144.; Sydney, 1 t., £136.; St. John's, N.F., 2 c., £30.

TIN OXIDE—
Adelaide, 1 t., £219.; Seville, 5 c. £62.; Sydney 10 c., £121.

TRICHLORETHYLENE—
Buenos Aires, 1 t., £50.
Rosario, 4 t. 18 c., £223.

TURPENTINE—
Shanghai, 6 c., £29.

VANILLIN—
Antwerp, 6 qrs., £139.; Auckland, 2 qrs., £59.; Melbourne, 10 c., £1,148.

WOOD PRESERVATIVE—
Auckland, 10 t. 8 c., £235.; Colombo, 8 t., £258.; Tuticorin, 7 c., £60.

ZINC CHLORIDE—
Madras, 15 c., £28.
Sydney, 1 t., £28.

ZINC OXIDE—
Auckland, 1 t., £44.

Week ending September 7.

BISMUTH (METAL)—
Boston, 4 c. 2 qrs.

CALCIUM CHLORATE—
Bombay, 37 pkgs.
Melbourne, 58 pkgs.

CAUSTIC SODA—
Acapulo, 69 drms.; Adelaide, 135 drms.; Amsterdam, 112 drms.; Alexandria, 29 drms.; Alexandretta, 79 drms.; Bahia, 150 drms.; Barbados, 13 drms.; Barcelona, 4 brls.; Beyrout, 40 drms.; Bari, 61 drms.; Bombay, 894 drms.; Bourgas, 246 drms.; Bremen, 34 drms.; Cartagena, Col., 50 drms.; Brisbane, 86 pkgs.; Calcutta, 240 drms.; Callao, 100 drms.; Cape Town, 153 drms.; Gothenburg, 50 drms.; Christiania, 160 drms.; Copenhagen, 50 drms.; Hamburg, 221 drms.; Jaffa, 53 drms.; Malacca, 9 drms.; Malmo, 10 drms.; Manzanillo, 100 drms.; Melbourne, 486 pkgs., 15 drms.; Pelotas, 90 drms.; Pto. Alegre, 752 cs.; Rangoon, 10 drms.; Rio de Janeiro, 309 drms.; Rio Grande do Sul, 17 drms.; San Antonio, Chili, 83 drms.; Santos, 15 drms.; Sekondi, 100 drms.; Shanghai, 50 jars; Singapore, 145 drms.; Sierra Leone, 20 bxs., 2 cs.; Stockholm, 7 drms.; Sydney, 26 drms.; Wellington, 90 cs.

FERRO MANGANESE—
Baltimore, 752 t.; Boston, 25 t.; Hamburg, 140 t.; Los Angeles, 100 t.; New Orleans, 75 t.; San Francisco, 50 t.; Sydney, 749 t.; Vancouver, 21 t.

FERRO TITANIUM—
Hamburg, 1 ck.

FERRO VANADIUM—
Havre, 10 drms.

GLUE, SIZE, AND GELATINE—
Bombay, 5 bgs.; Boston, 100 cs., 200 bgs., 10 brls.; Buenos Aires, 22 pkgs.; Delagoa Bay, 10 pkgs.; Kobe, 100 pkgs.; Madras, 50 pkgs.; Shanghai, 100 tins; Singapore, 1 cs.; Sydney, 160 tins, 1 cs.; Wellington, 60 bgs.

MANGANESE ORE—
Bombay, 1 t.; Cape Town, 1 t.

PLUMBAGO—
Brisbane, 2 t. 10 c. Havana, 6 cks.

SALT—
Abonema, 20 t.; Accra, 30 t.; Algoa Bay, 7 t.; Antwerp, 150 t.; Annotto Bay, 5 t.; Belize, 9 t.; Bergen, 65 t.; Brisbane, 6 t.; Calcutta, 1,201 t.; Cape Town, 5 t.; Cape Coast, 3 t.; Christiania, 227 t.; Copenhagen, 10 t.; Degama, 5 t.; Drammen, 106 t.; Durban, 61 t.; Dunedin, 17 t.; East London, 5 t.; Halifax, N.S., 331 t.; Iddo, 1,040 t.; Kingston (Ja.), 93 t.; Lagos, 75 t.; Montreal, 200 t.; Mossel Bay, 5 t.; Pt. Harcourt, 73 t.; Quebec, 100 t.; Rio de Janeiro, 1 t.; Saltpond, 17 t.; Sekondi, 15 t.; Shanghai, 3 t.; Sierra Leone, 85 t.; Valparaiso, 1 t.

SOAP—
Accra, 1,120 bxs.; Alexandria, 300 pkgs.; Amboina, 35 pkgs.; Ampenam, 100 pkgs.; Antigua, 40 bxs.; Auckland, 1,194 pkgs.; Bandjermassin, 30 cs.; Balik Pappan, 30 cs.; Bangkok, 480 pkgs.; Barbados, 818 bxs.; Barcelona, 30 cs.; Batavia, 12 pkgs.; Belawan, 1,300 bxs.; Bermuda, 25 bxs.; Bluff, 25 cs.; Boeleleng, 100 cs.; Bolivia, 2 cs.; Bombay, 1,467 pkgs.; Bonny, 60 cs.; Buenos Aires, 3 cs.; Buguma, 50 pkgs.; Calcutta, 181 pkgs.; Calabar, 1,885 bxs.; Cape Coast, 162 bxs.; Casablanca, 5 bxs.; Christchurch, 480 bxs.; Ceuta, 125 bxs.; Cochin, 140 bxs.; Colombo, 681 bxs.; Colon, 352 bxs.; Corinto, 200 bxs.; Curacao, 276 bxs.; Durban, 24 pkgs.; Dunedin, 2 bxs.; Duala, 140 bxs.; Falmouth, 14 bxs.; Fiume, 35 bxs.; Germany, 31 cs.; Gisborne, 168 bxs.; Gibraltar, 143 bxs.; Grenada, 303 bxs.; Gravosa, 6 cs.; Greymouth, 80 bxs.; Hong Kong, 34 bxs.; Iddo, 506 bxs.; Karachi, 745 pkgs.; Kingston, Ja., 1,761 bxs.

SOAP—
Kilindini, 2 cs.; Larache, 198 pkgs.; Las Palmas, 362 bxs.; Launceston, 2 pkgs.; Leghorn, 250 pkgs.; Macassar, 507 cs.; Madras, 63 bxs.; Malacca, 420 bxs.; Malta, 2 bxs.; Manilla, 25 cs.; Melilla, 433 bxs.; Menado, 560 cs.; Meulabah, 25 cs.; Montego Bay, 25 pkgs.; Montreal, 2 cs.; Napier, 160 cs.; New York, 20 cs., 6 drms.; Opobo, 375 cs.; Oratava, 28 bxs.; Padang, 341 pkgs.; Panama, 55 cs., 75 bxs.; Penang, 2 cs.; Piraeus, 50 cs.; Pt. Antonio, 7 bxs.; Pt. Harcourt, 145 cs., 465 bxs.; Pt. Louis, 11 cs., 10 bxs.; Pt. Said, 302 cs.; Punta Arenas, 17 cs.; Rangoon, 870 pkgs.; Reval, 3 brls.; Rio de Janeiro, 2 cs.; Rosario, 1 cs.; Rotterdam, 10 bxs.; Sabang, 50 cs.; Saltpond, 60 bxs.; Salonika, 21 pkgs.; Samarang, 610 cs.; Samarinda, 30 cs.; Sapele, 2 cs.; Sekondi, 137 bxs., 1 drm.; Shanghai, 1,931 pkgs.; Singapore, 2,836 pkgs.; Sierra Leone, 3 bxs.; Sarawak, 6 cs.; Sinoe, 3 bxs.; Sourabaya, 664 pkgs.; St. Anne's Bay, 51 bxs.; St. John's, N.F., 835 pkgs.; St. Kitts, 50 bxs.; St. Lucia, 99 bxs.; Sydney, 14 pkgs.; Tandjong Balei, 753 bxs.; Tangiers, 66 bxs.; Tapatoean, 20 cs.; Tetuan, 180 pkgs.; Teneriffe, 256 bxs.; Trieste, 19 bxs.; Tientsin, 46 cs.; Trinidad, 78 pkgs.; Valparaiso, 6 cks.; Vera Cruz, 5 drms.; Warri, 302 pkgs.; Winnebah, 141 bxs.

SODA ASH—
Adelaide, 142 bgs., 118 pkgs.; Alexandretta, 50 bgs.; Batavia, 145 bgs.; Bombay, 1,000 bgs.; Brisbane, 59 cks., 138 pkgs.; Calcutta, 26,000 bgs.; Cheribon, 100 pkgs.; Callao, 50 pkgs.; Corfu, 20 pkgs.; Copenhagen, 250 pkgs.; Hong Kong, 3,370 pkgs.; Kalmar, 200 pkgs.; Kobe, 15,850 pkgs.; Madras, 10 pkgs.; Melbourne, 1,450 pkgs.; Moji, 2,110 bgs.; Pto. Alegre, 260 pkgs.; Riga, 50 bgs.; Rio Grande do Sul, 149 pkgs.; Rio de Janeiro, 113 pkgs.; Rosario, 192 pkgs.; Rotterdam, 1,000 bgs.; Samarang, 200 bgs.; Santos, 56 cks.; Shanghai, 3,069 pkgs.; Singapore, 125 cks.; Sourabaya, 200 bgs.; Sydney, 1,228 pkgs.; Vancouver, 50 pkgs.; Wellington, 277 pkgs.; Yokkaichi, 3,516 bgs.; Yokohama, 3,021 bgs.

SODA CRYSTALS—
Bombay, 100 kgs.; Colombo, 10 pkgs.; Malta, 90 bgs.

SODIUM BENZOATE—
Shanghai, 28 cs.

SODIUM BICARBONATE—
Adelaide, 24 pkgs.; Alexandria, 105 kgs.; Alexandretta, 10 bgs.; Algiers, 150 pkgs.; Antwerp, 1,016 pkgs.; Batavia, 30 kgs.; Bombay, 500 kgs.; Brisbane, 184 pkgs.; Corfu, 5 pkgs.; Buenos Aires, 100 cks.; Calcutta, 1,050 pkgs.; Christiania, 20 pkgs.; Colombo, 320 pkgs.; Fremantle, 358 pkgs.; Genoa, 100 pkgs.; Gibraltar, 7 pkgs.; Kobe, 538 pkgs.; Malta, 75 bgs.; Manilla, 200 kgs.; Melbourne, 483 pkgs.; Moji, 2,154 pkgs.; Pt. of Spain, 100 pkgs.; Rangoon, 200 pkgs.; Rotterdam, 200 pkgs.; Rosario, 25 pkgs.; Rouen, 251 pkgs.; Shanghai, 644 pkgs.; Singapore, 200 bgs.; Sourabaya, 50 kgs.; Sydney, 40 kgs., 580 pkgs.; Trinidad, 200 kgs.; Wellington, 69 kgs.; Yokkaichi, 538 pkgs.; Yokohama, 646 pkgs.

SODIUM BISULPHITE—
Havana, 20 drms.
Pt. Swettenham, 50 drms.

SODIUM PERBORATE—
Sydney, 5 kgs.

SODIUM PEROXIDE—
Sydney, 10 cs.

SODIUM PRUSSIATE—
Kobe, 21 cks.
Rio de Janeiro, 10 cks.

SODIUM SILICATE—
Adelaide, 168 pkgs.; Auckland, 13 pkgs.; Barranquilla, 65 cks.; Cartagena, Col., 50 pkgs.; Christiania, 80 pkgs.; Hankow, 126 cks.; Hong Kong, 50 drms.; La Guaira, 10 cs.; Melbourne, 7 cks., 571 bgs.; Montreal, 32 pkgs.; Montreal, 50 cks.; Shanghai, 49 cks.; Sydney, 67 bgs., 15 pkgs.

SODIUM SULPHIDE—
Genoa, 40 pkgs.; Rio de Janeiro, 82 drms.; Sekondi, 100 drms.; Sydney, 48 drms.

TALLOW—
Hamburg, 113 pkgs.
Salonika, 90 brls.

LONDON.

Week ending September 5.

ACETIC ACID—
Auckland, 2 cs., £5.; Barbados, 1 hhd., £10.; Christchurch, 5 cs., £18.

ACETYL SALICYLIC ACID—
Bombay, 3 cs. (pt.), £7.; Cape Town, 3 cs. (pt.), £32.; Calcutta, 1 cs. (pt.), £8.; Colombo, 1 cs., £20.; Madras, 2 cs. (pt.), £7.; Malacca, 1 cs. (pt.), £7.; Melbourne (F.), 3 cs., £46.; Montreal 9 cs. (pt.), £95.; Otago, 1 cs., £17.; Rangoon, 2 cs. (pt.), £42.; Shanghai, 5 cs. (pt.), £18.; Sydney, 3 cs., £77.

ACID CALCIUM PHOSPHATE—
Pasages, 5 cks., £30.

AMMONIA—
Alexandria, 4 cs., £7.; Barbados, 3 cs., £6.; Beira, 3 cs., £5.; Cape Town, 10 cs., £17.; Delagoa Bay, 6 cs., £10.; Durban, 4 cs., £7.; East London, 5 cs., £9.; Hong Kong, 3 cs., £5.; Pt. Elizabeth, 3 cs., £5.; Pt. Said, 6 cs., £11.; Shanghai, 8 cs., £15.; Valparaiso, 5 cs., £8.

AMMONIA (ANHYDROUS)—
Alexandria, 2 cylds., £16.; Benkoelen, 2 cylds., £17.; Calcutta, 30 cylds., £300.; Rotterdam, 20 cylds., £152.

AMMONIUM BROMIDE—
Melbourne, 7 cs. (pt.), £7.

AMMONIUM CARBONATE—
Adelaide, 9 c., £19.; Bangkok, 5 c., £18.; Bordeaux, 10 c., £20.; Hong Kong, 15 c., £46.; Melbourne, 2 c., £17.; Paris, 7 t. 10 c., £283.; Penang, 1 t. 16 c., £92.; Singapore, 13 c., £40.

AMMONIUM CHLORIDE—
Calcutta, 3 cs., 2 cks., £49.

AMMONIUM NITRATE—
Cape Town, 58 t., £1,320.
Oporto (F.), 19 c., £38.

AMMONIUM SULPHATE—
Hong Kong, 225 t., £3,490.; Kobe, 200 t., £3,285.; Las Palmas, 44 t., £579.; Teneriffe, 15 t., £222.; Yokohama, 100 t., £1,675.

AMMONIUM SULPHYDRATE—
Canterbury, 5 cs., £11.

ANTIMONY OXIDE—
Santos, 6 cks., £35.

ANTIMONY SULPHIDE—
Copenhagen, 4 cks., £88.; Genoa, 14 cks., £141.; Montreal, 10 cks., £99.; New York, 34 cks., £336.; Sydney, 21 cks., £362.; Rotterdam, 4 cks., £68.; Toronto, 20 cks., £180.

ARSENIC—
Cape Town (F.), 4 cs., £19.
Napier, 60 drms., £228.

BARIUM SULPHATE (BLANC FIXE)—
Havre (F.), 12 cks., £48.
Paris, 100 bgs., £155.

BARIUM SULPHIDE—
Paris, 1 cs., £8.

BISMUTH CARBONATE—
Auckland, 1 cs. (pt.), £19.; Brisbane, 1 cs. (pt.), £36.; Christchurch, 2 cs. (pt.), £18.; Dunedin, 1 cs. (pt.), £18.; Melbourne, 7 cs. (pt.), £71.; Singapore, 1 cs. (pt.), £5.; Wellington, 2 cs. (pt.), £19.

BISMUTH SALTS (*otherwise undes.*)
Calcutta, 2 cks. (pt.), £126.

BISMUTH SUBCARBONATE—
Bangkok, 2 cs., £70.

BISMUTH SUBNITRATE—
Brisbane, 1 cs. (pt.), £30.
Melbourne, 7 cs. (pt.), £11.

BISULPHITE OF LIME—
Colombo, 2 cks., £7.

BITUMEN—
Monte Video, 11 cks., £33.

BONE FERTILISER—
Channel Islands, 19 t., £158.
Fremantle, 5 c., £6.

BORAX—
Adelaide, 1 t., £100.; Antwerp, 1 t. (F.), £25.; Auckland, 5 c., £8.; Brisbane, 2 t. 10 c., £250.; Callao, 1 t., £28.; Sydney, 1 c., £6.; Valparaiso, 4 t. 19 c., £145.

BORAX GLASS—
Benkoelen, 2 t. 5 c., £165.

BORIC ACID—
Bombay, 3 c., £10.; Calcutta, 1 t. 6 c., £86.; Malta, 2 c., £7.; Matadi, 1 c., £6.

BROMIDES (*otherwise undescribed*)
Christchurch, 1 cs., £7.

CALCIUM CARBIDE—
Pt. Swettenham (F.), 4 t. 18 c., £74.

CALCIUM HYPOPHOSPHITE—
Bombay, 4 cs., £66.

CALCIUM PHOSPHATE—
Channel Islands, 21 t., £92.

CAUSTIC SODA—
Townsville, 16 c., £39.

CHROME ALUM—
Dunkirk, 5 t., £500.

CHEMICALS (*otherwise undescribed*)
Adelaide, 2 cs., £6.; Alexandria, 4 cs., £28.; Switzerland, via Antwerp, 1 cs., £55.; Ascension, 7 pkgs., £5.; Auckland, 9 cs., £38.; Barbados, 5 pkgs. (pt.), £9.; Barcelona, 20 pkgs., £56.; Beira, 20 cs., £75.; Bombay, 1 pkg (F.), £13.; Bombay, 7 cs. (pt.), £38.; Bordeaux, 37 cks., £154.; Brisbane, 1 cs., £58.; Brussels, 1 kg. (F.), £30.; Buenos Aires, 6 pkgs. (pt.), £24.; Calcutta, 17 pkgs. (pt.), £145.; Cape Town, 2 cs. (pt.), £36.; Colombo, 1 cs. (pt.), £7.; Demerara, 20 pkgs. (pt.), £28.; Dominica, 4 pkgs. (pt.), £6.; Dunedin, 4 cs. (pt.), £7.; Durban, 3 pkgs. (pt.), £12.; Fremantle, 2 cs., £20.; Hamburg, 200 pkgs., £523.; Jamaica, 5 pkgs. (pt.), £6.; Kobe, 50 pkgs. (F.), £250.; Lyttleton, 1 cs., £68.; Madras, 4 cs. (pt.) £19.; Malta, 2 cs., £6.; Melbourne, 22 pkgs. (pt.), £236.; Montreal, 13 cs. (pt.), £203.; New York, 2 cs. (pt.), £19.; Otago, 40 pkgs. (pt.), £366.; Petrograd, 200 pkgs., £540.; Petrograd, 50 pkgs. (F.), £288.; Pt. Elizabeth, 5 pkgs., £24.; Puerto Barrios, 2 cs., £7.; Riga, 500 pkgs., £1,255.; Rio de Janeiro, 10 cs., £38.; Rotterdam, 9 pkgs., £20.; Shanghai, 1 cs., (pt.), £8.; Singapore, 4 kgs., £7.; Stockholm, 10 pkgs. (F.), £52.; Sydney, 34 pkgs. (pt.), £669.; Tarragona, 200 pkgs., £740.; Toronto, 3 cs. (pt.), £22.; Trinidad, 8 cs. (pt.), £26.; Tuticorin, 11 cs. (pt.), £34.; Wellington, 11 cs. (pt.), £93.

CHROMIUM OXIDE—
Rotterdam, 1 kg., £15.

CITRIC ACID—
Adelaide, 5 c., £40.; Auckland, 6 c., £49.; Brisbane, 2 t. 10 c., £400.; Bunbury, 1 c., £10.

CITRIC ACID—
Fremantle, 10 c., £90.; Jamaica, 1 c., £10.; Melbourne, 2 t., £420.; Rio de Janeiro, 5 c., £57.; Rotterdam, 1 t., £175.; Santander, 5 c., £40.; Shanghai, 5 c., £50.; Sydney, 3 t. 10 c., £560.; Tientsin, 1 cs., £5.; Timaru, 3 c., £54.; Valparaiso, 13 c. £123.; Wellington, 5 c. £40.

COAL TAR PRODUCTS—
Anthracene Oil
Boston, 100 brls., £292.
Carbolic Acid
Barbados, 2 cs., £8.; Melbourne, 7 cs. (pt.), £8.; Napier, 90 drms., £74.
Creosote
Brussels, 3 cks., £18.; Channel Islands, 6 cks., £30.; Montreal, 10 cks., £35.; Pt. Elizabeth, 20 drms., £17.; Switzerland, 4 cs. (pt.), £9.
Creosote Oil
U.S.A., 40 drms., £1,197.
Naphthalene
Cape Town, 2 cs., £8.
Rotterdam, 500 bgs., £510.
Pitch
Auckland, 15 cs., £19.
Smyrna, 14 brls., £117.
Tar
Broome, 10 drms., £5.; Cape Town, 12 drms., £30.; East London, 100 drms., £13.; Mossel Bay, 20 drms., £16.

COBALT OXIDE—
Brussels, 1 ck., £142.

COBALT SULPHATE—
Brussels, 5 cks., £76.

COPPER SULPHATE—
Adelaide, 5 t., £131.; Calcutta, 1 t. 2 c., £29.; East London, 9 c., £15.

CREAM OF TARTAR—
Adelaide, 18 t., £1,573.; Amoy, 1 c., £8.; Auckland, 4 t., £357.; Beira, 1 c., £6.; Berbice, 1 c. (F.), £5.; Brisbane, 6 t. 18 c., £590.; Brussels, 1 t. 10 c. (F.), £150.; Bundaberg, 10 c., £43.; Cairns, 10 c., £43.; Calcutta, 1 c., £8.; Chefoo, 1 c. (F.), £6.; Christiania, 1 t. (F.), £120.; Fremantle, 1 t., £86.; Hong Kong, 1 c. (F.), £8.; Lyttletou, 10 t. 10 c., £898.; Mackay, 1 t., £86.; Melbourne, 6 t. 10 c., £556.; Pt. Alma, 1 t., £86.; Sydney, 45 t. 10 c., £3,887.; Townsville, 1 t. 2 c., £137.; Valparaiso, 10 c., £54.; Vancouver, 10 c., £49.; Vera Cruz, 4 c., £19.

DISINFECTANTS (*otherwise undes.*)
Auckland, 7 t. 1 c., £173.; Bagdad, 3 c., £60.; Bangkok, 1 t. 16 c., £40.; Basra, 14 c., £36.; Bermuda, 8 c., £9.; Bombay, 2 t. 5 c., £62.; Calcutta, 4 t. 2 c., £222.; Cape Town, 10 t. 2 c., £185.; Colombo, 2 t. 2 c., £62.; Demerara, 3 t. 14 c., £85.; Dunedin, 4 c., £33.; Durban, 2 t. 6 c., £56.; Gibraltar, 5 c., £11.; Hong Kong, 1 c., £17.; Karachi, 2 t. 1 c., £54.; Lagos, 2 t. 6 c., £131.; Madras, 1 t. 5 c., £30.; Malacca, 11 c., £17.; Montreal, 2 c., £8.; Paris, 4 t. 12 c., £75.; Shanghai, 1 t., £72.; Sydney, 5 c., £41.; Tientsin, 5 c., £17.; Timaru, 2 c., £26.; Toronto, 8 c., £41.; Townsville, 1 t. 2 c., £64.; Trinidad, 18 c., £25.

DYESTUFFS (ARTIFICIAL)—
Nigrosine
Sydney, 1 cs., £7.
Unspecified
Auckland (F.), 4 kgs.. £90.; Bagdad (F.), 1 cs. (pt.), £8.; Bombay, 1 cs. (pt.), £12.; Boulogne, 38 cks., £480.; Brisbane, 2 cs. (pt.), £99.; Calcutta, 2 cs., £7.; Cape Town, 1 kg., 2 cs., £43.; Cochin, 6 cs., £29.; Durban (F.), 1 kg., £27.; Durban, 1 ck., £19.; Lyttleton, 1 cs. (pt.), £8.; Melbourne, 9 pkgs., £308.; Ostend, 1 kg., £10.; Sydney, 1 cs. (pt.), £15.; Valparaiso, 2 cs. (pt.), £24.

ETHER—
Barbados, 2 cs., £5.; Bermuda 4 cs., £10.; Otago, 2 cs., £15.; Puerto Barrios, 1 cs., £7.; Trinidad, 3 cs., £5.

ETHYL CHLORIDE—
Vancouver, 1 cs., £30.

FERTILISERS (*otherwise undes.*)
Baltimore, 50 t., £315.; Channel Islands, 2 t. 19 c., £45.; New York, 1 t., 35 bgs., £76.; Philadelphia, 3 t. 10 c., £90.; Valparaiso, 2 c., £5.

GLYCERINE (CRUDE)—
Cape Town, 171 t. 7 c., £8,466.; Colombo, 5 c., £40.; Shanghai, 5 c., £27.; Yokohama, 29 t. 7 c., £2,421.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
Melbourne, 7 cs. (pt.), £8.

HYDROBROMIC ACID—
Calcutta, 2 cs., £11.

HYDROCHLORIC ACID—
Antofagasta, 3 c., £11.; Benkoelen, 3 t. 8 c., £51.; Bombay, 3 c., £12.; Oruro, 6 c., £20.; Tuticorin, 1 c., £8.

HYDROFLUORIC ACID—
Pt. Elizabeth, 1 cs., £15.

HYDROGEN PEROXIDE—
Lourenco Marques, 2 cs. (pt.), £8.
Toronto (F.), 1 cs., £8.

HYPOPHOSPHITE OF LIME—
Brussels, 4 cs., £78.

HYPOPHOSPHITES (*otherwise undescribed*)—
Melbourne, 7 cs. (pt.), £7.
Montreal, 5 cs., £74.

IODIDES (*otherwise undescribed*)—
Calcutta, 2 cs. (pt.), £153.; Dominica, 1 cs. (pt.), £5.; Demerara, 3 cs. (pt.), £34.

IODINE—
Auckland, 1 cs. (pt.), £26.; Barbados, 1 cs., £6.; Calcutta, 1 ck. (pt.), £26.; Dunkirk, 10 kgs., £650.; Trinidad, 1 cs. (pt.), £5.

IODINE (RESUBLIMED)—
Brussels, 3 cs. (pt.), £152.
Rio de Janeiro, 1 cs., £44.

IRON AMMONIUM CITRATE—
Bombay, 1 cs., £6.; Calcutta, 2 cs., £13.; Havana, 2 cs., £11.

LEAD ACETATE—
Trinidad, 2 cks., £9.

LEAD ARSENATE—
Callao, 27 cks., £231.
Pisco, 26 cks., £227.

LEAD CHROMATE—
Brisbane, 1 drm., £6.

MAGNESIA—
Auckland, 25 cs., £60.
Demerara, 2 cs., £11.
Fremantle, 2 cs., £5.
Sydney, 35 cs., £94.

MAGNESIA (CALCINED)—
Acajutla, 3 cs., £37.; Bilbao, 4 kgs., £14.; Buenos Aires 1 cs., £28.; Sao Paulo, 10 kgs., £50.

MAGNESIUM CARBONATE—
Acajutla, 2 cs., £9.; Bombay, 2 cs., £9.; Brisbane, 2 cs., £5.; Calcutta, 2 cs., £9.; Trinidad, 1 cs., £6.

MAGNESIUM CITRATE—
Calcutta, 15 cs., £124.
Limon, 1 cs., £13.

MAGNESIUM SULPHATE—
Bombay, 3 c., £5.; Brisbane, 4 t. 19 c., £111.; Buenos Aires, 2 c., £6.; Bundaberg, 5 c., £6.; Calcutta, 4 c., £5.; Durban, 10 c., £12.; East London, 10 c., £11.; Maryborough, 5 c., £6.; Melbourne, 1 t. 19 c., £41.; Rockhampton, 1 t. 5 c., £28.; Pt. Swettenham, 1 t. 5 c., £16.; Townsville, 1 t. 10 c., £34.; Trinidad, 10 c., £7.

MANGANESE BORATE—
Sydney, 1 ck., £18.

MANGANESE OXIDE—
Durban, 6 cks., £48.

MERCURIALS (*otherwise undes.*)
Jamaica, 1 cs. (pt.), £7.; Montreal, 20 cs., £184.; Trinidad, 1 cs. (pt.), £6.

MERCURY BICHLORIDE—
Penang, 3 cs. (pt.), £20.

MERCURY OXIDE—
Bombay, 1 cs., £43.

METHYL SALICYLATE—
Brisbane, 1 cs., £8.

NICKEL SALTS (*otherwise undes.*)
Yokohama, 1 cs., £10.

NITRIC ACID—
Bombay, 3 c., £22.; Oruro, 4 c., £19.; Otago, 4 c., £19.; Tuticorin, 2 c., £6.

OXALIC ACID—
Penang, 1 kg., £5.

PHOSPHORIC ACID—
Auckland, 1 cs., £6.; Demerara, 1 t. 17 c., £45.; Fremantle, 2 cs., £5.

PHOSPHORUS (AMORPHOUS)—
Trinidad, 3 cs., £34.

PHOSPHORUS SESQUISULPHIDE
Ghent, 40 cs., £405.

POTASSIUM BROMIDE—
Melbourne, 7 cs. (pt.), £6.

POTASSIUM CARBONATE—
Hong Kong, 5 cs., £11.

POTASSIUM CHLORIDE—
East London (F.), 5 bgs., £5.

POTASSIUM CITRATE—
Auckland, 1 cs. (pt.), £6.; Bombay, 2 cs., £20.; Brisbane, 2 cs., £14.; Calcutta, 3 cs. (pt.), £34.; Christchurch, 2 cs. (pt.), £6.; Melbourne, 3 cs., £39.

POTASSIUM CYANIDE—
Canton, 4 cs., £57.
Montreal, 1 cs. (pt.), £5.

POTASSIUM IODIDE—
Alexandria, 1 cs., £86.; Antwerp, 1 cs., £86.; Bangkok, 3 cs., £309.; Bombay, 1 cs., £88.; Brussels, 5 cs. (pt.), £218.; Calcutta, 2 pkgs. (pt.), £177.; Dunedin, 1 cs. (pt.), £22.; Havana, 1 cs. (pt.), £78.; Kobe, 5 cs., £392.; Penang, 3 cs. (pt.), £24.; Pt. Elizabeth, 1 cs. (pt.), £44.; Rio de Janeiro, 2 cs., 1 ck., £308.; Sydney, 2 cs., £239.; Wellington 2 cs. (pt.), £22.

POTASSIUM METABISULPHITE
Colombo, 2 cks., £28.; Perth, 2 cks., £22.; Sydney, 2 cs., £23.

POTASSIUM PERMANGANATE—
Buenos Aires, 1 cs. (pt.), £5.; Christchurch, 2 cs. (pt.), £5.; Cape Town (F.), 1 drm., £5.; Perth (F.), 1 ck., £7.

POTASSIUM PRUSSIATE—
Antwerp, 10 kgs., £70.; Hamburg, 5 cks., £138.; Montreal, 10 cks., £70.

POTASSIUM SALTS (*otherwise undescribed*)—
Montreal, 41 pkgs., £392.

POTASSIUM SULPHATE—
Demerara, 30 bgs., £33.
Townsville (F.), 80 t., £825.

PYROGALLIC ACID—
Sydney, 2 cs., £59.

ROCHELLE SALTS—
Canton, 1 cs., £5.
Cape Town, 2 c., £8.

SALAMMONIAC—
Auckland, 4 cks. (pt.), £39.; Buenos Aires, 5 cks., £70.; Melbourne, 2 cks., £6.

SALICYLATES (*otherwise undes.*)—
Montreal, 5 cs. (pt.), £26.
Sydney, 2 cs. (pt.), £38.

SALICYLIC ACID—
Brisbane, 1 cs., £7.; Callao, 1 cs., £14.; Rangoon, 1 cs., £6.

SALTPETRE—
Amsterdam, 3 t. 10 c., £149.; Brisbane, 1 t. £40.; Canterbury, 1 t. 10 c., £59.; Cape Town, 1 t. 10 c., £61.; Colombo, 10 c., £19.; Delagoa Bay, 5 c., £11.; Durban, 1 t. 7 c., £61.; East London, 1 t. 1 c., £49.

SALTPETRE—
Las Palmas, 8 t. 14 c. (F.), £250.; Paris, 4 c., £34.; Pt. Elizabeth, 1 t. 9 c., £62.; Rio de Janeiro, 1 t. 19 c., £78.; Sydney, 2 c., £8.

SHEEP DIP—
Auckland, 5 c., £14.; Baltimore, 9 t. 4 c., £220.; Wellington, 6 t. 5 c., £305.

SILVER NITRATE—
Auckland, 1 cs. (pt.), £5.
Trinidad, 1 cs. (pt.), £5.

SODA CRYSTALS—
Cape Town, 1 t., £5.

SODIUM ACETATE—
Sydney (F.), 17 cks., £100.
Sydney, 5 t. 1 c., £118.

SODIUM ARSENATE—
Melbourne, 2 kgs., £7.

SODIUM BENZOATE—
Calcutta, 5 cs., £32.
Oporto, 1 cs., £10.

SODIUM BICARBONATE—
Bombay, 2 c., £7.; Constantinople, 2 c., £6.; East London, 4 c., £5.; Monte Video, 4 c., £12.; Nassau, 3 c., £5.; Smyrna, 10 c., £40.

SODIUM BISULPHITE—
Callao, 2 t., £30.
Pt. Swettenham, 7 t. 10 c., £150.

SODIUM BROMIDE—
Melbourne, 7 cs. (pt.), £6.

SODIUM CARBONATE—
Shanghai, 1 t., £10.

SODIUM CITRATE—
Calcutta, 4 cs., 1 cks. (pt.), £27.
Melbourne, 1 cs., £12.

SODIUM GLYCEROPHOSPHATE—
Havana, 2 cs. (pt.), £20.

SODIUM HYPOPHOSPHITE—
Bombay, 4 cs., £80.; Brussels, 2 cs., £45.; Sydney, 2 cs., £45.

SODIUM HYPOSULPHITE—
Kobe, 1 t. £18.

SODIUM IODIDE—
Brussels, 2 cs. (pt.), £22.

SODIUM PYROPHOSPHATE—
Sydney, 10 c., £23.

SODIUM SALICYLATE—
Christchurch, 2 cs. (pt.), £7.; Shanghai, 2 cs. (pt.), £26.; Singapore, 1 cs., £10.

SODIUM SALTS (*otherwise undes.*)
Calcutta, 2 cks., £35.

SODIUM SULPHATE—
Alexandria, 4 c., £10.; Barbados, 1 t. 6 c., £9.; Demerara, 1 t., £10.; Jamaica, 10 c., £5.; Trinidad, 2 t., £21.; Wellington, 10 c., £5.

SODIUM SULPHIDE—
Rotterdam, 5 t. 4 c., £73.

SODIUM SULPHITE—
Shanghai, 1 t. 8 c., £44.

SPENT OXIDE—
Amsterdam, 185 t., £429.
Hamburg, 1,003 t., £1,603.

SULPHITE OF LIME—
Boulogne, 3 kgs., £10.

SULPHUR—
Montreal, 1 c., £6.
Mossel Bay, 2 t. 5 c., £34.
Trinidad (F.), 10 c., £7.

SULPHURIC ACID—
Bombay, 4 c., £20.; Oruro, 5 c., £16.; Otago, 5 c., £14.; Pt. Elizabeth, 6 c., £20.; Piraeus, 2 cs., £7.; St. Vincent, 5 c., £10.; Trinidad, 7 t. 10 c., £148.; Tuticorin, 1 c., £5.

SUPERPHOSPHATE—
Channel Islands, 5 t., £25.
Durban, 201 t. 18 c., £1,575.

TANNIC ACID—
Calcutta (F.), 1 cs. (pt.), £7.

TARTARIC ACID—
Adelaide, 4 t. 10 c., £924.; Amsterdam, 5 c., £31.; Auckland, 16 c., £176.; Bombay, 1 t. (F.), £124.; Brisbane, 2 t. 5 c., £277.; Brussels, 1 t. 10 c. (F.), £260.; Bunbury, 1 c., £8.

TARTARIC ACID—
Dunedin, 10 c., £62.; Fremantle, 2 t., £246.; Gothenburg, 1 t., £123.; Hamburg, 1 t., £123.; Hong Kong, 3 c., £25.; Jamaica, 1 c., £8.; Melbourne, 9 t., £1,107.; Napier, 3 c., £37.; Rangoon, 2 c., £19.; Shanghai, 5 c., £39.; Singapore, 10 c., £72.; Sydney, 4 t., £418.; Timaru, 5 c., £31.; Townsville, 10 c., £69.; Valparaiso, 12 c., £93.; Vancouver, 10 c., £66.; Wellington, 11 c., £104.

THEOBROMINE—
Hamburg, 1 cs., £59.

THEOBROMINE SODIUM SALICYLATE—
Hamburg, 1 cs., £42.

ZINC OXIDE—
Bombay, 8 brls., £89.; Montreal, 20 cks., £91.; Petrograd, 92 brls., £1,120.; Reval, 100 cks., £183.; Riga, 40 cks., £80.

ZINC SULPHATE—
Brussels, 5 cks., £47.
Las Palmas, 24 t., £384.

Week ending September 8.

ANTIMONY REGULUS—
Durban, 2 t.
Valparaiso, 1 t.

BEESWAX—
Quebec, 2 t.

FULLER'S EARTH—
Antwerp, 10 t.
Christiania, 25 t.

GLUE, SIZE, AND GELATINE—
Bombay, 7 t. 12 c.; Brisbane, 2 c.; Brussels, 5 t. 1 c.; Calcutta, 12 t. 10 c.; Cape Town, 1 c.; Delagoa Bay, 12 c.; East London, 3 c.; Fremantle, 2 c.; Kobe, 15 t.; Manila, 6 t.; Melbourne, 2 c.; New York, 2 t. 19 c.; Paita, 9 c.; Paris, 10 t. 13 c.; Perth, 1 t.; Pt. Elizabeth, 15 c.; Reval, 2 t.; Rotterdam, 1 t. 10 c.; Shanghai, 2 c.; Singapore, 1 t.; Sydney, 1 t. 6 c.; Toronto, 7 c.; Valparaiso, 4 c.; Yokohama, 5 t.

ISINGLASS—
Sydney, 2 c.

MINERAL WAX—
Christchurch, 5 c.
Yokohama, 7 t. 10 c.

PARAFFIN WAX—
Bombay, 3 t.

PLUMBAGO—
Bangkok, 1 t.; Brisbane, 18 c.; Rangoon, 5 c.; Talcahuano, 11 c.

QUININE—
Bombay, 6,178 oz.; Brisbane, 200 oz.; Colombo, 40,304 oz.; Calcutta, 30,560 oz.; Demerara, 33 oz.; Dominica, 100 oz.; East London, 72 oz.; Jamaica, 25 oz.; Karachi 2,155 oz.; Lagos, 1,600 oz.; Madras, 462 oz.; Mauritius, 700 oz.; Melbourne, 100 oz.; Piraeus, 1,016 oz.; Rio Janeiro, 428 oz.; Trinidad, 337 oz.

SALT—
Beira, 5 c.; Bombay, 9 c.; Colombo, 3 c.; Durban, 16 c.; Hong Kong, 8 c.; Malmo, 9 c.; Oporto, 3 c.; Penang, 3 c.; St. Helena, 14 c.; St. Vincent, 1 c.; Singapore, 1 t. 2 c.; Townsville, 2 t. 17 c.; Trinidad, 2 c.; Zanzibar, 7 c.

SOAP—
Accra, 3 t. 15 c.; Adelaide, 1 c.; Aden, 1 c.; Alexandria, 13 c.; Amsterdam, 5 c.; Antwerp, 1 c.; Antigua, 3 c.; Ascension, 17 c.; Auckland, 1 t. 11 c.; Bombay, 11 c.; Boston, 3 c.; Calabar, 32 t. 11 c.; Christchurch, 5 c.; Calcutta, 6 t. 6 c.; Canton, 2 c.; Christiania, 1 c.; Cape Town, 3 t. 6 c.; Colombo, 12 c.; Copenhagen, 6 c.; Cuba. 11 c.; Callao, 10 c.; Demerara, 2 c.; Dominica, 1 t.; Dunedin, 8 c.; Durban, 1 t. 6 c.; Genoa, 1 c.; Gibraltar, 1 c.; Grenada, 2 t. 5 c.; Hong Kong, 1 c.; Iddo, 10 c.; Iquique, 2 c.; Italy, 16 c.; Jaffa, 1 c.

SOAP—
Lagos, 6 t. 14 c.; Karachi, 1 c.; Madras, 2 t. 11 c.; Malta, 3 c.; Mauritius, 4 t. 15 c.; Melbourne, 5 c.; Opobo, 4 t. 9 c.; Otago, 1 c.; Paramaribo, 6 c.; Penang, 12 c.; Perth, 1 c.; Pt. Harcourt, 10 t. 9 c.; Pt. Said, 4 c.; Pt. Swettenham, 5 c.; Rio de Janeiro, 1 t.; Rotterdam, 19 c.; St. Helena, 7 c.; St. Lucia, 1 t.; Seychelles, 2 c.; Shanghai, 2 c.; Singapore, 1 t. 12 c.; Suez, 2 c.; Sydney, 5 c.; Timaru, 3 c.; Toronto, 3 t. 11 c.; Trinidad, 3 t. 8 c.; Trondhjem, 8 c.; Valparaiso, 1 c.; Warri, 11 t. 7 c.; Wellington, 3 c.; Yokohama, 3 c.

STEARINE—
New York, 9 t.

TALLOW—
Danzig, 33 t. 1 c.; Genoa, 10 t. 5 c.; Hamburg, 35 t.; Harlingen, 13 t. 13 c.; Libau, 12 t. 15 c.; Nantes, 32 t. 3 c.; Rotterdam, 50 t. 2 c.; Wiborg, 50 t. 2 c.

TAR (STOCKHOLM)—
Fremantle, 2 c.

WAX (*otherwise undescribed*)**—**
New York, 5 c.
Paris, 1 t. 5 c.
Piraeus, 10 c.
Stockholm, 8 c.

WHITE LEAD—
Auckland, £914.; Barbados, £77.; Brisbane, £92.; Buenos Aires, £175.; Calcutta, £482.; Dunedin, £427.; Durban, £142.; East London, £67.; Gisborne, £49.; Lyttleton, £44.; Mossel Bay, £18.; Piraeus, £37.; Pt. Elizabeth, £110.; Rangoon, £167.; Rotterdam, £21.; Singapore, £24.; Sydney, £762.; Timaru, £123.; Wellington, £206.

MANCHESTER.

Week ending August 30.

ACID (*otherwise undescribed*)**—**
Haifa, 3 cs.

AMMONIUM SALTS (*otherwise undescribed*)**—**
Copenhagen, 5 cks., 2 kgs.

BLEACHING POWDER—
Abadan, 2,828 drms.
Bagdad, 110 drms.

CALCIUM CHLORIDE—
Busrah, 10 drms.
Pt. Said, 1 drm.

CAUSTIC SODA—
Bagdad, 60 drms.
Basra, 20 drms.

CHEMICALS (*otherwise undescribed*)
Bagdad, 72 cs., 17 drms.; Busrah, 10 cylds.; Bombay, 94 drms.; France, 4 crts., 1 brl.; St. John, N.B., 1 ck., 1 cs.

CHLORINE—
Busrah, 10 cylds.
Mohammerah, 1 cs.

COAL TAR PRODUCTS—
Aniline Oil
Switzerland, 111 drms.
Naphthalene
Holland, 365 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bombay, 3 cks., 4 drms., 1 cs.; France, 3 cks., 3 kgs.; Melbourne, 5 drms.; Switzerland, 32 drms.; Sydney, 11 drms.

GLUE—
Alexandria, 40 bgs.
Canada, 45 bgs.
Malta, 5 bgs.
Pt. Said, 6 tins.

MAGNESIUM SULPHATE—
Bagdad, 2 cs.

POTASSIUM SALTS (*otherwise undescribed*)**—**
France, 13 cks.

RED LEAD—
St. John, N.B., 4cs.

RED AND WHITE LEAD—
Pt. Said, 10 drms.

SALT—
Quebec, 1,600 sks.
St. John, N.B., 1,450 sks.

SIZE—
Bombay, 5 brls.
France, 40 brls.

SOAP—
Alexandria, 1 cs.; Bagdad, 6 bls.; Basra, 350 bxs.; Bombay, 48 cs.; Busrah, 6 bxs.; Mohammerah, 770 bxs.; Sydney Mines, 8 cs.

SODA ASH—
Ahwaz, 147 brls.

SODA CRYSTALS—
Basra, 20 kgs.

SODIUM BICHROMATE—
Ahwaz, 60 brls.

SODIUM SULPHATE—
Bagdad, 2 cs.

TALLOW—
Pt. Said, 1 bx.

Week ending September 7.

BARIUM SALTS (*otherwise undes.*)
France, 1 kg.

BLEACHING POWDER—
Bombay, 6 drms.

CHEMICALS (*otherwise undescribed*)
Ahwaz, 3 kgs.; Jersey, 1 bg.; Sweden, 20 drms.

COAL TAR PRODUCTS—
Aniline Oil
Switzerland, 59 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Australia, 25 drms., 5 kgs.

SALT—
Basra, 5 cs.

SIZE—
Belgium, 1 ck.

SOAP—
Abadan, 2 cs.; Basra, 40 drms., 7 cs.; Cairo, 6 cs.

NEWCASTLE-ON-TYNE

Week ending September 8.

AMMONIA—
Alicante, 662 bgs.
Copenhagen, 5 cks.

ANTIMONY—
Antwerp, 6 cks.
Copenhagen, 16 cks.

BLEACHING POWDER—
Rotterdam, 88 cks.

CARBON (RETORT)—
Antwerp, 404 t.

CAUSTIC SODA—
Bergen, 86 drms.; Christiania, 10 drms.; Copenhagen, 62 drms.; Gothenburg, 294 drms.; Rotterdam, 35 drms.

COAL TAR PRODUCTS—
Pitch
Antwerp, 6 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bergen, 2 kgs.

IRON OXIDE—
Copenhagen, 3 cks.

LITHARGE—
Antwerp, 45 cks.
Christiania, 4 cks.
Copenhagen, 12 cks.
Rotterdan, 4 cks.

MAGNESIUM CARBONATE—
Antwerp, 20 bgs., 10 cs.

RED LEAD—
Christiania, 5 cks., 5 kgs.
Copenhagen, 12 cks.
Gothenburg, 12 cks.
Rotterdam, 100 cks.

SODIUM SULPHITE—
Copenhagen, 10 kgs.
Wifstarf, 497 t.

WHITE LEAD—
Copenhagen, 5 cks.

N. & S. SHIELDS.

Week ending September 8.

NIL.

PRICES CURRENT.

WEDNESDAY, SEPT. 12, 1923

PREPARED BY MESSRS. HIGGINBOTTOM & CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23/6 & 47/-		
Acetic, (Glacial, B.P.) in carboys	*ton	68	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	8¼
Formic, 80/85%	*ton	52	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 80%	ton	60	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	6
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	9
Tarteric (crystals)	lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	4
Naphthalene, refined	ton	18	10	0
Pitch (f.a.s. Liverpool)	ton	6	15	0
Pyridin	gallon	1	0	0
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	130	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	10	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	69	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	10	0
Formaldehyde, 40%	ton	78	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	42	0	0
Lead Acetate (brown)	ton	43	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge	ton	35	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, comml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	46	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	28	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	9¾
Potassium Prussiate (yellow)	lb.	0	1	1
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	10	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/- & 57/-		
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carbonate, (Soda-ash), 48%	ton	15	0	0
Sodium Carb. (Alkali), 58% bags	†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	6
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	14	0	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	30	0	0
Copper	ton	63	15	0
Lead (Chemical Sheet), delivered	cwt.	1	14	0
Lead (Foreign Pig)	ton	25	5	0
Nickel	ton	130	0	0
Silver	oz.	0	2	7⅝
Tin, English Ingots	ton	198	0	0
Zinc (Spelter)	ton	33	12	6
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	42	10	0
Linseed, Raw	*ton	44	10	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	9	6

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
A Question of Policy	329
The British Association	330
The British Cellulose Report	330
Damp Rot in Wooden Roofs	331
Physical Chemistry of Interfaces	332
British Association	335
British Overseas Chemical Trade	338
National Gas Exhibition	339
Items of Interest	340
Coming Events	341
Cumberland Coking and By-product Industries	341
Trade Inquiries	341
Exports of Chemical and Allied Products in August	342
Fertiliser News	343
New Companies	343
Correspondence	345
Gazette News	345
Thirty-five Years Ago	345
Reports of Companies	346
South Wales Notes	346
The Patent List:—	
Applications for British Letters Patent	346
Complete Specifications Accepted	346
Complete Specifications Open to Public Inspection before Acceptance	346
Abstracts of Latest Complete Specifications	347
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	347
Market Reports:	
London "Open Market" Report	348
London Metal Market	349
Manchester Chemical Market	349
Swansea Market Report	350
Liverpool Chemical Market	350
West of Scotland Chemicals	350
Imports of Chemical Products	351
Exports of Chemical Products	353
Prices Current	358

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CURRENT TOPICS.

A QUESTION OF POLICY.

THE interest and concern aroused by the resignation of Professor A. G. Green from his post of Director of Research to the British Dyestuffs Corporation, and the concomitant broad question of the policy of the present directors towards research, shows little sign of diminishing. Yet there is, we think, one factor in the present dyestuffs situation, having a very important bearing upon the present position in this country, which has been almost entirely overlooked. Before the war, as is well known, Germany possessed a virtual monopoly in the dyestuffs markets of the world. This monopoly covered every class of product, from the cheapest sulphur dyestuff to the most expensive vat colour, and resulted in the general net profit being sufficiently high both to allow of undercutting an incipient competitor in any particular dyestuff, and to allocate a substantial proportion of the profit to research and developmental work. It cannot be too strongly emphasised that, from the first, German dyestuffs research was financed by profits made in manufacturing dyestuffs. It is true that, as Professor Gardner points out in a letter we publish elsewhere in this issue, in the early days of the industry, the British colour manufacturers by adopting the shortsighted policy of withdrawing practically the whole of their profits were responsible for Germany obtaining her dominant position, and it is also true that were the present British manufacturers adopting a similar policy under comparable circumstances public alarm would be fully justified. The circumstances, however, are by no means comparable. With the world's capacity for consuming dyestuffs little if anything above that of pre-war years, the world's productive capacity has increased to from two to three times its pre-war extent. This is the dominant fact of the situation. In Great Britain, America, and France, huge manufacturing plants have been erected, all making similar products—sulphur, acid, basic, direct cotton, mordant, and vat dyestuffs—and all realising the necessity, in addition to supplying their home markets, of capturing a great portion of the world's markets if their plants are to be run on an economical basis; capable of producing profits large enough to allow a considerable margin being allocated to research, and on a scale extensive enough to provide a really efficient safeguard in times of war. The result is that even were the German competition entirely eliminated, neither

the British, French, nor American works, if all three operate at only moderate efficiency, can hope to sell their bulk colours in anything approaching the quantities sold by Germany in 1913, and all being inevitably highly capitalised, a very moderate margin of profit would seem all that can safely be anticipated. The statement of the case is easier than the suggestion of the remedy, but it is obvious—again leaving Germany and Switzerland out of account—that that country which first produced most efficiently and most cheaply the greatest number of bulk colours, by which we mean such dyestuffs as, for example, indigo, the alizarin mordant dyes, sulphur blacks, methyl violet, direct cotton blacks, and the simpler acid azo wool colours, would gain a preponderating position in the general world market, leading to a greater amount of profit becoming available for research. The strategic advantage thus gained in the commoner colours would, under efficient management, be maintained with newer, more complex colours, and on this account we think the present directors of the British Dyestuffs Corporation are right in their expressed policy of concentrating, for the time being, on their bulk products. Most technical men and scientists obsessed by German pre-war activities do not give sufficient attention to these greatly altered conditions. The dyestuffs industry cannot be subsidised indefinitely, either by the shareholder or the colour user, and general Government support must be kept within reasonable proportions. By obtaining a leading position in those bulk colours in greatest demand at present, our dyestuffs industry should become self-supporting, and with the help of research work unexcelled by that of any other country in the world—predominantly progressive. Notwithstanding, however, our approval for the reasons outlined above, of the broad policy of the Board of the British Dyestuffs Corporation, we nevertheless hold fast in our opinion as to the necessity for incorporating technical men in the directorate. Expert technical advice is as essential in cutting down production costs of bulk colours as in adjudicating upon the merits of new processes and products, and a combined Board of commercial and technical men is certainly the most efficient and logical method of control of any fine-chemical manufacturing industry.

THE BRITISH ASSOCIATION.

Not for many years have we known such large audiences as were present to hear the addresses to the Chemistry Section of the British Association at Liverpool. On the occasion of the delivery of Professor Donnan's presidential address, for instance, the large lecture hall was not only crowded but considerably overcrowded, and many had to be content with the echo of the speaker's voice in the corridor outside. The same state of affairs prevailed when the joint meeting with Sections A and G was held for the purpose of discussing cohesion and molecular forces, and also during the discussion on enzymes. Whilst the attendances have been extremely satisfactory, one feels tempted to make a slight criticism in two respects. The first is to express a regret that more attention is not given in Section B to applied chemistry, and the other is that some efforts are not made to encourage better discussions of the communications that are presented. Apart from the discussions already mentioned, one's impression is that of authors hurriedly reading papers, and of the President regretting there was no time for discussion. The lack of discussion was very noticeable, although the difficulties in the way of securing speakers who can discuss any particular subject are increased by the fact that only members of the British Association are admitted to the meetings. We feel safe in suggesting that only a very small percentage of chemists trouble to pay the small fee necessary to become a member and attend the meetings. Another disadvantage of the British Association meetings generally is the absence of any official record of any of the Sectional proceedings. All this, however, must not be taken to imply that matters of the highest interest and importance from both the pure and applied side were not dealt with. Our report elsewhere, in which we have dealt with the outstanding communications and discussions, is a sufficient indication that this was so, but the feeling persists that in such an active centre of the chemical manufacturing industry as Liverpool, the opportunity was lost of introducing more communications of direct practical interest. Judged by the standard of previous years, the 1923 meeting of Section B does not suffer by comparison. Next year, as has been known for some time, the meeting of the Association is to be held in Toronto, from September 3 to 10, under the presidency of Major-General Sir David Bruce. Incidentally, it may not be generally known that the British Association Fuel Economy Committee no longer exists. No report was presented this year, and in the circumstances no good purpose is served by discussing the reasons why the Committee has gone out of existence.

THE BRITISH CELLULOSE REPORT.

The report and accounts of the British Cellulose and Chemical Manufacturing Company covering the period of twenty months ended February 28 last, show a slight though definite improvement in its affairs. Although a total loss of £492,000. is recorded during the period under review, yet when comparison is made with the year ended June 30, 1921, during which a total adverse balance of £673,000. was disclosed, indications that the Company is making progress towards a profit-making basis are evident. The Company's main misfortune has been that the overcoming of the technical difficulties of manufacture and dyeing, and the extension of production capacity to a scale commensurate with the capital of the undertaking, have synchronised with a period of acute general trade depression. The energetic sales campaign prosecuted by the directors, and the growing public appreciation of the Company's artificial silk, give every indication, however, that with restoration of normality in trade, the end of the Company's long succession of troubles will be definitely reached.

DAMP ROT IN WOODEN ROOFS.

ITS PREVENTION AND CONTROL.

By Hartland Seymour.

WHEREVER wooden roofs are adopted, an ever-present problem is the prevention of rot caused by the accumulation of moisture. This condensation comes from the fact that cracks between the planks permit the warm air from the room or workshop below to pass through and come into contact with the roof covering, which, of course, is at the temperature of the outside air. The result is condensation of moisture between the wooden roof and its covering. This type of rot is found wherever high relative humidity is the rule, for instance, in textile mills and food factories. The damage thus caused is enormous, and runs into thousands of pounds annually.

In considering the cause of decay in wood there are two general classifications of fungus, which, it is generally admitted, are almost entirely responsible. The first of these is the dry-rot type, which flourishes within a narrow range of cold to moderate temperatures, and which does not require any great amount of moisture. The second is the damp-rot type, which thrives in warmer temperatures and requires larger amounts of moisture for its development. The second group—*i.e.*, damp rot—requires either air at nearly 100 per cent. humidity or a supply of water such as condenses on cool surfaces.

Types of Damp-Rot Fungi.

There are six or seven types of fungi which attack wooden roofs, and these types flourish according to their various requirements of temperature and moisture. As a general rule, these fungi germinate and propagate at temperatures between 35° F. and 110° F., while the strongest growths occur between 75°—100° F. Some of these fungi will not grow at all if they are subject to alternate wetting and drying, since this action destroys the spores; other kinds flourish best in darkness, while others require a certain amount of light, but will perish under direct sunlight.

Some investigations carried out by Mr. Wendall S. Brown, of the American Society of Mechanical Engineers, led him to the belief that decay of a wooden plank begins usually at the top surface of the plank, especially if the first ply of paper is dry sheathing not properly wiped down. Sometimes, however, infection first obtains a foothold just above the tongue and groove or spline and progresses more rapidly in the central section of the plank lying between the two extremes of moisture.

Causes of Damp Rot in Saw-tooth Roofings.

In saw-tooth buildings, valley planks usually decay first, this being generally traceable to one or more of the following contributory causes:—

1. Since saw-tooth lighting areas usually face north, the valleys are shaded considerably by the adjacent saw-teeth, which intercept the warming effect of the direct sun rays, when the sun is at a low altitude during the heating season.

2 Heating coils are often placed solely under the glass or at some distance up the wooden back of the saw-tooth, leaving the valley portion chilled, and therefore subject to excessive condensation.

3. There is a tendency for the moisture of condensation to drain to the lowest portion of the roof.

An indication of the comparative extent to which rotting has progressed in various parts of the roof may often be obtained from the brown extractive matter deposited in rusty streaks on rafters and planks. Decay is usually greatest in planks and beams at bearings, because, owing to the additional insulating properties of the supporting members, the locus of condensation dips. Tops of roof rafters and girders rot first, usually for the same reason. Also, other conditions being equal, decay is more active in the vicinity of ventilators, conductor pipes, and similar equipment.

The quality of the wood as well as the species or variety is also a factor in longevity, and various factors in the former often tend to upset too close generalisations concerning the placement of decay. For instance, three years ago two bays of roof plank and one roof rafter in a weaving shed were replaced by entirely new but unsuitable material having a high percentage of sap wood. The plank is already more than one-half rotten, and is in a worse condition than the remainder of the roof, which is thirteen years old.

Methods of Treatment.

Regarding the matter of treatment, there sems to be no practicable means of preventing exposure to infection, or of eliminating rot-producing conditions, as far as temperature alone is concerned. For new wood roofs, antiseptic treatment such as creosoting and kyanising is possible, and other processes may be adopted for the preservation of the plank.

One creosoting manufacturer has recently introduced a priming paint, and claims that it is not penetrable by creosote, thus making possible the application of white ceiling paint without sheathing. Girders and beams may be made of steel, but if untreated timber is used the upper edges of beams may be chamfered and covered with a layer of waterproof paper. Chamfering tends to raise the locus of condensation, and the paper still further assists in keeping the tops of the beams dry.

In the case of existing roofs, the treatment must necessarily be ameliorative in character rather than preventive or curative. Here it should be remembered that the term "preservation" is meant to indicate merely the economic postponement of ultimate roof renewal, and not the effect of permanency. Briefly, the treatment consists in removing from the fungus its water supply by preventing condensation as far as is practicable. Condensation is decreased by insulating the outer roof surface, the degree of prevention depending upon the amount of insulation.

There are certain limitations inherent in this treatment which prevent the full attainment either of water-supply removal or of sterilisation. Firstly, it is impracticable on account of excessive initial expense to lay enough insulation entirely to prevent condensation within the roof plank even in moderately cold winter weather. Secondly, certain fungi are suspected of having the power, once they are well developed, of manufacturing water to a limited extent through the decomposition of the wood structure itself, provided decay is deep-seated and protected from too rapid evaporation. That is, water in its liquid state is not absolutely necessary for their maintenance.

Efficient Insulation the Best Method.

Top insulation has the effect of moving the plane or locus of condensation for any given set of atmospheric conditions nearer the outer surface of the plank than before, and, in mild weather, of eliminating it entirely. In other words, the rate of condensation is reduced, as is also its duration, resulting in checking inroads of disease already established, and also in lessening the susceptibility of timber to further infection.

Insulation should be in sufficient amount entirely to prevent condensation on the under side of the roof in the coldest weather, and, if wood, should itself be antiseptically treated. Creosoted yellow-pine boarding nailed to furring strips has been found to be an economical type of insulation. Cheap, open-grained lumber, preferably sap wood, should be used, since it readily absorbs the necessary amount of wood preservative. By laying it over furring strips, additional and especially effective and inexpensive insulation in the form of an air space is obtained. This type of insulation also adds materially to the strength of the roof plank; in fact, it may be made thick enough to support the old plank if the latter has become seriously weakened, and the importance of not interrupting production is paramount. The old plank, where dangerously decayed, would then be spiked to the new plank from below.

In order to prevent entrance into the new insulating air space of warm, humid air from the room below (and therefore condensation which would otherwise occur within the upper insulating deck and would drip upon the lower untreated plank), it is necessary to have a waterproof membrane between the old roof and the new insulation. The old roofing paper may be left intact and used for this purpose, if practicable. On one large weaving shed the new insulation was laid directly on the tar-and-gravel roof without removal of gravel, except what could be easily brushed off. If considerable structural renewal becomes necessary, however, it will generally be found advisable to remove the roofing paper entirely, and, after necessary replacements have been made, to lay down a two-ply roof over the same before applying the insulation.

An economic consideration of the question invariably shows that the additional insulation saves enough heat to help very materially in meeting fixed charges on the initial cost of installation. Further, dripping from the ceiling,

which may have been experienced previously, and is a source of considerable annoyance, will be stopped.

Rearrangement of Heating Surfaces.

Sometimes it is advisable to rearrange the heating system so as to obtain a more uniform distribution. In saw-tooth buildings a portion of the heating surface should be placed under the plank and a portion under the glass, the object being to obtain a balance (that is, as little circulation of air as possible directly under the saw-teeth), and thus maintain a uniform and somewhat higher temperature here, without, however, increasing the room temperature on the working plane. The effect is to decrease still further the rate of condensation within the old roof and the number of days of its occurrence during the year.

One saw-tooth weaving shed is now twenty-three years old, and during the past ten years considerable portions of the roof have been replaced. For humidity, during approximately the first twenty years it depended upon the admission of moist basement air through belt holes in the floor at each individual loom, the basement being traversed by a canal and containing more or less standing water. Recently mechanical humidifiers were installed with the intention of maintaining a more constant relative humidity (approximately 75 per cent.) than was before possible. The humidifier installation probably has accelerated roof decay somewhat, but on the other hand, the basement may now be properly ventilated, and the present ravages of decay in floor plank, beams, and columns prevented, or at least materially retarded.

Sixty per cent. of the roof plank was so rotted as to need renewal. Two per cent. of the 6in. by 12in. yellow-pine rafters, and 25 per cent. of the 11in. by 14in. yellow-pine rafters, were replaced for the same reason.

How a Weaving-shed Roof was Saved.

The facts in this particular instance were briefly as follows: The insulation consisted of $\frac{7}{8}$in. square, edged, creosoted yellow-pine boarding nailed on $\frac{7}{8}$in. creosoted furring pieces, resulting in a $\frac{7}{8}$in. air space between the old roof and the new boards. The timber was treated on the spot by the hot-dip process, being unloaded direct to a storage pile within 40ft. of the creosoting tank, which was of steel, 20ft. long, 7ft. wide, and 5ft. deep, and had ample capacity for 3,000ft. of timber used daily.

Boards were stuck with 6ft. pieces every six boards, and were divided into two sections for a given charge, each section fastened with a cable sling. An A-frame derrick made of two 50ft. telegraph poles was used for lifting the sections into the tank. It also served in removing batches from the tank and hoisting them to the weaving-shed roof. Heavy timbers were used to ballast the lumber being treated, and these were taken to and from the tank on a carriage moving on rollers, and were lifted from it by the derrick. A batch, after being lifted out of the hot creosote, was held over the tank and allowed to drain for three or four minutes. It was then hoisted to the roof, after which practically no more dripping occurred; the partial vacuum set up by the air and steam in the wood cells, cooling, contracting, and therefore sucking in the excess surface oil.

The creosote oil used was supplied in a tank truck placed on a siding some 300ft. from, and considerably above, the creosoting tank, thus allowing a gravity flow in the pipe line connecting the two. Make-up oil was added each time a batch was removed, except that toward the end of the creosoting process, after all the oil has been placed in the tank, the amount of timber per batch had to be gradually reduced. During treatment the oil was kept at a temperature of about 230° F. by means of high-pressure steam coils having a total heating surface of 270 sq. ft. placed in the bottom of the tank.

The use of wet or unseasoned wood was apparently not detrimental, except for the fact that a longer treatment was necessary in order to ensure thorough penetration by first boiling out the entrained water.

The creosote oil used had a specific gravity at 59° F. of at least 1.08, and gave when distilled no distillate below 392° F., not more than 1 per cent. below 410° F., and not more than 10 per cent. below 455° F. The penetration was quite thorough, the amount of oil used averaging 9.4lb. per cu. ft. for a 20-hour treatment.

Where planks were rotted at bearings, but fairly sound elsewhere, new bearing strips were spiked to each side of the rafter for necessary support.

It sounds easy for an engineer or chemist to prescribe a wholesale scrapping of a wooden roof, but the owner as a rule has economic considerations at stake which do not readily permit him to put any of his plant or buildings on the scrap heap. The only satisfactory solution of the problem is a thorough study of each individual case, which must be dealt with strictly on its merits.

PHYSICAL CHEMISTRY OF INTERFACES.*

THE REMARKABLE PROPERTIES OF SURFACE LAYERS.

In recent years a great deal of attention has been paid by chemists, physicists, and physiologists to the phenomena which occur at the surfaces or interfaces which separate different sorts of matter in bulk. During the last quarter of the nineteenth century both J. Willard Gibbs and J. J. Thomson had shown clearly, though in different ways, the peculiar nature of these interfacial or transitional layers. It was evident that things could happen in these regions which did not occur in the more homogeneous and uniform regions well inside the volume of matter in bulk. Such happenings might, if they could be investigated, reveal molecular or atomic peculiarities which would be undetectable in the jostling throng of individuals inside. A surface or surface layer represents a sort of thin cross-section which can be probed and examined much more readily than any part of the inside bulk. It is indeed only within comparatively recent years that the X-rays have provided a sufficiently fine probe for examining this bulk in the case of crystalline matter.

The living organisms of plants and animals are full of surfaces and membranes. What can happen at surfaces is therefore a matter of great importance for the science of living things. We are bound to hold as long as possible to the assumption that the physico-chemical manifestations of life can be explained in terms of the potentialities of action inherent in electrons, atoms, and molecules. The modes of action of ordered arrays and marshallings of atoms and molecules are of extreme interest, since such modes of action will constitute phenomena non-existent in a disordered multitude of the same atoms and molecules with exactly the same individual powers and potentialities.

"Special Orientation" in Surface Layers.

An essential characteristic of this ordering or arraying may consist in *special orientation*. In the chemical and physical actions occurring in a volume of liquid whose bulk is large compared with its surface, the molecules or atoms probably move towards each other with every sort of orientation, no special type being privileged or distinguished. Should, however, some special orientation be characteristic of interfaces, then it is clear that such interfaces will exhibit new phenomena due to this special sort of arraying.

Dr. W. B. Hardy has been the chief pioneer in the development of these newer theories, having been led thereto by his researches on surface tension, surface films, composite liquid surfaces, and static friction and lubrication.

Unimolecular Oil Films on Water.

This question of the orientation of molecules at the surfaces of liquids has been greatly extended in recent years by a detailed study of the extremely thin and invisible films formed by the primary spreading of oily substances on the surface of water. The late Lord Rayleigh showed many years ago that when olive oil forms one of these invisible films on water, there is no fall in surface tension until the surface concentration reaches a certain very small value. He made the highly interesting and important suggestion that this concentration marks the point where there is formed a continuous layer just one molecule thick. In the case of olive oil, he found this critical thickness to be 10^{-7} cm., and concluded that this number represented the order of magnitude of the diameter of a molecule of the oil. Increase in surface concentration beyond this point causes the surface tension to fall, until a second point is reached, after which no further fall in surface tension occurs. Lord Rayleigh assumed that at the second point a layer two molecules thick is formed. This pioneer work of Lord Rayleigh was repeated and extended by H. Devaux and A. Marcelin, who showed

* Abstract of Presidential Address by Professor F. G. Donnan to the Chemistry Section of the British Association.

the correctness of his first suggestion—namely, that the primary film consists of a *unimolecular layer*. It appears, however, that the fall in surface tension, which he ascribed to the building-up of a bimolecular layer, must be ascribed to the closer packing of the molecules of the unimolecular layer, and that the second point occurs when these molecules are packed as tightly as possible.

Langmuir reasoned that the formation of these primary unimolecular films must be due to the presence of active groups in the molecules, which are attracted inwards towards the water, and thus cause the long open chain molecules of the fatty acids to be oriented on the water surface with their long hydrocarbon axes vertical and side by side.

These regularly oriented and unimolecular surface films on water have been recently investigated in a very detailed and careful manner by N. K. Adam, who has improved the method employed by Devaux and Langmuir. His results provide an ample confirmation of the theory of unimolecular films of juxtaposed and oriented molecules. If we calculate the average distance between two carbon atoms for the four acids, we obtain the following results:—

	Distance (cms.) $\times 10^{8}$.
Myristic acid	1.6
Pentadecylic acid	1.6
Stearic acid	1.5
Behenic acid	1.5

Distance Between Carbon Atoms in Organic Compounds.

These values do not deviate much from the value for the distance between the carbon atom centres in the diamond (1.52×10^{-8} cm.). Concerning this point some very interesting results have been recently obtained in Sir William Bragg's laboratory by Dr. A. Müller. In these experiments layers of crystallised fatty acids on glass plates have been examined by an X-ray photographic method. From these results it appears that the unit cell is a long prism, the cross-section of which remains constant for the substances investigated, whilst the length of the prism increases linearly with the number of carbon atoms in the molecule. The increase in length of the unit prism per carbon atom in the molecule is found to be 2.0×10^{-8} cm. Since it appears likely that there are *two* molecules arranged along the long axis of each unit cell (prism), it would follow that the increase in the length of the molecule per carbon atom added is 1.0×10^{-8} cm. Comparing this result with the value for the distance between the carbon centres in the diamond lattice, it would appear that the carbon atoms in the long hydrocarbon chains of the higher saturated fatty acids are arranged in a zig-zag, or more probably in a spiral or helix. If this be the case, the closer packing or compression of the juxtaposed molecules in the unimolecular films, as revealed in the investigations of Devaux, Langmuir, and Adam, may be to some extent explained by the straightening out of these zig-zags, or perhaps by the "elastic compression" of the helices.

Condensation of Vapours on Liquids or Solids.

As pointed out by Langmuir, the question of the formation of unimolecular surface films can be attacked in a different manner. It is known that gases or vapours can be condensed or adsorbed by solid and liquid surfaces. The question then arises, does the formation of primary unimolecular films ever occur in such cases? Langmuir has measured the adsorption of a number of gases at low temperatures and pressures on measured surfaces of mica and glass, and has arrived at the conclusion that the maximum quantities adsorbed are always somewhat less than the amounts to be expected in a unimolecular surface layer. E. K. Carver, who has measured the adsorption of toluene vapour on known glass surfaces, has arrived at a similar conclusion. The view that the *maximum* adsorption from the gas phase cannot exceed a unimolecular layer has, however, been much criticised.

Gibbs, and later J. J. Thomson, have shown that if a dissolved substance (in relatively dilute solution) lowers the surface tension, it will concentrate at the surface. That such a phenomenon actually occurs has been qualitatively demonstrated in the experiments of D. H. Hall, J. von Zawidski, and F. B. Kenrick and C. Benson, by the analysis of foams and froths. In 1908 S. R. Milner used the same method in the case of aqueous solutions of sodium oleate, and arrived at a mean value of 1.2×10^{-10} gram. mols. excess concentration per sq. cm. of surface.

It is highly probable that the molecules which are concentrated in the surface from the state of solution in the liquid phase are not in quite the same situation as the molecules of practically insoluble substances which are placed *on* the surface. In the former case the molecules are still "dissolved," so that they will be more subject to thermal agitation and less able to form a juxtaposed unimolecular layer. They may also be "hydrated." Nevertheless, the agreement as regards order of magnitude in the values of the surface area per molecule in the two types of case is certainly very suggestive and significant.

Electrical Potential Differences in Surface Layers.

Another very interesting phenomenon relates to the surfaces of liquids and solutions—namely, the existence of an electrical potential gradient or potential difference in the surface layer. These interfacial potential differences are of great importance, and play a fundamental rôle in determining the stability or instability of many colloidal states of matter. The liquid-gas interface offers the simplest case of such interfaces, and so the investigation of the potential differences which may exist at this interface is a matter of fundamental interest.

If air be violently churned up with water, only comparatively large bubbles are produced, and these quickly rise to the surface and burst. If now a very small quantity of a substance which concentrates at the air-water interface be added, an almost milk-white "air emulsion" of small bubbles is produced, which rise to the surface and produce a relatively durable froth. These phenomena were discussed by the late Lord Rayleigh in a very interesting Royal Institution lecture on "Foam." It is clear that the diminution in interfacial tension facilitates the sub-division or dispersal of the air. The existence of the surface layer will also confer a certain amount of stability on the resultant froth, since it will give rise to forces which resist the thinning of a bubble wall. Any sudden increase in the surface will produce a momentary diminution in the concentration or "thickness" of the surface layer, and hence a rise in surface tension, which will persist until the normal thickness or concentration is readjusted by diffusion of molecules from the inside volume—a process which in very dilute solution will occupy a perceptible time. It is probable, however, that the explanation of the stability of very durable forms —as, for example, those produced by the sea at the sea coast, by beer and stout, by aqueous solutions of soap or saponin, etc.—is often more complex, and that we must seek it in the formation of very viscous or semi-rigid or gel-like membranes at the interface.

The Stability of Emulsions.

Many years ago it was shown by Gad and by Quincke that a fatty oil (such as olive oil) is very readily dispersed in the form of an emulsion by a dilute solution of caustic soda. Some experiments which I once made showed that a neutral hydrocarbon oil could be similarly emulsified in a dilute aqueous solution of alkali if one of the higher fatty acids was dissolved in it, whilst the lower fatty acids do not produce a similar action. It was shown that the action runs parallel to the lowering of interfacial tension, and must be ascribed to the formation of a soap, which lowers the interfacial tension and concentrates at the interface.

We have seen that in the case of the air-water surface there exists an electrical separation or potential difference in the surface layer, and that certain substances can produce pronounced variations, or even reversals in sign, of this electrical double layer. It becomes a matter, therefore, of great interest to inquire whether similar phenomena occur at the interface between two immiscible liquids, and, if so, to ascertain whether such electrical charges or double layers bear any relation to the "stability" of pure emulsions, or fine dispersions of one liquid in another. It is well known that those disperse or finely heterogeneous states of matter known as colloidal solutions depend in part for their stability on the existence of such electrical potential differences. We might expect, therefore, that an investigation of these emulsion systems would throw some light on the general theory of what are called "suspensoid" or "lyophobic" colloidal states. Investigations with these objects in view were carried out some years ago in my laboratory by R. Ellis and F. Powis. The method employed was to measure directly by means of a microscope the motion of minute globules (sus-

pended in water) under the influence of a known electric field.

The Critical Potential Zone.

Perhaps the most remarkable result which has emerged from these investigations is the relation between the stability of the emulsion and the potential difference of the interfacial double layer. The minute oil globules are in constant Brownian motion and must frequently collide. Why do the forces of cohesion not produce agglomeration or coalescence (coagulation or clearing of the emulsion)? We should expect that under determinate conditions a certain fraction of these collisions would give rise to coherence. Is there any other factor besides orientation of path and kinetic energy which affects the probability of coherence following an encounter? The answer to the question is that the third factor is the potential difference or electric density of the interfacial double layer. Under definite conditions there exist, therefore, what we may, speaking broadly, call a *critical potential* and a *critical potential zone*. When the P.D. is outside this zone the emulsion is comparatively very "stable." Very small concentrations of electrolytes, which, as we have seen, increase the P.D., increase this stability. As soon as the concentration of any electrolyte is sufficient to bring the P.D. into the critical zone, the stability of the emulsion undergoes a sudden and very marked decrease, and relatively rapid coagulation occurs. Here we see a very striking analogue and explanation of the phenomena observed by Joly in studying the effect of aluminium salts on the sedimentation of clays, and of the numerous examples of the so-called "irregular series" observed in the flocculation of suspensoid hydrosols by salts with polyvalent cations.

New Light on Colloidal Phenomena.

As Linder and Picton showed, when two suspensoid hydrosols, one negative and the other positive, are mixed, then, depending on the ratio, a stable hydrosol (either positive or negative) can be obtained. In continuation of this work, W. Biltz demonstrated the existence in such cases of a "zone of coagulation"—*i.e.*, a zone of concentration ratios leading to coagulation. A study of the mutual behaviour of a negative oil emulsion and the positively charged ferric oxide hydrosol provides a complete explanation of this curious phenomenon. When increasing amounts of the iron oxide hydrosol are added to the oil emulsion it is found that the interfacial P.D. falls to zero, and then reverses its sign, becoming increasingly positive—an action which is due to the adsorption of the positively charged micelles at the oil-water interface. When the P.D. is above a certain value (positive or negative) the system is stable. But within the critical zone a rapid and relatively complete mutual coagulation takes place

These studies of oil emulsions (and of the glass-water interface), by means of the micro-cataphoresis method, have thrown a great deal of light on many previously ill-understood points in the theory of colloids. If, for example, the P.D. between the particles of a suspensoid hydrosol and the aqueous fluid are not above the critical potential, coagulation will occur. But very small concentrations of certain electrolytes can raise the P.D. and stabilise the hydrosol. This is the explanation of the well-known "peptising" action. The fundamental fact is that under given conditions the rate of coagulation of the particles of an oil suspension or of a lyophobic hydrosol undergoes a relatively sudden and very great increase when the interfacial P.D. falls below a certain finite value (positive or negative).

In discussing the "stabilities" of hydrocarbon oil emulsions, it must not be forgotten that I was dealing with very dilute *suspensions* of oil in water, produced by mechanical agitation without the addition of any "emulsifier." I pointed out that in the emulsification of oils in water by means of soap, the soap lowers the interfacial tension and concentrates at the interface. When we wish to produce oil emulsions in the ordinary sense of the term we must use some such emulsifying agent, and for this purpose many substances are employed, such as soap, gum acacia, gelatine, casein, starch, etc., etc. All these substances concentrate or condense on the surfaces of the oil globules. If we may regard these surface films as very mobile from the molecular-kinetic point of view, it is clear that they will confer an increased degree of stability on the emulsion. It is probable, however, that the stability of the emulsion is in many cases due to the fact that the surface films possess a very viscous, quasi-rigid, or gel-like character, so that a more mechanical explanation is necessary.

Altering the Surface Properties of Solids.

Sir George Beilby has shown that when the surface of crystalline matter is subjected to shearing stress there is produced a surface layer of a vitreous or amorphous character—a "flowed" surface—in which the particular ordered arrangement of the molecules or atoms which is characteristic of the crystalline matter largely disappears. Working at University College, London, Dr. Travers and Mr. R. C. Ray have recently obtained a very interesting confirmation of the "Beilby Effect." The heats of solution in kilogramme calories per grm. mol.) of vitreous silica and silver sand (silica as crystalline quartz) in aqueous hydrofluoric acid were found to be 37.24 and 30.29 respectively. After grinding for fifteen hours the corresponding values were 36.95 and 32.46 respectively. If we assume that the internal energy of the amorphous phase produced by grinding is the same as that of the vitreous silica (silica glass), we can calculate from these results that about 31 per cent. of the crystalline silica has been converted by grinding into "amorphous" silica. The densities of silica glass and silver sand were found to be 2.208 and 2.638 respectively. After fifteen hours' grinding the density of the latter was lowered to 2.528. On the same assumption as before, it follows that about 26 per cent. of the quartz has been converted into the vitreous condition. The difference between the figures 31 and 26 is doubtless due to the approximate character of the assumption underlying the calculations and to experimental errors. There seems little doubt, however, about the soundness of the main conclusion—namely, that the mechanical action of shearing stress on crystalline matter is to produce a random molecular or atomic distribution in the surface layers.

General Conclusions.

This discussion, necessarily brief and limited, of certain aspects of the properties of surfaces—molecular orientation, surface concentration or adsorption, electrical or ionic polarisation—has dealt very largely with states of thermodynamic equilibrium. The chief interest of such studies has always appeared to me to lie in their possible ultimate bearing on the phenomena of life. We must remember, however, that the activities, and indeed the very existence, of a living organism depend on its continuous utilisation of an environment that is not in thermodynamic equilibrium. A living organism is a consumer and transformer of external free energy, and environmental equilibrium means non-activity and eventual death. It is probable, therefore, that along and across "living surfaces" there is a continual flux of activity. Does the very existence of these surfaces depend on some special sort of activity? Questions such as these must make us cautious as regards any premature generalisation from simple physico-chemical results. But there is encouragement if we may assume that the physico-chemical manifestations of life are functions of the same powers and potentialities of electrons, atoms, ions, and molecules that we find in what we call inanimate environments. Life would then be simply a new functional relationship of very old parameters, at all events in so far as its various physico-chemical "mechanisms" are concerned.

French Dyestuffs Production. — According to the recently-published annual report of the "Union des Producteurs et des Consommateurs pour le Développement de l'Industrie des Matieres Colorantes in France," the total French dyestuffs production in 1922 was 8,065 tons, as against 5,842 tons in 1921 and 7,356 tons in 1920. If indigo and sulphur colours are left out of account, the 1922 production shows a figure of 4,978 tons, as against 2,407 tons in 1921 and 2,508 tons in 1920. The imports of reparation dyes into France from Germany were 765 tons in 1922 as against 330 tons in 1921 and 3,200 tons in 1920. Ordinary purchases of colour from Germany in 1922 totalled only 5 tons. In 1922 France imported 935 tons of colour from Switzerland (as against 629 tons in 1921). Total imports, excluding German imports, were 1,797 tons as compared with 1,134 tons in 1921.

THE BRITISH ASSOCIATION.

PROCEEDINGS OF THE CHEMISTRY SECTION.

ON Thursday, September 13, Section A (Mathematical and Physical Science), Section B (Chemistry), and Section G (Engineering), met for a general discussion on Cohesion and Molecular Forces.

DISCUSSION ON COHESION AND MOLECULAR FORCES.

Sir William Bragg, F.R.S., who opened the discussion, said that in the early days we had been compelled to deal with forces of cohesion in the aggregate. Now it was essential to get down and know the nature and effect of cohesion as between atoms and molecules themselves. We must think of molecule acting upon molecule and building up just in the same way as a girder structure was built up. The trouble in the past had been that we had thought too much in the direction of aggregates.

Dr. W. Rosenhain, F.R.S., said that cohesion phenomena were much more strongly marked in metals than organic salts or several of the inorganic salts. The closeness with which atoms approached each other had an enormous influence upon the behaviour of metals in subsequent working, and therefore it was essential to know the conditions which permitted of the atoms bonding themselves together more closely or less closely. He put forward the suggestion that the forces applied at the crystal boundary are greater than in the crystal itself, since in the boundary, the arrangement of the atoms was more dense than in the crystals themselves. It was not surprising therefore that the diffusion of gases and solids in the case of metals took place along the crystal boundaries.

Dr. A. A. Griffith said that the branch of engineering which was most intimately concerned with the phenomena under discussion, was the science of elasticity and strength of materials. Whilst the majority of structural materials were ductile and the primary failure did not involve atomic separation but just a failure in shear, nevertheless, in the case of certain materials, such as glass, stone, and hard steel, which exhibited brittle fractures running perpendicularly to the direction of greatest tensile stress, the shearing type of failure did not occur at all. A large discrepancy apparently existed, inasmuch as the tensile strengths were only a small fraction of the molecular tenacity. The problem which awaited solution might be put in the following terms: If a metallic crystal be subjected to a shear strain, what is the greatest possible elastic strain and, in the case of greater strains, by what changes in atomic configuration and orientation does the crystal adjust itself to the new conditions? Further, what is the state of stress in the crystal after the completion of the process of adjustment? Work was being done at Farnborough which might throw light upon these problems.

Sir Oliver Lodge, F.R.S., suggested that it was rather remarkable at this time in the history of science three sections of the B.A., should be asking the question why, when one picked up one end of a stick, the other end came up also. Electrical attraction was the force which must exist, although there was also Armstrong's theory of residual chemical affinity, but it did seem to him that electrical attraction must play a part. Indeed, if the atom was constructed as Dr. Langmuir wished it to be, electrical attraction was the only force. If, on the other hand, the atom was constructed as Bohr wished it to be, then other forces must come into play. Because the electrons were revolving, there must also be magnetic force.

Professor R. W. Wood asked for an explanation of a phenomenon first discovered by the Japanese, and since confirmed by himself, that if a plate of rock salt is placed in hot water at a certain temperature, it is possible to bend it to a certain angle, whereas when placed in oil at the same temperature it would not bend. It always puzzled him to know how this happened, and there was the further phenomenon that the plate so bent was permanently bent.

THE FORMATION OF PRECIPITATES.

Professor Sven Oden followed with a paper on this subject, which he had to hurry through owing to lack of time. He said that whilst precipitation is one of the oldest known problems to the chemist, very little was known of what happens. More detailed and definite mathematical knowledge was required.

The formation of precipitates may be summarised as consisting of the following stages.—

(1) The formation of nuclei consisting of addition of ions and molecules until the more stable unit-cell is completed.

(2) The growth of these nuclei or unit-cells which takes place more rapidly.

(3) The aggregation of the prime particles to secondary aggregates is analogous to the coagulation of colloids, and may be summarised as follows:—(*a*) With decreasing charge of the particles there will come a critical point when the prime-particles will aggregate. (*b*) Passing below this charge, there will be a greater number of particles in the aggregate, the smaller the charge of the individual particles, thus tending to form aggregates of unlimited size with zero-charge of the particles. (*c*) In the reversible aggregate there is no amalgamation of the individual particles and probably no equalisation of the charge on the particles. (*d*) The time for complete formation of these aggregates is great compared with the formation of nuclei and their growth, and inversely proportional to the number of prime-particles per c.c., if the electrolytes are present in the same amount, but decreasing rapidly with increasing concentration of the electrolytes, and in most cases being less than one minute.

(4) The fourth stage consists of the formation of irreversible aggregates of the prime-particles either, (*a*) of a definite structure—*e.g.*, snowflakes, skeletons, crystallites; (*b*) spherolites; and (*c*) irregular shape, assumed under pressure or external influences.

(5) The fifth and last stage is the growing of bigger crystals at the cost of smaller ones. Conditions are not only a difference in solubility with size, but also a variation in size. The more prominent the latter the more rapidly this recrystallisation or "ripening" takes place.

THE RESIN-CONTENT OF HEVEA RUBBER.

Professor G. S. Whitby, in a paper on the subject was also compelled to give only an outline of the work he has been doing, and neither in his case nor that of Professor Sven Oden was there time for discussion, although in both instances the attendance was considerable.

The resin of raw rubber, which constitutes about 3 per cent. of the material, has been found to contain liquid unsaturated acids, a new solid fatty acid (Heveic acid), a phytosterol glucoside, a phytosterol ester, a free phytosterol, quebrachitol, and *d*-valine. The acids have a marked influence on the vulcanisation of rubber in the presence of catalysts. The introduction into the rubber of strong bases has a striking effect in increasing the rate of vulcanisation with catalysts and in enhancing the tensile strength of the product. This effect is not due merely or mainly to the elimination by neutralisation, of the retarding influence of acids, but is due largely to the dispersing action on the caoutchouc of the soaps produced. The total resin-acid-content of different samples of raw rubber varies greatly. Such variation is probably an important factor in the vulcanisation of rubber samples. The ability of the resin constituents and of certain related substances to act as emulsifying agents, and that of a wide range of organic substances to swell rubber have been studied.

THE QUANTUM THEORY IN CHEMISTRY.

On Friday, September 14, following the Presidential Address by Professor J. G. Donnan, F.R.S. (see page 332), was an important theoretical paper by Professor G. N. Lewis on "The Quantum Theory in Chemistry." We will not enter into the detailed discussion in the paper, but merely indicate the broad outlines of Professor Lewis' ideas. He stated that the quantum theory leads us to suspect, not that geometry is untrue but that it is inapplicable to the problems of physical science; that any branch of mathematics based on the idea of extension or of continuous flux leads to inadequate physical predictions. There were many facts which were forcing us towards a theory of discontinuity in natural phenomena, and we were compelled to examine these facts whether we liked them or not. There were very strong intimations that our former ideas of space—even the beautifully developed theory of relativity—will prove incompetent to deal with the strange phenomena that are brought to light by the study of the individual atom. Just what substitution must be made for the continuous space of geometry it was too early to predict, nevertheless, it seemed probable that however far-reaching might be the philosophic implications of a discontinuous space, such ideas could be incorporated without much difficulty into physics and chemistry.

In the afternoon of Friday, September 14, a paper on "The Activation of Hydrogen in Organic Compounds," was read by Miss Edith H. Usherwood.

ACTIVATION OF HYDROGEN IN ORGANIC COMPOUNDS.

As a result of recent work on heavily-substituted derivatives of ethane, the idea has become familiar that the strength of the carbon-carbon bond can be so diminished that there is a progressive tendency towards dissociation in solution into two radicles. A similar phenomenon can also be noticed in the case of carbon-halogen compounds. Thus, while the bond in methyl iodide is comparatively stable, it has been found by Walden that tertiary butyl iodide is ionised in sulphur dioxide solution. There is no doubt that a similar variation exists in the strength of the carbon-hydrogen bond, and although the weakening of the bond only proceeds in rare instances to such a degree that electrolytic dissociation occurs in solution, nevertheless Miss Usherwood endeavoured to show that such variability as does occur is one of the main factors which govern the occurrence and reversibility of a great variety of apparently unrelated organic reactions, and, furthermore, is consequent upon certain well defined structural conditions.

It was evident, the paper pointed out, that there is a remarkable parallelism between the property of organic compounds of forming metallic derivatives and capacity for tautomerism, and it was probably true to say that all substances which are capable of yielding metallic derivatives and which, in addition, contain an appropriately situated double or triple bond, are actively tautomeric under experimental conditions. Capacity for alkylation is yet another important criterion of the presence of activated hydrogen. The power of a substance to act as an addendum towards an unsaturated compound, affords yet another means of recognising hydrogen in its activated condition, for the characteristic feature of additive reactions of this type is the separation of the activated hydrogen atom from the residue to which it was previously attached.

Two main classes of compounds containing an activated hydrogen atom were considered:—(*a*) compounds in which hydrogen is attached to the electro-negative atoms of oxygen, sulphur or nitrogen; and (*b*) compounds in which hydrogen is attached to carbon. As regards (*a*) it was pointed out that hydrogen attached to oxygen, sulphur or nitrogen is always activated, although the degree of mobility depends, naturally, on the configuration of the rest of the molecule. In cases in which nitrogen is attached to two hydrogen atoms, only one of these is in the activated condition, but if this becomes replaced by the alkyl group, then the other hydrogen atom becomes activated in turn. In the case of (*b*), hydrogen attached to carbon may or may not be mobile, and it is admitted that the circumstances necessary and sufficient to secure activation are by no means simple. The usefulness of these views was illustrated by reference to certain phenomena predicted from theory and experimentally verified by the author during the past few months—*e.g.*, the formation of rings with the aid of the nitroso group; and the reversibility of the aldol reaction.

DISCUSSION ON ENZYMES.

On Monday, September 17, a discussion on enzymes was opened by Dr. E. F. Armstrong, F.R.S., who said that the study of enzyme action now resolved itself very largely into the study of surface effects, and he ventured to predict that the study of surface effects would be one of the most important tasks of the chemist during the next few years.

Recent knowledge of enzymes had taught us that they belong to the class of colloids. The reactions brought about by enzymes were largely hydrolytic—*i.e.*, they concerned active hydrolysis—if water was split off into HO-H, alternatively, they involved oxidation and reduction, which were only two phases of the same thing. In this latter case, water was split off into H_2-O, so that the study of enzyme action was virtually a study of changes of water. It used to be considered that in the opalescent liquid obtained by filtering dry ruptured yeast cells the enzyme was truly in solution, but he believed to-day the view was that we are really dealing with a colloid gel.

The next stage in the investigation of the enzyme was the manner in which enzymes act as judged from the point of view of the rate of their activity. As a matter of fact, very nearly half the experiments with regard to enzyme action did not measure the rate of activity of the enzyme at all. They measured something quite different; in many cases, the rate of accumulation of dirty impurities in the solution. In other words, it was the rate of the destruction of the enzyme and not the rate of the action of the enzyme, but it could be taken that when the conditions were ideal the rate of the action of enzymes was such that it could be expressed graphically, time against action, by a straight line.

Precautions Essential in Working with Enzymes.

Enzymes, as active catalysts, were extraordinarily sensitive to outside influences. A trace of alkali in particular, and acids to a less extent, affected very considerably their activity. It was practically essential therefore that all work on them should be carried out in hard glass beakers and flasks, and that solutions should be kept in hard glass bottles, and that pipettes and burettes should be of hard glass. Neglect of these precautions had led to many of the anomalous and complicated results to be found in the literature. If we regarded enzymes as colloids, then every possible means must be taken to keep the surface clean. If the surface were allowed to become attacked by acids or alcohols, the surface would be harmed in some way. If the surface were allowed to become smeared with albuminous matter, mucilages, etc., similar results would follow.

The Anomalous Results of Attempted Purification.

Referring again to the yeast extract, Dr. Armstrong said that the best way to make a very strong enzyme from yeast was to put some ordinary brewer's yeast in a bottle with a little toluene on the top, and place it in an incubator at 36° C., for a week or more. The result would be a dark-brown liquor which, after filtering, was a thick opalescent liquor, although a very dark solution. By the cautious addition of alcohol, this could be precipitated into a brownish whitish slime, a sort of colloidal substance which, after washing with alcohol, could be quickly redissolved in water. This gave a much cleaner solution, highly active and hydrolysing. If that process were repeated with care a dozen or more times, they would get less and less material and the activity increased. They would then find, as the purification was carried farther and farther, that the reaction with sugar grows fainter; the reaction with amino acids and protein bodies would grow fainter and, in fact, nearly all the reactions would grow fainter.

Does an Enzyme Really Exist?

The only conclusion to be drawn from work of that kind was that it was impossible to purify the enzyme because there was no such thing as an enzyme in the sense that there was, say, a molecule of cellulose. It seemed to him that it was highly improbable that there is such a thing as an enzyme and that what one really deals with is a big colloid surface, one part of which contains a certain grouping which, under the proper physical conditions, is able to act as a catalyst.

What chemists wanted to know was what particular groupings existed for each specific enzyme action. All we know at the moment is that there is some definite relation between the activity of the enzyme and the substance on which it acts. Fischer suggested the analogy of the lock and key to show how to fit an enzyme on sugar, and that idea had been in the minds of most experimenters ever since. This analogy was rather an unfortunate one from our present-day point of view because it did not correlate itself with the ideas of surface action at all.

He would now like to dwell upon the nature of the first phase of the reaction, between the substance attacked and the enzyme. There were two rival theories at the moment, but the only difference was the view in the one case that the forces were chemical, and in the other case that they were physical. It was not possible to offer proof of the formation of complexes in the case of enzymes, but it was possible to offer it in the case of other catalysts, and particularly nickel, in which case there was convincing proof that such a complex was formed. It would look as if the formation of this complex was necessary for the formation of an electro-chemical circuit where the energy was started by radiations or by the ultra-violet light, on which Professor Baly was working. If we once solved this problem, then we would have a very clear idea of the manner in which changes are brought about in the living organism.

Professor F. C. C. Baly said he thought it possible to found an explanation, on the quantum energy theory, of the supply of energy by means of a catalyst to the substance which has been catalysed, which he would call a "catalyte," for want of a better word. There was the possibility that the complex is stabilised by a definite transference of energy from one component to the other, and then such a complex could not be resolved back again into its components, until or unless the energy goes back again from one component to the other. Some experimental work which he had carried out by means of spectroscopic examination pointed to the truth of this view.

A Problem in the Chlorination of Toluol.

Professor H. E. Fierz said that in the course of work he had been carrying out at Zurich he had been astonished to find that ultra-violet rays had no effect at all in the chlorination of toluene. He had not been able to come to a conclusion with regard to this, but it would be interesting to know whether Professor Baly had ever absorbed completely the heat waves. It was quite possible that if the heat waves were taken away and there was absolutely cold ultra-violet light, there might be no reaction.

Professor Baly, in reply, said he would like to know, in the first place, whether the wave length of the light used in the ultra-violet agreed with the absorption band of toluene in the ultra-violet. Professor Fierz said it did. Professor Baly said that if the energy was absorbed at the ultra-violet absorption band of toluene, instead of one quantum being absorbed, about 25 times the quantum was absorbed, and the result of the absorption of that energy was quite different from the changes produced with one quantum. If 25 times the quantum were used, the toluene would be in such a condition that it would not react with chlorine. There was a definite condition for each particular reaction, and for each specific reaction there must be the corresponding condition. The energy might be one, two, three, four or more quanta, and this might explain the difficulty encountered by Dr. Fierz.

A paper entitled " Catalytic Actions in the System Copper, Copper-Oxide, Oxygen, and Gaseous Reducing Agent," was then read by Mr. W. G. Palmer.

THE SULPHONATION AND NITRATION OF NAPHTHALENE.

Reviewing the voluminous literature, Professor H. E. Fierz, who read a paper on this subject on Tuesday, said one felt that the data which have been published since 1819 are lacking in system, and, moreover, are often contradictory. The technical man, who had to deal with this subject, knew that our knowledge was not very deep, and that as soon as he was compelled to proceed to manufacture any of the compounds which were so well and simply described, he was at a loss how to work and how to distinguish the many isomers encountered during the technical process.

Inaccuracies in Literature on the Subject.

The most valuable work ever done on the field of the chemistry of naphthalene was certainly that by Armstrong and Wynne, who established the law that by the interaction of naphthalene and sulphuric acid there were never obtained derivatives containing sulphonic groups in ortho-para or peri-position. This law held good in every case which had been carefully examined, and statements contrary to this law had been found to be incorrect and devoid of foundation.

Armstrong and Wynne did not state clearly whether they obesrved that on treating naphthalene with fuming sulphuric acid, derivatives were obtained containing two sulphonic groups in one benzene nucleus; but his (Dr. Fierz) work led him to the belief that the substitution of naphthalene with two sulphonic groups invariably gave disulphonic acids containing an acid group in each of the two fused benzene nuclei, and never both in the same one. This fact had always been tacitly accepted, but Dr. Fierz had found that in this field it was never safe to accept anything unless it was positively proved; and although this observation seemed at the first glance of no importance, it had, nevertheless, hindered the chemist getting a clear view of a field which was of great importance in connection with synthetic dyestuffs, in particular the azo colours.

The method of investigation adopted by Dr. Fierz consisted in preparing the pure free acids by decomposing the barium salts with the calculated amount of sulphuric acid. In most cases it was found that the free sulphonic acids in the naphthalene series were most beautifully crystallised substances which were non-deliquescent, and which were contrary to the statements found in the scientific literature, very easily prepared.

The facts elucidated by Dr. Fierz can be stated shortly as follows:—

Naphthalene Monosulphonic Acids.

At temperatures below 40° C. with a quantity of sulphuric acid just sufficient to mono-sulphonate the naphthalene there is formed 96 per cent of α-acid and 4 per cent. of β-acid. The 2-acid is not to be regarded as a transformation product of the 1-acid, because by dissolving pure 1-acid in sulphuric acid at 40° C. transformation to 2-acid does not occur to any appreciable extent. At temperatures of 165° C. there is invariably obtained a mixture of 85 per cent. of 2-acid and 15 per cent. of 1-acid. This is to be regarded as an equilibrium mixture, and the proportion of 1- to 2-acid varies with the temperatures, but it is impossible to obtain pure 1-acid or pure 2-acid by simply altering the reaction conditions.

The Disulphonation of Naphthalene.

The disulphonation of naphthalene has been studied by Armstrong and Wynne, as well as by Ebert and Merz, who did not agree with regard to the quantitative aspect. It is very easy to show, however, that Armstrong and Wynne were very near the truth, although their work did not allow any control, but Dr. Fierz had found that some of their data are lacking in exactitude.

On treating pure naphthalene with sulphuric acid containing just enough anhydride (SO_3) to obtain disulphonic acids, the following isomers are reading established. At temperatures under 40° C. there is obtained a mixture containing 70 per cent. of 1.5-disulphonic acid, and about 25 per cent of 1.6- and probably a little 2.7-disulphonic acid. It is very easy to show that the amount of 1.5-disulphonic acid reaches 70 per cent., because its barium salt is practically insoluble in hot or cold water, and separates immediately on mixing the boiling solution of the sodium salts of the different isomers. This interesting barium salt contains one molecule of water of crystallisation, and not four, as Armstrong stated about 30 years ago.

At temperatures between 120° and 135° C. the 1.5-acid gradually disappears, and a new disulphonic acid makes its appearance. This new acid is the 2.7-naphthalene disulphonic acid. It is not very easy to separate the 1.6- and the 2.7-acids, because the solubility of their salts is so close. What is important to the techical chemist is the fact that not a trace of 2.6-acid can be detected.

Formation of the 2.6-Acid.

On raising the temperature to 140° C. the 2.6-acid makes its appearance, being readily identified by its barium salt, which is characterised similarly to the 1.5-salt by a surprisingly small solubility. The ease of identification of the 2.6-barium salt makes it very easy to show that a statement of Ebert and Merz found in every text-book for the past fifty years is devoid of foundation—namely, that at a temperature of 180° C. the 2.6-acid is the sole product. Personally, Dr. Fierz had not been able to find more than 30 per cent. of the 2.6-acid, but Professor André Wahl had obtained 33—35 per cent.

The 2.6-acid is further characterised by a calcium salt which loses its water of crystallisation at 100° C., changing into an anhydride which is practically insoluble. The same reaction can be effected simply by heating a solution of 2.6-acid in water in a closed vessel to about 130° C., when the anhydrous form separates quantitatively in a very pure state, the other isomers remaining in solution. This experiment shows that at a temperature of 165° C. there is always formed, in round numbers, a mixture of 24 per cent. 2.6-acid, 10 per cent. or more of 1.6-acid, and 65 per cent. or less of 2.7-acid. No other acid could be identified, and it is impossible to obtain one isomer as the sole product of the reaction. The amount of free SO_3 necessary to obtain quantitative disulphonation depends on the amount of concentrated sulphuric acid also present, and taking two parts of 100 per cent. sulphuric acid and one part of naphthalene, disulphonation proceeds quantitatively at 165° C. in the course of three hours.

Euves had shown that the 1-acid and the 2-acid are changed one into the other according to the temperature, and Dr. Fierz has found that exactly the same intramolecular change takes place in the case of the disulphonic acids. The change is observed when mixtures containing no 2.6-acid are heated above 140° C.; the reverse change is effected when mixtures containing 2.6-acid are heated at 120°.

The Trisulphonic Acids.

According to the Armstrong-Wynne rule, there can be formed three different trisulphonic acids of naphthalene, but only one of them is of great technical importance—viz., the 1.3.6-trisulphonic acid. Of the two other trisulphonic acids, both are transformed readily into the same tetra-acid —viz., the 1.3.5.7, or the 2.4.6.8-tetra-sulphonic acid.

Mono- and Dinitro-compounds.

The nitration of naphthalene gives rise to two isomers—viz., the 1- and the 2- nitronaphthalene. Unlike the acids, there is no change from one into the other, and the sole similarity between sulphonation and the nitration consists in the fact that in many cases nitration at higher temperature leads to the formation of more or less 2-isomers. The 2-nitro-compound is invariably distinguished by its greater solubility, and appears therefore in the mother liquors. As a rule, the nitro-compounds are not isolated, but are at once reduced to the corresponding amino-compounds. The best-known nitrosulphonic acids are the 1.5, the 1.8, the 1.6, the 1.4.8 and the 1.3.6.8 trisulphonic acid. But there our knowledge practically ends. Professor Fierz has been able to show that nitration never proceeds quantitatively and that as a rule 10-40 per cent. escapes nitration. The free nitrosulphonic acids are very strong acids.

Difficulties in Reduction to Amino Compounds.

The reduction of the different nitro-acids is a reaction which does not always proceed smoothly. The 1.5, 1.8, and the 1.4.8, and 1.3.6.8- amino-sulphonic acids are very readily obtained, but in other cases matters are not so simple. The yield, for instance, of the naphthylamine-disulphonic acid 1.3.8, never exceeds 43 per cent., in addition to 15 per cent. of the so-called Andresen acid (2.4.7-naphthylamine disulphonic acid). In the mother liquor there remains invariably about 42 per cent. of unknown acids which cannot be purified on a small scale. The same fact applies to the preparation of the important Cleve-acids, 1.6 and 1.7, both of which are only obtained in a very unsatisfactory yield, never exceeding 65 per cent. of the theoretical.

Dr. Fierz has investigated this particular case in detail, and has been able to show that three distinct factors determine the yield. Firstly, it is not possible to nitrate the mixture of 85 per cent. 2-acid and 15 per cent. 1-acid, quantitatively, but about 10 per cent. escapes nitration and on increasing the amount of nitric acid, dinitro-acids are formed. Secondly, the reduction of the Cleve-acids is very sensitive towards free acid; the hydroxylamine derivatives, which are formed as an intermediate product are only reduced with difficulty, readily changing at the same time to aminonaphthol-sulphonic acids which cause the rapid oxidation of the Cleve-acids obtained.

A Remarkable New Diazo Compound.

The mixture of the four different amino-naphthylamine sulphonic acids, together with the aminonaphthol and the unchanged β-acid, gives rise to a colloidal solution from which the amino-acids separate only very slowly, in spite of their great insolubility. Studying this reaction in detail, Dr. Fierz has come across a new and remarkable diazo- compound which has hitherto not been described. It was noticed that nitro-Cleve acid which had been re-crystallised several times, gave Cleve-acid of surprising purity and in yields reaching 97-100 per cent. of the theoretical. At the same time it was noted that the nitrating mixture always contained a nitro-naphthol sulphonic acid, the appearance of which could be explained. The nitration mixture on one occasion, gave all the characteristic reactions of a diazonium salt, and he had been able to show that this compound is formed from the unchanged 2- naphthalene sulphonic acid always present in the crude nitration mixture. On mixing 2-naphthalene sulphonic acid with sulphuric acid and nitrous acid– in the form of sodium nitrite—no reaction whatever takes place. Adding a trace of mercuric oxide or selenium, reaction sets in immediately. At first the solution becomes greenish and then it rapidly changes to dark brown-yellow. On diluting the mixture with ice, there is obtained a solution containing the new diazonium-salt. This reaction is new in the naphthalene series but well known in the anthraquinone series, and recalls the formation 1-diazo-4-oxyanthraquinone discovered by R. E. Schmidt. Dr. Fierz said he had been able to prepare a number of azo dyes from this compound, having shades varying from orange to blue red. Curiously enough, the other sulphonic acids seem not to give similar diazonium compounds.

Bauxite in Russia.—It is reported that large deposits of bauxite have been discovered in the province of Permsk as a result of explorations carried out under the leading of M. Tumanoff, and 160 tons are said to have already been produced. An application has now been made to the Supreme Council of National Economy for the allocation of funds to work the deposits.

BRITISH OVERSEAS CHEMICAL TRADE.

AUGUST IMPORTS AND EXPORTS.

THE Board of Trade returns, so far as they relate to the chemical trade make very gloomy reading. Compared with the previous month the import trade in chemicals has increased by over 60 per cent., while exports are lower. Imports of chemicals, drugs, dyes, etc., amounted in value to £1,315,824. in August, against £796,366. in July and £1,125,021. in August, 1922. British exports of these products were valued at £1,645,856., compared with £1,739,561. in July, £2,385,072. in June, and £1,444,643. in August, 1922. The quantity figures of imports and exports of selected products are given in the table below :—

		1923. August.	July.
IMPORTS—Increases on July Quantities.			
Barytes, ground	cwts.	46,008	39,808
Boron minerals	tons	3,561	375
Calcium carbide	cwts.	50,896	37,159
Dyeing extracts	,,	8,629	8,533
Indigo, natural	,,	70	30
Manganese ore	tons	61,844	37,296
Nickel oxide	cwts.	7,129	1,860
Petroleum, crude mineral	galls.	34,310,667	30,075,435
Phosphate of lime	tons	31,584	18,696
Rosin	cwts.	123,624	76,770
Sodium nitrate	,,	262,313	40,889
Sodium c'p'ds. (except nitrate)	,,	17,517	11,647
Sulphur	tons	10,065	715
Turpentine	cwts.	59,048	32,139
White lead	,,	11,349	8,453
Zinc oxide	tons	626	484
Decreases on July Quantities.			
Acetic acid	tons	316	752
Bleaching materials	cwts.	1,290	1,608
Borax	,,	4,150	7,450
Cream of tartar	,,	2,646	4,588
Glycerine, crude and distilled	,,	286	2,209
Gums and resins (except rosin)	,,	21,154	23,963
Mercury	lb.	93,711	114,092
Paraffin wax	cwts.	65,389	67,713
Potassium compounds (except nitrate)	,,	138,923	147,465
Potassium nitrate	,,	6,263	15,541
Pyrites, iron	tons	34,551	41,153
Tanning extracts	cwts.	57,378	85,636
Tartaric acid	,,	1,237	2,680
EXPORTS—Increases on July Quantities.			
Ammonium chloride	tons	204	176
Benzol and toluol	galls.	366,562	67,763
Bleaching powder	cwts.	12,622	6,750
Carbolic acid	,,	11,581	9,648
Disinfectants, insecticides, etc.	,,	28,976	23,634
Paraffin wax	,,	28,020	10,732
Potassium chromate and bichromate	,,	3,746	1,530
Soaps (total)	,,	113,983	90,972
Tar, coal	tons	384	358
Tar oil, creosote, etc.	galls.	2,627,301	2,029,275
Tartaric acid	cwts.	706	648
Decreases on July Quantities.			
Ammonium sulphate	tons	17,002	20,586
Barytes, ground	cwts.	427	14,167
Caustic soda	,,	110,042	111,391
Cement	tons	25,963	54,924
Copper sulphate	,,	522	1,290
Dyestuffs, coal-tar	cwts.	12,830	15,023
Glue and size	,,	7,276	10,133
Glycerine, distilled	,,	2,922	3,986
Naphtha, coal-tar	galls.	8,840	9,281
Naphthalene	,,	11,168	19,856
Pitch, coal-tar	tons	1,074	4,542
Potassium compounds (except chromate and bichromate)	cwts.	1,601	2,128
Salt (other than table)	tons	28,881	33,169
Sodium carbonate	cwts.	411,306	414,608
Sodium sulphate	,,	101,846	212,546
Sulphuric acid	,,	693	1,961
White lead	,,	7,398	15,811
Zinc oxide	tons	53	243

NATIONAL GAS EXHIBITION.

INTERESTING DISPLAY AT BIRMINGHAM.

THE National Gas Exhibition, the first to be held in the provinces, was opened at Bingley Hall, Birmingham, on Monday, and will remain open until October 3. It is of a very comprehensive character, thoroughly representative of the British gas industry, its object being to demonstrate the service of gas in home and industry. It is fitting that the exhibition should take place in the district in which Murdoch made many of his early experiments in gas lighting at Soho, Birmingham.

The great hall is filled with trade exhibits, many of technical interest having relation to the underlying principles of gas manufacture; but the exhibition, as a whole, serves to demonstrate the extent of the progress made in recent years with regard to gas-manufacturing methods and gas equipment for domestic purposes. The promoters have demonstrated how ill-founded is much of the criticism that has been directed to the gas industry in recent years; they certainly show that the industry is capable of rendering to the public the greatest possible service by the provision of light, heat and power, while at the same time conserving our coal supplies and purifying the atmosphere.

British-Sulphate-of-Ammonia-Federation Exhibit.

There are a number of stands of chemical engineering and kindred interest, and here it may be mentioned that the by-products of gas manufacture in this country annually include 10 million tons of coke and 150,000 tons of sulphate of ammonia. The wonderful effect on vegetable life of the latter is shown in the British Sulphate of Ammonia Federation's exhibit, at the main entrance, of an old-fashioned garden, together with some remarkably fine specimens of farm roots, including sugar beet.

The South Staffordshire Mond-Gas Company (Dudley) exhibit bituminous paints and varnishes, preservatives, disinfectants and sheep dip, etc., produced from the residual products of the manufacture of Mond gas.

Soap and soap powders, as well as paste for removing grime, grease and stains from the hands without injury are exhibited by Messrs. Fitchetts, Ltd., of Birmingham.

Tar products, horticultural sundries and synthite are displayed by the Midland Tar Distillers, Ltd., of Birmingham.

Messrs. Thomas and Bishop, Ltd., London, exhibit "Permac" jointing material; water, at a pressure of 250lb. per sq. in. is employed, and joints are broken and remade, the claim being made that no time is necessary for setting, and that disintegration does not take place where acids or chemicals are used.

Obviating Naphthalene Troubles.

The Shell-Mex, Ltd., London, exhibit Mexsol for dealing with naphthalene troubles. This material is a straight-run petroleum distillate, with a low final boiling point, and is now used as a naphthalene solvent, by evaporating by heat or by spraying. It is claimed, moreover, that the presence of the dissolved naphthalene in the gas improves its calorific and lighting value. Models are shown illustrating the supply and distribution of Shell gas oil as a washing, absorbing or extracting agent.

The Horstmann Gear Co., Bath, display controllers for automatic street lighting; the National Gas Engine Company, of Ashton-under-Lyne, gas engines, coupled with dynamos, for generating electric light; and a number of exhibits of industrial interest are sent by the Industrial Research Laboratories of the Birmingham Gas Department, of which Mr. C. M. Walter, D.Sc., is the engineer in charge. These include a new type of high-efficiency gas furnace, having an inside working chamber of 4ft. 6in. long by 2ft. 6in. wide by 18in. high, working with town's gas with a natural draught. It has been developed with the object of producing a heating plant of a high thermal efficiency, especially in the larger sizes having hearth areas of from 3ft. by 2ft. up to 12ft. by 5ft. The construction follows closely the lines of existing large-type producer-gas-fired furnaces, and includes a special type of counter-current regenerator applying to both gas and air supplies. A gas-heated tube furnace for the special treatment of steel components without oxidation also commands attention. The work is suspended in a tube, heated externally, through which a sealing gas is passing, burning at the top; thus all air is excluded.

Co-operative Exhibits.

A large amount of space is devoted by the British Commercial Gas Association to a comprehensive and representative display of the many branches of public service which the gas industry is able and anxious to offer to consumers. It effectively demonstrates, largely by photographs, the seriousness of the smoke evil, the latter emphasising the economy achieved by carbonising coal in gasworks and so preserving valuable by-products, samples of which are shown, including sulphate of ammonia, benzol, coke, tar, dyes, disinfectants and perfumes. A co-operative exhibit by Midland gas undertakings takes the form of a series of model rooms designed to show up-to-date gas fittings and apparatus.

By-Product Plant and Refractories.

The Chemical Engineering and Wilton's Patent Furnace Company, London, have an interesting stand which includes an open saturator for making daily one ton of sulphate; a draining table for draining sulphate fished from saturators; a change valve for operating the oxide purifiers; a small ammonia still section, together with a model of a large ammonia still; a neutral sulphate of ammonia dryer, a model plant for dehydrating tar, and a forced-draught furnace for burning coke breeze and other low-grade fuels for steam-raising purposes.

Refractory material is featured, and in this regard reference should be made to silica bricks and blocks shown by the Meltham Silica Fire Brick Company, of Huddersfield, these being peculiarly suitable for steel, glass, and gasworks, and coke-oven plants. Vertical and horizontal retorts are also shown. Retort charging machines, gas valves and producer doors and grates, as well as machine-made retorts, silica bricks and segmental retorts, are displayed by Messrs. Gibbons (Dudley) Ltd., Worcestershire; and the Consett Iron Co., Consett, Durham, show a variety of refractories. Samples are on view of raw material, together with the finished product of silica segmental retort. Messrs. Mobberley and Perry, Ltd., Stourbridge, have a number of exhibits of lumps of fireclay (part green and part burnt) showing slight shrinkage, gas retorts, fractured pieces of fire bricks revealing uniform texture, and blue bricks and fractured portions showing complete vitrification.

Scientific Control Equipment.

Scientific and gas manufacturing equipment of various kinds is arranged by Messrs. Alexander Wright and Co., of London; this includes photometrical apparatus, calorimeters, laboratory meters, apparatus for verification of such meters, equipment for determining and recording specific gravity of gases, and a carbon-monoxide recorder. Gas coal and by-products from same, together with paints for gas holders, are exhibited by the G. J. Eveson Coal and Coke Co., Ltd., Birmingham. Gas calorimeters are featured by the Sigma Instrument Co., Letchworth; they include indicating and recording instruments for use with purified or unpurified gas, and a water flow calorimeter which has easy access to the water space.

Meetings and Lectures in Connection with the Exhibition.

From October 1 to October 3 the British Commercial Gas Association will hold its conference in Birmingham. On the morning of October 2, following a civic welcome, and Alderman Lloyd's presidential address, Mr. J. R. Clynes, M.P., will speak on "Goodwill in Industry," and in the afternoon Sir Frederick Mott will preside at a conference on "Gas Service in Relation to Domestic Economy." The use of gas in industry and in catering will also be discussed, and a number of popular lectures will be given in connection with the exhibition.

The Birmingham and Midland Section of the Society of Chemical Industry and the Midland Junior Gas Association will hold a joint meeting on the evening of September 25, Dr. E. B. Maxted presiding. The following papers will be read: "Specific Heat of Coal in Relation to its Composition," by Mr. G. Coles (Mining Research Laboratory); "A New Gas-fired Combustion Furnace," by Mr. T. J. Hedley (Department of Chemistry, University of Birmingham); and "Improvements in Net Value Calorimetry (with a description of an automatic device for temperature and pressure correction)," by Mr. C. H. Beasley. Discussion will be opened by Mr. C. F. W. Rendle (President of the Midland Junior Gas Association). Mr. William A. Twine (Chemical Plant Superintendent, Birmingham Gas Department) will lecture on "Coal and What We Get from It." On Saturday, September 22, there will be a joint meeting of junior gas associations and salesmen's circles.

ITEMS OF INTEREST.

Belgian Gas-Shell Works Fatality.—Three persons have been killed and four injured in an explosion at the Liessis works, near Quevy, where old gas shells were in process of being refilled.

Soda-ash Production in Italy.—The firm of Solvay and Co. are now manufacturing sodium carbonate of 98-100 per cent. purity at their Rosignano (Pisa) factory, and are offering it for sale in the Italian market.

Pyrometer Maintenance.—In a circular, the Bowen Instrument Co., of Leeds, draw attention to the fact that they undertake tests, repairs and replacements of any make of pyrometer, and invite contracts for regular inspection and maintenance.

Change of Address.—The London offices of the Agricultural Information Bureau for the French Potash Mines have been removed to 11-12 Bury Street, St. Mary Axe, E.C. 3. Telegrams: "Sylvinite, Ald., London"; Telephone No. "Avenue 3205."

Death of Dr. Friedlandep.—The death is announced from Germany of Dr. Paul Friedländer at the age of 66. Dr. Friedländer was one of the best-known German dyestuff chemists, his monumental work, "Die Fortschritte der Teerfarbstoff-Industrie" being a universal book of reference.

Consett Coking Plant.—On Saturday, at the invitation of the Consett Iron Co., Ltd., about a hundred expert coke-oven managers and technical representatives of various concerns visited the new works. The new plant consists of 60 Wilputte ovens of the regenerative type, and they are expected to carbonise at least 6,000 tons of coal per week.

Fire.—It is reported that a fire broke out last week in the works of Messrs. Archibald H. Hamilton and Co., Ltd., oil and paint manufacturers, Glasgow. It originated in a timber and corrugated iron erection, which with its contents was damaged to the extent of £400. The firemen prevented the flames from spreading to a large quantity of petrol which was stored in the vicinity.

Removal of Chemical Works.—Messrs. Brotherton and Co., of Leeds, it is announced, are removing immediately their Workington chemical works, which deal with half the output of tar from the Cumberland collieries. Their lease of the site at Workington Dock, on which the plant was laid down ten years ago, has expired, and it is understood cannot be renewed. The decision is causing great regret locally.

Benzol-plant Fatality. — A double fatality occurred at New Brancepeth Colliery, near Durham, last week. Arthur Greenwell (35), and Frederick Underwood (31), had been sent to clean out a tank at the benzol plant. They had been engaged about an hour removing slurry from the bottom, which was about ten feet down, when they were found lying there dead, having been overcome by the poisonous gases which they had disturbed.

Wholesale Druggists' Failure.—At a meeting of creditors of W. N. Monks and Co., Ltd., 38, Silverwell Lane, Bolton, a statement of affairs presented disclosed liabilities £3,334. 1s. 8d., of which £2,730. 12s. 1d. was due to unsecured creditors, while the bank were creditors for £603. 9s. 7d. Net assets were £1,877. 10s. 7d., leaving a deficiency of £1,456. 11s. 1d. It was decided to confirm the appointment of Mr. Whittaker, of Bolton, as liquidator.

Tariff Notes.—Under the revised commercial convention between France and Czechoslovakia, which came into force on September 1, customs duties leviable on various goods have been reduced as follows:—Sulphuric acid, not fuming, 20 per cent. reduction in tariff duty; sodium chlorate, 20 per cent.; barium carbonate, nitrate and chloride, 20 per cent.; ultramarine blue, 25 per cent.; inks, 25 per cent.; refined soap, 40 per cent.; aromatic essences, 40 per cent.

Business Notices. — Keeling's Oxides (1921), Ltd., announce to the trade that they have appointed James M. Brown, 35, Surrey Street, Strand, London, W.C. 2, as sole distributor of their products Hitherto Mr. Brown has been sales controller to the company since its inception and possesses a wide and exact knowledge of the zinc oxide trade. All orders and communications should be addressed as above, and all cheques made payable James M. Brown.—By permission of the Board of Trade, the name of Hacars, Limited, soap and disinfectant manufacturers, has been changed to The Salus Company, Limited.

The Vulcanisation of Rubber.—We have received from Dr. Henry P. Stevens a brochure containing reprints (from the *Rubber Age*) of the three Cantor Lectures he delivered before the Royal Society of Arts in the spring of this year.

Low-temperature Carbonisation in Japan.—An order on behalf of the Japanese Government has been received by the Low Temperature Carbonisation Company for a smokeless fuel plant for the manufacture of "Coalite" and by-products of coal.

Activity in British Dyestuffs Shares.—A good deal of buying both of the preference and preferred ordinary shares of the B.D.C. is reported to have taken place during the week, and rumour is prevalent that some form of reconstruction of the company is probable in the near future.

New Diabetes Remedy.—It is reported that Mr. Oliver H. Newell, a biological chemist of London, has prepared an inorganic compound which he claims to be as efficient as insulin in combating diabetes. The product, which has been termed "diabetene," can be administered through the alimentary tract.

British Lead Mining. — The Weardale Lead Company, Ltd., announce that they have arranged for a lease of the Allendale lead mines, Northumberland. These mines in the past produced important quantities of lead ore, and there is considerable promise in certain workings which will be more fully developed.

Dangerous Drugs in Ships. — The Home Secretary has made a regulation, dated September 10, empowering port medical officers to issue certificates to masters of foreign ships authorising them to obtain, within certain limits, preparations containing opium, cocaine, morphine, or heroin, which are required to complete the necessary medical equipment of the ship.

New Capital Issue.—Burt, Boulton and Haywood, Ltd., is offering to shareholders registered on September 8 88,000 ordinary shares of £1. each at par, payable 5s. per share on application, on December 12, 1923, and on January 16 and March 26, 1924, respectively. The right of renunciation is given, and the allotment letter will be split once. The new shares will rank for dividend from January 1, 1924.

International Chemical Congress on Tanning Materials. —From September 17 to September 21 an international congress of chemists engaged in the tanning-materials industries has been held at Barcelona. The congress has been organised by the Spanish section of the "Chemische Gesellschaft der Gerbindustrie," and delegates were presnt from England, Belgium, Italy, Switzerland and Japan

Unlawful Possession of Cocaine. — Answering an advertisement on August 28 regarding the sale of chemicals, John Radcliff, a technical chemist, of Woodside Park Road, N., found the chemicals to be cocaine. The high price asked, £2,000. per kilo., aroused his suspicions, and he communicated with Scotland Yard. In the result, E. Landorff and A. Lundberg, Swedish merchants, were arrested and charged with unlawful possession of cocaine.

Ammoniacal Liquor for Water-softening.—In a paper read at the annual meeting of the Société Technique de l'Industrie du Gaz en France and reported in the *Gas Journal*, M. Chevalet proposes the use of ammoniacal liquor for softening feed water to boilers. He is of the opinion that the combination of ammoniacal liquor and heat presents a system of feed-water treatment which is not costly, is extremely simple of control from the chemical point of view, and enables one to use plant of far smaller dimensions than when heat alone is employed.

Compagnie Nationale des Matieres Colorantes.—At the annual general meeting of the "Compagnie Nationale des Matières Colorantes," which was held on September 6, it was stated that the number of individual dyestuffs manufactured had increased from 10 in 1920, to 600 in 1921 and to over 1,000 at the end of 1922. In total weight of products, the colours made in 1922 exceeded the 1921 figure by 125 per cent. The company has extended its plant during the year, has built extensive new laboratories at Villiers St. Paul, and has reduced its production costs. The report mentions that the sudden fall in the price of indigo in the Far East and the increasing competition in overseas markets have presented great difficulties. From a total profit of 5.92 million francs, 4.79 millions have been relegated to the amortisation account, 56,842 francs to the compulsory reserve funds and the remainder carried forward to the present year No dividend has been paid.

Lead and Silver Discovery in Burma.—It is reported from Kalaw Shan States that an extremely rich silver and lead mine has been found at Heho, at the end of the Southern Shan States line, states a message from Rangoon dated September 14. It is stated that the new discovery is likely to prove one of the largest mines in the world.

Czecho-Slovakian Trade in July. — The official figures give the value of exports from Czechoslovakia in July as 1,008,000,000 crowns, and imports, 744,000,000 crowns. Export of chemicals and allied products were valued at 13,000,000 crowns, and 82,000,000 during the seven months ending July 31. Imports of chemical products during July also totalled 13,000,000 crowns, and 125,000,000 crowns since January 1, 1923.

Rubber Latex Exports.—Rubber latex made its first appearance as an item in the monthly return of exports from British Malaya in the month of June, 1922. Since that date to the end of June, 1923 (thirteen months) a total of 97,015 gallons, valued at £18,973., have been exported. Of this amount 72,409 gallons were exported to the United Kingdom, 20,792 gallons to the United States of America, 2,468 gallons to the Continent of Europe, 720 gallons to British Possessions, and 626 gallons to Japan.

Detection of Hydrocyanic Acid.—The United States Bureau of Mines has been conducting an investigation into the employment of colour test papers for detecting hydrocyanic acid vapour in the air of tanks, apparatus, and in ships and buildings after fumigation. A method was developed whereby the shade of colour produced in tests when compared with a colour chart gives an estimation of the concentration of the gas over a range of 25 to 1,000 parts per million parts of air. The investigators' determinations in the laboratory were within 20 per cent. of those found by chemical analysis. It is recommended that unprotected persons should not be allowed to enter atmospheres containing hydrocyanic acid gas unless tests show concentrations not exceeding 100 parts per million.

World's Salt Production. — The total world output of salt is estimated at about 17,200,000 tons before the war, and about 18,700,000 tons in 1920, an increase of more than 8 per cent, according to *Commerce Monthly*. In 1920, the United States headed the list of producers with 6,107,000 tons, against 4,300,000 in 1913; Germany 2,887,000 tons (1,888,000 tons); United Kingdom, 2,158,000 tons (2,248,000 tons); India, 1,764,000 tons in 1919 (1,299,000 tons in 1913); France, 1,230,000 tons (1,262,000 tons); Spain, 974,000 tons (59,000 tons); Japan, 580,000 tons (610,000 tons); and Russia, 539,000 tons (1,910,000 tons). It will be seen that whereas the production in the United Kingdom has fallen off slightly, the output in America has increased by 70 per cent., and the German production by 65 per cent. The output in Spain has also developed considerably during the period.

COMING EVENTS.

National Gas Exhibition.—September 17 to **October 3**, at Bingley Hall, Birmingham. Joint visit on **Tuesday, September 25**, by the Society of Chemical Industry and the Midland Junior Gas Association; meeting, **6 p.m.** Papers: "Specific Heat of Coal and Relation to Its Composition," by G. Coles; "A New Gas-fired Combustion Furnace," by T. J. Hedley; "Improvements in Net Value Calorimetry," by C. H. Beasley.

Institution of the Rubber Industry (London Section).—Meeting, **Monday, October 1**, at **8 p.m.**, at the Engineers' Club, Coventry Street, London, W. Paper: "Plantation Life from a Topical Point of View," by C. Baxendale.

Society of Chemical Industry (Bristol Section).—Meeting, **Thursday, October 4**, at **7.30 p.m.**, at the University, Woodland Road. Paper: "An Outline of Rubber Manufacture," by J. F. Reid.—**(Manchester Section)**: Meeting, **Friday, October 5.** Address: "Recent Progress in Chemistry," by the chairman of the Section, Dr. H. Levinstein.

Society of Public Analysts.—Meeting, **Wednesday, October 3**, at **8 p.m.**, at the Chemical Society's Rooms, Burlington House, Piccadilly, W. Papers: "The Sampling of Coal," by J. H. Coste, E. R. Andrews, and W. E. F. Powney; "A New Test for Distinguishing Castor Oil," by H. G. Stocks; "The Volumetric Estimation of Vanadium in Steel," by A. E. Etheridge; "The Iodimetric Determination of Sugars," by C. L. Hinton and T. Macara.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

Another furnace in the district has been put into blast on ordinary iron, and the position for the time being at all events is rather improved. It has to be confessed, however, that there is very little new business stirring in the West Coast hematite pig-iron market, and as regards the furnaces in North Lancashire it is still uncertain whether a curtailment of production may not become necessary. On the other hand the furnaces in West Cumberland are apparently assured of the absorption of their full output. Here at any rate no stocks are being accumulated, in spite of the fact that Continental requirements are very small now, and that the needs also of Scotland and South Wales are severely restricted. Most of the iron hitherto has been going to the Midlands. There is some prospect that the local consumption may shortly become larger. There are not many rail orders to be obtained, but the United Steel Company has got an order for rails from the Crown agents for the Gold Coast that will give the rolling mills employment, though not on a large scale, for many weeks. With a proportion of the make of ordinary iron going, therefore, to the steelworks at Workington it seems evident that all the coke that can be made in the district will be required. The output of local coke, the Whitehaven collieries having started raising coal, is of course increasing, and the coking industry must depend more than ever for the disposal of its products upon the hematite pig-iron industry. The East Coast coke supplies are little fuller this week, though there is an additional furnace blowing, and the presumption is that the extra coke needed is being taken from the West Cumberland ovens. Local iron smelters are still paying from 29s. to 33s. per ton according to carbon content, and deliveries overseas will be more important towards the end of the year. There is no change to note in the condition of the coal trade. The local outlet is restricted on account of the depressed state of the iron ore industry, but the shipments to Ireland are rather heavier. Brotherton and Co., Ltd., of Leeds, are shortly to dismantle their chemical works which they placed at Lonsdale Dock at Workington in 1910.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Belgium.

A Belgian firm in Brussels desires to secure the wholesale agency of British manufacturers of chemical and pharmaceutical products. (Ref. No. 291.)

Brazil.

A confidential memorandum on the market for photographic materials in Brazil has been prepared by the Department of Overseas Trade. British firms desirous of receiving a copy of the memorandum should communicate with the Department. (Ref. D.O.T. 905/3/F.G./C.C./2.)

Norway.

A commission agent in Christiania desires to secure the representation of British exporters of tinplates and olive oil for use in Norwegian canning factories. (Ref. No. 293.)

Poland.

The Commercial Secretary at Warsaw reports that a local bank is desirous of purchasing the following goods monthly: Soya bean oil, double refined, edible, 30 tons; coconut oil, refined, edible, 10 tons; tallow, Australian, fair mixed or another mark for soap-making factories, 20 tons. (Ref. D.O.T. 7931/F.R./C.C./2.)

Spain (Canary Islands).

A commission agent of Santa Cruz de Tenerife is desirous of obtaining the representation of British firms exporting paints, soaps, cement, candles, etc. (Ref. No. 294.)

Italy.

His Majesty's Consul at Turin reports that a local railway company is in the market for a considerable amount of pitch for use in the manufacture of briquettes. (Ref. No. 20579/F.W./M.C.2.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN AUGUST.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month of August, 1923, compared with 1921 and 1922. As from April 1, 1923, the export trade of the Irish Free State is excluded from the returns.

ARTICLES.	QUANTITIES. Month ended August 31.			VALUE. Month ended August 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
CHEMICAL AND MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):				£	£	£
ACIDS:						
Sulphuric ..... cwts.	2,723	1,377	693	3,549	1,766	798
Tartaric (including Tartrates not elsewhere specified) ..... ,,	581	321	706	8,712	1,941	4,732
AMMONIUM COMPOUNDS:						
Chloride (Muriate) tons	156	444	204	7,409	18,278	7,455
Sulphate—						
To France..... ,,	—	2,933	972	—	48,596	13,517
,, Spain and Canaries .... ,,	531	4,587	2,204	7,533	75,532	33,617
,, Italy ..... ,,	40	170	15	520	2,831	250
,, Dutch East Indies ..... ,,	3,044	1,959	205	57,808	26,708	2,952
,, Japan ..... ,,	1,367	201	7,450	17,773	3,206	121,333
,, British West India Islands (including Bahamas) and British Guiana ,,	18	2,026	479	288	34,002	6,989
,, Other Cntries ,,	2,549	2,770	5,677	37,772	45,485	82,653
Total ..... ,,	7,549	14,649	17,002	121,694	236,360	261,311
BLEACHING POWDER cwts.	8,216	10,713	12,622	7,428	7,291	7,181
COAL TAR PRODUCTS, not elsewhere specified:						
Anthracene..... cwts.	—	47	—	—	28	—
Benzol and Toluol galls	—	658	366,562	—	176	30,044
Carbolic Acid ... cwts	4,715	19,091	11,581	11,347	37,101	46,829
Naphtha ..... galls	1,435	2,084	8,840	209	281	995
Naphthalene .... cwts.	970	2,758	11,168	1,287	1,933	6,753
Tar Oil, Creosote, etc. ..... galls.	3,275,794	2,076,635	2,627,301	113,626	56,674	99,052
Other Sorts ..... cwts.	20,215	23,516	34,614	11,045	15,478	18,218
Total ..... val.	—	—	—	137,514	111,671	201,891
COPPER, Sulphate of ..... tons	191	869	522	6,186	23,045	13,081
DISINFECTANTS, Insecticides, Weed-killers and Sheep and Cattle Dressings, except Tobacco Offal, containing no Dutiable Ingred'nt cwts.	15,198	33,085	28,976	45,238	76,073	79,100
GLYCERINE:						
Crude ..... cwts.	—	1,336	2,710	—	4,596	6,070
Distilled ..... ,,	2,088	8,927	2,922	13,122	36,858	11,714
Total ..... ,,	2,088	10,263	5,632	13,122	41,454	17,784
POTASSIUM COMPOUNDS:						
Chromate and Bichromate ..... cwts.	332	2,103	3,746	1,212	6,042	9,365
Nitrate (Saltpetre) British prepared ,,	821	1,155	533	2,058	2,683	1,098
Other Sorts ..... ,,	1,927	1,988	1,068	9,818	11,615	6,528
Total ..... ,,	3,080	5,246	5,347	13,088	20,340	16,991
SODIUM COMPOUNDS:						
Carbonate (including Soda Crystals, Soda Ash, and Bi-carbonate) .. cwts.	163,450	311,739	411,306	58,680	100,994	118,430
Caustic ..... cwts.	26,715	134,816	110,042	31,897	142,204	98,784
Chromate and Bichromate ..... ,,	3,475	5,331	4,811	10,243	11,456	9,650
Sulphate, including Saltcake ... ,,	20,111	35,495	101,846	11,929	9,503	25,763
Other Sorts ..... ,,	37,735	58,714	56,522	87,021	101,739	95,005
Total ..... ,,	251,486	546,095	684,527	199,770	365,896	347,632
ZINC OXIDE ..... tons	122	332	53	4,879	10,284	2,352
CHEMICALS, all other Sorts .... val.	—	—	—	163,940	243,072	213,787
DRUGS, MEDICINES, and MEDICINAL PREPARATIONS:						
Quinine and Quinine Salts... oz.	83,932	167,794	39,297	17,955	20,024	4,943
Opium, dried and powdered in the United Kingdom lb.	55	67	457	31	102	389
Other Sorts ..... val.	—	—	—	134,724	187,360	175,894
Total ..... ,,	—	—	—	152,710	207,486	181,226

ARTICLES.	QUANTITIES. Month ended August 31.			VALUE. Month ended August 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
DYES and DYESTUFFS (except Dye-woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning Products of Coal				£	£	£
Tar ..... cwts.	4,098	2,868	12,830	71,830	46,686	100,168
Other Sorts ..... ,,	5,637	4,097	5,265	12,665	7,777	7,005
Total ..... ,,	9,735	6,965	18,095	84,495	54,463	107,173
PAINTERS' COLOURS and MATERIALS not elsewhere specified:						
Barytes, Ground (including Blanc Fixe) cwts.	200	3,835	427	167	2,200	171
White Lead (Basic carbonate) .... ,,	10,916	20,669	7,398	25,624	46,926	16,648
Paints and Colours Ground in Oil or Water ..... ,,	18,008	16,526	18,629	48,590	41,163	46,080
Paints and Enamels Prepared (including Ready-Mixed) ,,	12,468	18,199	12,612	46,244	66,981	44,981
Other Sorts ..... ,,	31,481	39,142	41,448	80,882	85,919	75,482
Total ..... ,,	73,073	98,371	80,514	201,507	243,189	183,362
CANDLES ..... cwts.	5,464	9,793	7,428	16,809	27,990	16,230
OILS, REFINED—						
*Lubricating, Mixed galls.	—	62,986	63,033	—	7,327	7,004
Petroleum:						
Lubricating .... ,,	402,567	507,629	395,458	73,803	66,173	48,032
Other Sorts .... ,,	69,845	2,158,639	1,381,264	6,334	32,815	121,832
SOAP, not containing Spirit:						
Soft ..... cwts.	1,149	1,193	2,379	2,900	2,270	4,317
Hard: Household and Laundry, in bars and tablets:						
To China..... cwts.	156	330	1,576	561	799	3,959
,, Other Foreign Countries .. ,,	19,143	25,144	31,753	50,911	56,389	61,689
,, British South Africa ..... ,,	25	88	353	82	290	744
,, British East Indies ..... ,,	37,396	24,719	31,883	79,707	52,365	62,421
,, Other British Possessions . ,,	37,232	16,691	31,333	94,543	35,773	63,906
Total ..... ,,	93,952	66,972	96,898	225,804	145,616	192,719
Toilet (including Shaving) ..... cwts.	2,443	5,300	4,328	30,092	58,678	37,106
Polishing and Scouring ..... ,,	488	1,031	2,299	1,435	2,697	6,907
Soap, not elsewhere specified . ,,	1,607	4,384	8,079	10,495	18,377	34,581
Total of Soap ,,	99,639	78,880	113,983	270,726	227,638	275,630
VARNISH ..... galls	74,118	88,363	69,004	52,850	54,914	37,332
WAX: Paraffin Waxcwts	15,748	9,906	28,020	19,931	12,176	26,457
OIL-SEED CAKE:						
Cotton-seed Cake. tons	1,089	611	158	10,405	4,554	1,539
Linseed Cake ... ,,	224	724	716	3,615	8,371	8,021
Rape-seed Cake . ,,	—	50	—	—	354	1
Soya Bean Cake ,,	—	55	66	—	620	598
All Other Sorts .. ,,	4,932	2,840	1,665	48,507	22,115	10,059
Total ..... ,,	6,245	4,280	2,605	62,527	36,014	20,218
OILS and FATS, refined, edible—Animal (except Marine Animal), refined:						
Lard ..... tons	12	36	19	1,275	2,103	1,960
Lard, Imitation . ,,	29	55	45	1,739	2,953	2,754
Vegetable (other than Essential), refined:						
Coconut Oil .... tons	70	40	65	5,393	2,105	3,303
Cotton Seed Oil . ,,	140	260	393	7,373	12,344	17,347
Olive Oil ..... ,,	6	6	5	988	2,307	1,359
Palm Oil ..... ,,	20	22	52	1,116	807	2,542
Palm Kernel Oil ,,	91	12	236	5,459	457	9,499
All other Sorts .. ,,	1,018	594	733	42,125	26,795	33,019
Total ..... ,,	1,386	1,025	1,548	65,468	49,871	71,783
SALT (other than Table Salt):						
To Sweden ..... tons	1,730	586	712	5,842	1,456	2,977
,, U.S.A. ..... ,,	735	250	250	3,617	1,033	1,020
,, Nigeria ..... ,,	1,583	5,940	3,022	9,902	28,409	12,802
,, Brit. E. Indies ,,	10,583	8,788	12,309	31,754	26,375	24,716
,, Australia..... ,,	11	262	3,316	26	1,245	7,920
,, New Zealand . ,,	754	3,299	1,361	3,692	12,787	5,271
,, Canada ..... ,,	4,469	2,660	2,720	13,972	6,975	6,707
,, Other Countries ,,	5,207	6,166	5,191	17,505	19,280	17,928
Total ..... ,,	25,072	27,951	28,881	86,320	97,560	79,341

* Included in "Oils, Refined: Petroleum—Lubricating" prior to 1922.

(*To be concluded.*)

FERTILISER NEWS.

Nitrate of Soda.—There is not much of interest to record so far as the present situation in this fertiliser is concerned, the general market being very flat. Interest in the States is not at all keen, and consumers seem disposed to await a fall in prices. On the Continent a certain amount of material is moving inland from ports, but it is probable that the country dealers and manufacturers of compound fertilisers are taking the bulk. Farmers generally are too busy with harvesting and similar operations to concern themselves with next year's fertiliser requirements. Demand in this country is restricted to chemical manufacturers and sellers of small lots to gardeners, etc. The economic position of the industry has attracted considerable attention in the United States, and by this time Dr. Foster Bain, who went out recently to Chile on behalf of the United States Government to study conditions there, will have returned. His report is awaited with widespread interest. Meanwhile, a member of the United States Department of Agriculture has been giving his views on the Chilean industry before the American Chemical Society. His address dealt mainly with the question of unsatisfactory chemical engineering, which he believed was the fundamental reason for the present difficult situation. The advice he offers to the Chilean producers is to lower the price of the product, in order to eliminate the incentive to develop production of atmospheric nitrogen in other countries. Seeing that the export tax, taken by the Chilean Government, amounts to over 40 per cent. of the cost of production and sale, it is thought that the price might be lowered through a reduction in the tax. It is well known, of course, that the principal revenue of the country is derived from this source, but it might be possible to replace the loss by distributing it over the other exporting industries—namely, copper, iodine, etc. The general system of taxation in Chile is capable of considerable improvement, and until something is done in this direction the ultimate future of the Chilean industry is far from clear. The loss of Germany as a customer is largely responsible for the under-production, with its attendant working losses, at the present time, and there is little likelihood of an immediate return of this buyer to the extent of the 900,000 tons taken before the war.

Sulphate of Ammonia.—Although the export figures for August, as published in the Board of Trade returns, are lower, there is much cause for encouragement to be found in them. Exports during the month totalled 17,002 tons, compared with 20,586 tons in July and 14,649 tons in August of last year. Japan continues to be our best customer, taking some 7,450 tons during August, against 8,272 tons in July and 204 tons only in August, 1922. This country is purchasing all her sulphate requirements from us at the present time, the United States not being able to supply the fertiliser at a price low enough to compete with the British material. Up to the end of August—that is, for eight months—total exports to Japan from the United Kingdom have reached 36,114 tons, against a negligible 255 tons in the corresponding period of last year. The demand in Spain has fallen off somewhat, possibly due to her now having considerable stocks on hand. The fact that imports into that country from Great Britain amounted to 46,815 tons in the first eight months of this year, against 14,879 tons for the same period of 1922, lends support to this assumption. An encouraging feature of the statistics is the re-entry of France as a buyer at 972 tons after a brief period of cessation. This compares with 2,933 tons in August of last year. Eight months' figures show the exportation last year to be about double the quantity despatched to France this year. The sudden drop in exports of sulphate to Italy, only 15 tons, compared with 444 tons in July, is due largely to the lack of interest on the Italian fertiliser market. Supplies of German sulphate of ammonia received under the reparation scheme have been responsible for a break in prices, with the result that British sulphate is rather too high in price. The continual fluctuations in exchange, and, to some extent, the political situation, have also adversely affected the position of the British product. The British West Indies and the Dutch East Indies are both taking considerably less—in fact, the latter have fallen off seriously. "Countries not separately specified" is the only heading other than France to register an increase, taking 5,677 tons, against 5,381 tons in July, making the total since January 1, 32,300 tons, compared with 18,828 tons in 1922. In all, 161,148 tons were exported from the United Kingdom in the eight months' period to August 31, which compares very favourably with the figure of 88,748 tons for the corresponding period of 1922.

Other Fertilisers.—In common with sulphate of ammonia, the general trade in fertiliser products during 1923 is on a much higher level than in 1922. Business in basic slag is much better, and exports during August reached 4,872 tons, against 353 tons in July and 282 tons in August of last year. Imports were reduced, stocks of British-produced slag being larger on account of the activity in the iron and steel industry over the past few months. The August figure is 2,978 tons, against 8,726 tons for August a year ago. The total figures for the eight months are 59,994 tons for 1923, and 32,225 tons for 1922; while exports over the same period amount to 17,258 tons, and 6,074 tons respectively. Exports of superphosphate registered a considerable decrease on the monthly figure as compared with the previous month, although total exports since January 1 at 8,060 tons amount to almost double the quantity of British-manufactured material sent abroad in the 1922 period. Compound fertilisers, including bone meal, were exported up to 2,038 tons in August, against 3,604 tons in July, bringing the 1923 total to 35,261 tons, compared with 22,834 tons during the first eight months of 1922. Imports of bones and bone materials for fertiliser manufacture were rather lower on the month, though the total importation so far on the year is about 10 per cent. higher than in 1922. Raw guano has been neglected, and imports are negligible. Phosphate rock, on the other hand, has recovered somewhat, and the August imports, amounting to 31,584 tons, compared with 18,696 tons in July, make the total for 1923 up to August 31, some 222,082 tons, against 242,176 tons for the eight months' period of last year.

The German Potash Industry.—During the first months of 1923 customers showed a certain reserve, which was partly due to the anticipated effect of the action taken by the Reichsbank to stabilise the mark, states a German report circulated by the Board of Trade. When it became clear at the beginning of May that stabilisation could not be maintained, the demand of German agriculture set in on such a scale that—*e.g.*, in June—the highest monthly sales so far recorded by the potash industry were effected—viz., 90,000 tons K_2O (as compared with average monthly sales of 50,000 tons). In spite of these large sales, the level of the previous year has not yet been reached, but it is assumed that the difference will be made good during the following months, provided no unforeseen circumstances arise. Foreign countries in particular should contribute thereto, as foreign sales in 1923 have so far been generally satisfactory. The fact must not, however, be lost sight of that difficulties of sale in the potash industry would arise immediately if the costs of production were rapidly adjusted to the gold parity, but foreign exchanges were to show a sinking tendency. In such case, the potash industry would doubtless feel the competition of the Alsatian works on the world's market seriously. As before, the American and Dutch markets are the most important customers for German potash. The internal consolidation of the industry by the closing-down of unsatisfactory shafts, and the amalgamation of individual works in concerns, has made further progress. This policy of concentration is said to have proved exceedingly successful, and has resulted in a considerable reduction of the costs of production. Only thus has it been possible to keep the inland prices of potash comparatively low, so that the increase as compared with pre-war times is considerably less than in the case of other comparable products of German industry.

NEW COMPANIES.

Crums Prints, Ltd.—Private company. Capital £100. Dyers and calico printers, etc. Office: St. James's Buildings, Oxford Street, Manchester.

Ilfar Aluminium Company, Ltd.—Private company. Capital £350. Foundrymen, refiners, smelters, etc. Solicitor: B. S. Gorton, City Chambers, High Street, Coventry.

Radiosan, Ltd.—Private company. Capital £10,062. 10s., in 10,000 10 per cent. cumulative preference shares of £1, and 15,000 ordinary shares of 1d. Manufacturers of and dealers in medical and pharmaceutical chemicals, etc. Office: 25, Duke Street, St. James's, London, S.W. 1.

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**** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE CONTROL OF OUR DYESTUFFS INDUSTRY.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—At the recent general meeting in Manchester of the British Dyestuffs Corporation (Limited), the Chairman indicated that the policy of the directors for the present would be not to strive after new discoveries, but to develop the cheaper manufacture of known products. This decision has led to the resignation of the chief research chemist of the Corporation, and, as pointed out in your leading article of August 31, the matter is of great public interest and importance, as it is generally recognised that the firm establishment of the dyestuff industry in this country is essential to our national security and industrial welfare.

It must be recognised that the directors are faced with enormous difficulties. Their capital charges and production costs are excessively high owing largely to conditions beyond their control; bad trade has greatly reduced the demand for their products in this country, and what export trade there is, is subject to the competition of Germany, Switzerland, and the United States. Dye users are strongly urging reduction in prices, and the shareholders in the Corporation have hitherto received a very meagre return. Under these conditions the directors are bound to adopt all possible economies which do not militate against ultimate success, and having spent £400,000. on research work during the past four years they propose to curtail such work in the future.

Two questions are involved. Is this policy the correct one; and, if not, what is the defect in the organisation which has led to its adoption?

With regard to the first point, the past history of the industry is very illuminating. It originated and was developed here for some years, but soon migrated to Germany, mainly because the large profits made were used here as dividends, but in Germany were utilised for research and works development. This fact, and the disastrous consequences of a repetition of the policy, have been pointed out again and again by those who have made a special study of the question. Did space allow, many such opinions could be quoted, but one must suffice—that of the man chiefly instrumental in developing the British dye industry during the war. Lord Moulton, speaking in Manchester in 1915, said: "If I had all the millions needed for a company, the shares of which would be considered as ordinary industrials, and the profits of which would be squeezed out without regard to the future, I would say at once that it was foredoomed to failure." The declared policy of the Corporation seems to be a repetition of the policy of the early sixties, which led to the shipwreck of the British dye industry in the early days. It is diametrically opposed to the policy which had led to success elsewhere. And in expending £400,000. in four years on research, the Corporation has only been fulfilling an essential condition. In the successful manufacture of dyes, research is as essential as raw material and special machinery, and, appositely enough, the *Board of Trade Journal* of August 30 (p. 216) gives the official figure of 21 million dollars as having been expended on dye research in the United States during the past five years. It is well known, also, that one of the large German colour works, the Badische Co., expended upwards of £900,000. on research on the synthetic production of indigo alone. Research is the lifeblood of colour manufacture, and the only wise policy in bad times is to intensify the work, which will lead to the introduction of new and valuable products from which a rich harvest will be reaped. To curtail research is to admit defeat by Continental and American competition.

It remains to consider the conditions which have made this retrograde step possible. These have arisen from the fact that scientific and technical knowledge and experience have been unable to exert their full energising and guiding practical influence. This is only possible when these factors are associated with and participate in final decisions in policy and administration. In other words, the present position is due to the absence of scientific and technical men from the directorate of the Corporation.

The fruitful result of a suitable collaboration of business men and scientific men is to be seen in all the large Continental colour works, and also in such British chemical works as Brunner, Mond and Company. Speaking during the war, Dr. Duisberg, one of the ablest industrial chemists in the world, and the head of one of the largest German colour works, is reported to have said:—"England talks not only of holding her own in the war, but of beating us in the organic chemical industry. She cannot do it, because she is incapable of the necessary concentration, patience, and the faculty of fixing the eye on distant consequences, and not merely on monetary results." Does not the avowed policy of the British Dyestuffs Corporation tend to show that his estimate was near the mark?—Yours, etc.,

Buckhurst Hill, Essex, September 15, 1923. WALTER M. GARDNER.

GAZETTE NEWS.

SATISFACTIONS.

British Isinglass Company, Ltd., Grimsby. — Satisfaction registered September 4, £4,000., registered July 20, 1915.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

British Carbonising Company, Ltd., Gloucester. — J. H. Baker ceased to act as receiver August 31.

Metallurgical Company, Ltd.—Resolved August 8: That the company be voluntarily wound up. G. H. Warmington, liquidator.

BANKRUPTCY INFORMATION.

Richardson, Thos., 95, Bank Road, Bootle, late trading at Shorey Bank, Darwen, as Evergloss Company, polish manufacturer. R.O., September 5. Adjourned September 5.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Norris Brothers, Ltd., registered office, 107-111, Moorgate Station Chambers; chemical merchants; £15. 14s. 5d. August 3.

Kershaw, Joseph, Old-Mill, Eccleshill, Bradford; dyer; £11. 18s. 6d. August 1.

Turp, David, 61, Cross Street, Sudbury; whiting manufacturer; £13. 12s. 2d. June 27.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," September 22, 1888.)

Board of Trade Returns.—The Board of Trade returns for the month of August, which have been issued, show that the imports have reached a value of £30,006,140., which is an increase of £307,120. over August of last year; whilst the figures for the eight months are £250,287,359., which shows an increase of £13,026,743. The exports of British produce and manufactures are set down at a value of £21,187,759., an increase of £1,399,460. Foreign and Colonial produce, which is set down at £5,566,555., shows an increase of £1,404,475., while the total increase during the eight months is £15,652,000. Amongst the imports there is an increase in metals of £332,414., a decrease in raw materials for textile manufactures of £947,258. (the actual figure is £3,051,507.), and increase of £537,407. in raw materials for other industries, and an increase of £451,109. on manufactured articles. During the eight months there is an increase on all imports save dutiable articles of food and drink and tobacco. Among the exports the only decrease is in manufactured yarns and textile fabrics, which reached £48,477., or a total of £9,879,533. The largest increase is in metals, which reaches £437,505. On the eight months there is an increase all round, yarns and textile fabrics, which are set down at £72,947,538., showing an increase of £2,087,414. In the detailed statement it is shown that there is an increase in the value of chemical imports of £45,000., and in raw materials for the textile industry, and a decrease of £354,529. in raw cotton. The decrease in the exports on yarns and textile fabrics is principally caused by a decrease of £370,120. on woollen and worsted yarns.

REPORTS OF COMPANIES.

British Cellulose and Chemical Manufacturing Company, Ltd.

The accounts for the twenty months ended February 28, 1923, show a net loss of £491,781, as follows: Loss from manufacturing accounts for twenty months, £210,537.; written off on revaluation of stocks, £57,463.; depreciation of surplus unerected plant, and losses on plant sold or wholly written off, £229,270.; losses on cancellation of erection contracts, £11,216.; debenture and other interest, less interest received, £35,251.; total, £543,737.; transfer fees, £1,261.; balance of reduction of capital account unappropriated, £50,694.; net loss, as above mentioned, £491,781. Of the total loss, states the report, only £210,537. is due to trading over the twenty months. The balance consists of non-trading losses (including debenture and other interest) and also loss on sale of Spondon Power House, in itself over £114,000. Although there are, of course, no audited accounts later than those at February 28, 1923, monthly figures since that date show earnings more than sufficient to cover all charges and the debenture interest, but without regard to depreciation. Since the last annual meeting important developments and extensions have taken place at the Spondon factory, all of which are calculated, when the demand becomes commensurate with the increased capacity, to ensure great economies. The board propose to alter the company's name to "British Celanese, Ltd.," so as to abbreviate and identify it more closely with the company's principal product.

DIVIDENDS.

RECKITT AND SONS, LTD.—Dividend of 8d. per share, less tax, on ordinary.

STAVELEY COAL AND IRON COMPANY, LTD.—Report for year to June 30, 1923, states that profit, including balance of coal award, amounts to £304,912.; add £42,760. brought in, making £347,672. Directors propose placing £100,000. to general reserve and a final dividend of 5 per cent., making 7½ per cent. To mark the sixtieth year of company's operations directors propose paying bonus of 2½ per cent., bringing distribution up to 10 per cent. for year, leaving to be carried forward £4,191.

ASBESTOS CORPORATION OF CANADA.—Following dividends have been declared: Preferred stock 1½ per cent., common stock 1 per cent., for quarter ending September 30.

DOMINION GLASS COMPANY.—A quarterly dividend has been declared of 1¾ per cent. on the common stock.

VAN DEN BERGHS, LTD.—Directors have declared interim dividend of 1s. per share on ordinary shares in respect of 1923.

BRITISH ALUMINIUM CORPORATION, LTD.—Dividend at rate of 5 per cent. per annum, less tax, on ordinary shares for six months to June 30.

BENZOL AND BY-PRODUCTS, LTD.—Interim dividend of 3 per cent. on preference

SOUTH WALES NOTES.

[SPECIALLY CONTRIBUTED.]

Business in the tinplate trade continues good, and is slowly expanding. Large orders are being received from Japan for tinplates and galvanised sheets, which are required for reconstruction work following the earthquake. The European markets also are better. Spelter has been bought more freely, and it is reported that the galvanised sheet makers in some instances have obtained sufficient orders to last them over next January. The patent fuel trade is keeping steady, and some large export orders have been executed during the week. Small coals are in plentiful supply. The only noteworthy feature in the fertiliser industry at the moment is the improved export of basic slag.

Exports during the week included 489 tons sulphate of ammonia to Dunkirk from Cardiff. Included in the imports were 2,843 tons copper matte, 1,491cwt. nickel oxide, 20cwt. cobalt oxide from Montreal, 6,094 tons pitch from Pensacola, 101 tons nitrate of potash from Antwerp, 110 tons nitrate of soda, 140 tons ferro silicon, 8 tons magnesite from Christiania, 297 tons barytes from Bremen, to Swansea; 3 tons chloride of ammonia from Hamburg, 3cwt. beeswax from Antwerp to Newport; 1,360cwt. resin from Bremen, 1 case nickel oxide from Hamburg, and 1,799cwt. glucose from New York.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

September 3 to 8 (inclusive).

Anthraquinone Derivatives. Beckett, E. G.; Scottish Dyes, Ltd.; and Thomas, J. 22,166.
Mixing Liquids in Definite Proportions. Chambers and Hammond, Ltd.; and Hammond, T. C. 22,505.
Aluminium-fluoride-Alkali-fluoride Double Compounds Free from Iron. Chemische Fabrik Griesheim-Elektron. 22,616.
Ultra-filter Membranes. Duclaux, J. 22,639 and 22,640.
Waterproofing Composition. Gardner, G. C. M.; and Paisley Oil and Chemical Co., Ltd. 22,431.
Roasting Furnaces. Geschwind, L. 22,570.
Chromates. Helbronner, A.; Jouve, A. J. B.; and Soc. Hydro-Electrique et Métallurgique du Palais. 22,625 and 22,626.
Drying Glue. Hoffmans, C. A. F. 22,129.
Sulphuric Acid. Keller, A. 22,429.
Cellulose Derivatives. Lilienfeld, L. 22,160 and 22,161.
Aluminium Alloys. Mond, A. L. (*Goldschmidt Akt.-Ges.*). 22,565.
Alloys of Molybdenum. Norske Molybdenprodukter Aktieselskabet. 22,322.
Manufacturing Furfural. Quaker Oats Co. 22,280.
Preservation of Organic Material. Quaker Oats Co. 22,282.
Keeping Speed of Laboratory Apparatus Constant. Rottenburg, H. 22,332.
Soap. Sutherland, P. J. 22,303.
Oleo Stearate of Glyceryl. Tokalon, Ltd.; and Walton, S. A. 22,447.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.

1922.

Apparatus for Drying, Grinding, and Neutralising Sulphate of Ammonia in One Operation. Thwaite, A. H.; and Pease and Partners, Ltd. 11,196. **203,013**
Fermentation Process for Preparing Organic Matter for Application to the Soil. Krantz, F.; and Krantz, H. 12,228. **179,198**
Black Azo Dyestuffs. Bloxam, A. G. (*Chemische Fabrik Griesheim-Elektron*). 15,065. **203,032**
Separating Air and Gases from Liquids. Elliott, W. S. 15,084. **203,034**
2 : 3-diamino-anthraquinone. Imray, O. Y. (*Soc. of Chemical Industry in Basle*). 15,362. **203,051**
Reduction of Nitro- and Azo-derivatives. Murdoch, D. G.; and Galbraith, W. L. 15,585. **203,059**
Treatment of Organic Compounds with Nitrous Acid. Siderfin, N. E., Tallantyre, S. B.; Shinnan, W. V.; and Galbraith, W. L. 15,586. **203,060**
3 : 3'-diamino 4 : 4'-dihydroxyarsenobenzene and Other Arseno Bases. Pomaret, M.; and May and Baker, Ltd. 16,170. **203,077**
Phenol Aldehyde Condensation Products. Petroff, G. 18,713. **203,124**
Base-exchanging Compounds. Hilditch, T. P.; Wheaton, H. J.; and Crosfield and Sons, Ltd., J. 22,092. **203,158**
Pressure Filters. Hurrell, G. C. 22,261. **203,162**
Railway Tank Wagons. Mathieson Alkali Works, Inc. 23,672. **193,001**
Lactose and/or Lact-albumen. Harding, L.; and Whetham, W. C. D. 26,879. **203,209**
Grids for Gas-purifiers. Spencer, S. E. 27,970. **203,216**
Activating and Reactivating Metallic Catalysts Applicable to the Obtention of a Continuous Hydrogenating Process. Technical Research Works, Ltd.; and Lush, E. J. 28,600. **203,218**
Chloridising Volatilisation of Metals. Vermaes, S. J.; and Lijnden, L. L. J. van. 30,300. **188,656**
Urea. Soc. des Produits Azotes. 32,545. **189,787**
Porous Masses for Storing Explosive Gases. Svenska Aktiebolaget Gasaccumulator; and Dalen, G. 34,727. **203,255**
Mixing Dry Materials. Partridge, T. O. 35,007. **203,259**

1923.

Barium Hydroxide. Michael and Co., J. 2,597. **192,415**
Working-up Mineral Sodium Carbonate. Blattner, R. H. D. (*Grouchkine, L.*). 3,709. **203,271**
Uniformly Ripening Alkali Cellulose. Pinel, A. 6,015. **194,693**
Pure Gelatine or Glue. Koln-Rottwell Akt.-Ges. 6,885. **203,276**
Multitank Wagons. Mathieson Alkali Works, Inc. 11,100. **197,927**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

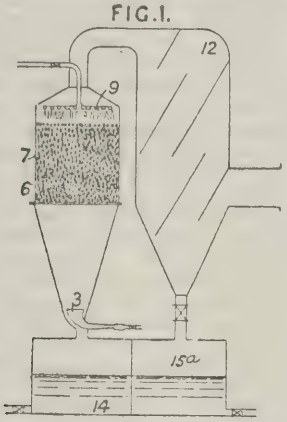
White Lead. Lloyd, G. F.; Clapp, F. B.; and Campbell, F. H. 17,278. **203,301**
Resins. Soc. of Chemical Industry in Basle. 19,475. **203,310**
Separating Substances from Solutions or Mixtures. Aktiebolaget Separator. 21,378. **203,324**
Destructive Fermentation of Organic Residues. Pico, L. Boggiano. 21,916. **203,336**
White Lead. Rascher, M.; and Plaueln, R. 22,004. **203,340**
Cellulose Derivatives. Lilienfeld, Dr. L. 22,160. **203,346**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Spray and Film Evaporators. Plauson's (Parent Company), Ltd., London. (H. Plauson, Hamburg, Germany.) British Patent, **200,998**, of 1922.

In concentrating solutions or colloidal dispersions, or drying suspensions of kaolin, mineral colours, coal, peat, graphite, etc., the liquid is distributed as a fine spray or film in a current of gas or steam moving at a high velocity (50 metres per sec. and upwards). The stream is obtained by allowing the gas to expand through funnel-shaped nozzles which may be arranged to give a rotary movement to the gas. The liquid may be supplied by a distributor 9 on to the upper surface of a packing 7 of Raschig rings, etc., in a vessel 6 through which a stream of gas or steam from a nozzle 3 arises. Concentrated liquid carried by the gas is

FIG. 1.



separated in a baffled chamber 12 and flows into a container 15a. The bulk of the concentrated liquid passes from the base of the vessel 6 into a container 14. The liquid to be concentrated may be supplied by atomising it by means of air or gas, downwards into the lower part of the vessel 6 below the packing 7. The liquid may be supplied to a rotating device, from which it is discharged as a thin vertical film into a stream of gas or steam moving horizontally. Solid or liquid products are separated from the gas by passage through a series of baffles or sieves, the different products from which are collected in separate containers. Materials having a dehydrating, ionising, or deionising effect may be added to the gas, for example, in concentrating calcium chloride solution, a small addition of hydrochloric acid gas may be made, and in concentrating sugar solutions, additions of carbon dioxide or alcohol increase the rate of concentration, while strong acids decrease the rate.

Anthraquinone Sulphonic Acids. J. Thomas, and Scottish Dyes, Ltd., Carlisle. British Patent, **200,851**, of 1922.

The anthraquinone-α: β-disulphonic acids or their salts, such as are obtained as by-products in the sulphonation of anthraquinone in the presence of mercury, yield anthraquinone or its 2-sulphonic acid on hydrolysis with sulphuric acid of about 80 per cent. strength, at a high temperature. According to an example, anthraquinone is sulphonated with oleum in presence of mercurous sulphate, the anthraquinone-α-monosulphonic acid separated as potassium salt, and the α: β-disulphonic acids in the filtrate isolated by evaporation or salting out; the α-monosulphonic may also be isolated by slightly diluting the sulphonation mixture and cooling; the disulphonic acids are then heated with sulphuric acid of 80 per cent. strength and mercurous sulphate at 180° C., and the anthraquinone and β-monosulphonic acid separated by pouring into water and salting out.

Titanium Sulphates. W. B. Llewellyn, H. Spence, and P. Spence and Sons, Ltd., Manchester. British Patent, **200,848**, of 1922.

Titanium sulphates are prepared by impregnating titaniferous materials in granular condition or in small pieces with sulphuric acid of a suitable strength, and heating the impregnated mass in the dry way to a temperature of about 300° C. The concentration of the acid is preferably adjusted so that while sufficient acid is present to react with the titanium oxide and other reactive bases, the volume is such that a semi-dry homogeneous mixture is obtained. The process is stated to be particularly applicable to siliceous minerals or residues containing relatively low proportions of titanium oxide.

Alkali Cyanides. E. C. R. Marks, London. (E. I. Du Pont de Nemours and Co., Wilmington, Delaware, U.S.A.) British Patent, **200,902**, of 1922.

Alkali cyanides are obtained by reacting with nitrogen, which may be under pressure, upon a mixture of an alkali compound such as sodium carbonate, and carbon obtained from the matter dissolved by alkali from wood or other fibrous vegetable matter in the presence of a metal catalyst such as iron or iron oxide and, if desired, an alkali halide such as sodium chloride or fluoride. The carbon used is obtained by incinerating the "black liquor" obtained in cellulose manufacture, and washing out the sodium carbonate remaining. The heating of the solid residue of the black liquor may be effected in a retort at a comparatively low temperature below 550° C., preferably 200–350° C., to obtain a high yield; or the concentrated liquor may be mixed with the catalysts and evaporated to dryness to obtain a suitable charge for the cyanide reaction. The nitrogen may be supplied in the form of producer gas, but in that case the retort is sealed after the reaction and only open when cold, to avoid the presence of carbon dioxide with the cyanide during cooling. An increase in yield may be obtained by adding a second portion of charge to the retort when its original charge has shrunk owing to the process of reaction, and then continuing the reaction for the same or a little time longer than the original charge would have taken.

Alkali Thiosulphates. W. J. Mellersh-Jackson, London. (Keppers Co., Pittsburg, U.S.A.) British Patent, **200,760**, of 1922.

Liquors containing alkali thiosulphates and other less soluble alkali salts such as carbonates, which may be products of gas-purifying processes, are evaporated until the boiling point reaches 120° C. at atmospheric pressure, when the salts such as alkali carbonates separate, and the crystals are removed in a centrifugal apparatus. The solution is then cooled to obtain crystals of thiosulphate. The mother liquor may be further concentrated to obtain a second crop of thiosulphate crystals; the final mother liquor contains sulphocyanides. The thiosulphate crystals are washed and recrystallised, the mother liquor being returned to the evaporator.

Filtering Media. C. Torley, Quatre-Bras, near Tervueren, Belgium. British Patent, **200,327**, of 1922.

Filter plates or bodies are made of a mixture of cleaned pumice stone in fine granules with Portland cement. The mixture is moistened with steam or finely atomised water and moulded under pressure when cool. The moulded bodies are allowed to set, then immersed in water, and finally sterilised in a steam boiler at a pressure of from 1½ to 2 atmospheres. The cement is preferably roasted before use.

Lead Hydroxide. A. W. Topp, Oswestry, Shropshire. British Patent, **200,693**, of 1922.

Lead hydroxide is precipitated by adding alkalies, ammonia, calcium hydrate, or the like to a chloride solution containing lead, which may be prepared from lead ores or tailings by treatment with brine and calcium chloride at 70-80° C. and filtering off the calcium sulphate. The lead hydroxide is separated and dried at 80-102° C. It may be ground with oil for use as a pigment.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Vulcanising Indiarubber. Naugatuck Chemical Company, Naugatuck, Connecticut, U.S.A. (Assignees of S. M. Cadwell, Leonia, New Jersey, U.S.A.) British Patent, **200,788**. Convention date, July 13, 1922.

Indiarubber in solid form or in solution is vulcanised with or without heat by mixing it with sulphur, zinc oxide or certain other metallic compounds, carbon disulphide with or without addition of a substance, such as carbon tetrachloride, which reduces its inflammability, and a primary or secondary amine, which must be an aliphatic amine—*e.g.*, benzylamine, if the inflammability-reducing ingredient is absent. Carbon oxysulphide may be used instead of carbon disulphide. Suitable amines are methylamine, dimethylamine, diethylamine

benzylamine, dibenzylamine, piperidine, aniline, para-toluidine, triethyltrimethylenetriamine, and tribenzyltrimethylenetriamine. The carbon disulphide may either be added with the other ingredients during milling, or it may be applied subsequently by painting the articles with it or subjecting them to its vapour. The Specification contains several examples.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—A quiet market is recorded in all quarters, and the few orders booked are small in size. Prices, however, are being maintained. Continental offers, especially those from Germany, seem firmer, and this is being reflected on spot in some directions, such as caustic potash and hyposulphite of soda, pea crystals. **Acetic Acid,** 80% technical, £47.; 80% pure, about £51.; 98% glacial, £60. in casks and £73. in glass demijohns, ex wharf London; spot values are well maintained, with a good demand on the market, and supplies limited. **Acetone,** British Government specification, £125. to £127. per ton, in drums; inquiry for spot material continues, with little about; values firm. **Alum,** lump, in casks, £10. to £10. 10s. per ton; dealers' prices keep steady at these figures, but there is little business doing. **Arsenic,** Cornish white powdered, about £68. per ton; the spot position seems very unsteady, with prices varying. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; this market remains very quiet, with dealers' prices unaltered. **Barium Chloride,** 98—100%, about £15. per ton for crystals; at this price the market is firm, but business is quiet. **Bleaching Powder,** 35—37%, about £10. to £10. 10s. per ton; dealers' prices are inclined to be firmer; business poor. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain; British makers continue to quote at these prices for home trade only. Dealers are quoting under similar conditions as to packing and delivery at: Commercial, granulated, £23. 10s.; and powdered, £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers' prices are maintained at these recently reduced rates, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid in Great Britain; British makers' prices, for home trade only; dealers are offering some grades at competitive prices. **Cream of Tartar,** 99—100%, about 88s. to 90s. per cwt., less 2½%, for one-ton lots; dealers are quoting at this unchanged rate, but business is slow, and the market is none too firm. **Citric Acid,** B.P., about 1s. 6d. per lb., less 5%; dealers' quoted rates are at this unchanged price, but the few sales made would be much under this figure for quantities; the position is very unsteady. **Epsom Salts,** commercial quality, about £5. per ton, in bags; dealers quoting at this price find business very slow. **Formaldehyde,** 40%, about £75. per ton; dealers are offering somewhere round this figure, but the little business about would probably be at slightly easier rates. **Glauber's Salt,** commercial quality, about £3. 15s. to £4. per ton; there is little business about so far as dealers are concerned. **Lead Acetate,** brown, about £40. to £41.; white, about £42. per ton; prices are quoted about the same, but business remains slow, and the market is unsteady. **Litharge,** about £35. 10s. to £36. per ton; dealers are offering Continental material at about these prices, with not much doing. **Lithopone,** 30% Continental red seal, £22. 10s. to £23. per ton; importers continue to find fair business, and their prices keep very steady. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31.; the tone here is, if anything, a shade firmer, with a tendency to higher prices. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers' quoted prices are unaltered. **Oxalic Acid,** about 6d. per lb.; this market remains very dull, and quoted prices are not at all steady. **Carbonate of Potash,** 90—92%, about £26. 10s. to £27.; 96—98%, about £30. per ton; prices asked by dealers are just a shade easier this week, with business still poor. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; hardly any inquiry on the market. **Caustic Potash,** 88—92%, about £31. to £31. 10s. per ton, in drums; after a period of dull and easier markets, this material has recovered sharply, owing to much higher rates on the Continent. **Permanganate of Potash,** commercial quality, about 9½d. to 9¾d. per lb.; business has been fair, and quoted values are well maintained. **Prussiate of Potash,** yellow, about 1s. per lb.; dealers have made no further reduction in their prices, and the market now seems much steadier, although business is still limited. **Sulphate of Potash,** 90%, £11. 10s per ton, ex ship; the market is unchanged on the week **Mercury,** about £9. per bottle of 75-76lb.; the spot position is still on the quiet side, with values as quoted none too steady. **Red Lead,** imported, about £35. 10s. to £36. per ton; dealers' prices are steadily maintained in this region, with some occasional business about. **Salammoniac,** dog-tooth crystals, £48. 10s. to £49.; medium, £43. to £44.; fine white crystals, £25. to £26. per ton; the spot position seems to be somewhat firmer, and slightly higher prices may be looked for shortly; spot supplies are offering. **Saltcake,** ground and unground, home trade, about £4.; export, about £5. 5s. per ton, f.o.b.; at these rates the position keeps quite steady. **Acetate of Soda,** about £24. 10s. to £25. per ton; some little inquiry has been dealt with at about these prices. **Soda Ash,** 58% light alkali, £7. 12s. 6d. per ton, in bags; British makers continue to quote at this price for home trade only, carriage paid in Great Britain; their prices for export vary as to destination. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s., per ton, in drums, ex wharf shipping port; dealers' prices show no change, and business seems to be still rather poor. British makers' prices to domestic consumers on contract are unchanged at: 70—72%, £16. 17s. 6d.; 76—77%, £18. 7s. 6d. per ton, in drums, carriage paid to destination; makers' prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers quote at about this figure, for home trade only, packages free, carriage paid in Great Britain. **Bichromate of Soda,** home trade, about 4½d. per lb.; export, slightly more; British makers' prices stated; no change on the week. **Cyanide of Soda,** 98—100%, export, 8½d. to 9d. per lb.; British makers' prices are unaltered on the week. **Hyposulphite of Soda,** pea crystals, about £14. to £14. 5s. per ton, in 1cwt. kegs; commercial quality, about £9. per ton, in casks, for spot supplies; c.i.f. quotations are a little easier than these rates; the position generally is firmer. **Nitrate of Soda,** 96%, about £13. 7s. 6d. per ton, f.o.r. or f.o.b.; at this price the market keeps steady, but is rather quiet. **Nitrite of Soda,** 100%, about £26. 10s. per ton; this market holds quite firm. **Prussiate of Soda,** about 6d. per lb.; business is still slow and small, with dealers' prices showing no further decline. **Sodium Sulphide,** 60—62% solid, about £14.; ditto, broken, about £15. 5s. per ton, in drums; 60—65% concentrated, about £14. per ton, in casks; prices quoted are about the same, but business is small. **Sulphate of Copper,** £26. per ton; British makers' quotations for home and export are at about this price, but Continental offers seem cheaper. **Tin Crystals,** 1s. 4d. per lb.; the market shows no change on the week. **Tartaric Acid,** B.P., crystals, about 1s. 2d. per lb.; business has shown no improvement, and the tone of the market is still unsteady and likely to weaken. **White Lead,** imported, about £42. per ton; prices mentioned are perhaps a little easier, with some limited business about. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers report there is no change in their prices.

Pharmaceutical Chemicals.—One or two changes in values, showing advances and declines, are recorded. The market generally is on the quiet side, with most business very limited in size, and the tone is fairly steady. **Acetanilid,** crystals and powder, about 1s. 7d. per lb.; the improvement in price recorded last week is fully maintained. **Acetyl-Salicylic Acid,** B.P., about 3s. 1d. per lb.; spot material seems steady at about this figure for good brands. **Benzoic Acid,** B.P., 2s. 3d. to 2s. 6d. per lb.; there is seldom any inquiry on the market. **Diethylbarbituric Acid,** B.P. (barbitone), about 17s. per lb.; the spot quotation is easier this week, with the market dull. **Salicylic Acid,** B.P., about 2s. 3d. to 2s. 4d. per lb.; at these rates the spot position is quite steady. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; business is rather slow, but a steady tone is maintained. **Amidopyrin,** about 14s. 6d. per lb.; the market remains quiet, and values as quoted are inclined to be weak. **Ammonium Bromide,** about 7d. per lb.; spot business is still slow and small, and values are unsteady. **Benzonaphthol,** about 5s. per lb.; nominal; no inquiry during the week. **Betanaphthol,** resublimed, 1s. 10d. to 2s. per lb.; the demand on spot is only occasional, with values unchanged. **Benzaldehyde 03,** about 3s. per lb.; holders of spot supplies continue to offer at this figure, with business quiet. **Calcium Lactate,** about 1s. 9d. per lb.; some fair business has been done, with the market steady. **Chloral Hydrate,** duty paid, about 4s. per lb.; slightly less for quantities. **Creosote,** B.P., about 2s. 6d. per lb.; quoted values are unchanged, with the market dull. **Creosote Carbonate,** about 8s. 6d. per lb.; inquiry very small; quoted rates unaltered. **Guaiacol Carbonate,** about 8s. 3d. per lb.; nominal; market inactive. **Hexamine,** about 3s. 6d. to 3s. 9d. per lb.; spot offers at these prices meet with only a limited demand. **Hydroquinone,** 3s. 3d. to 3s. 6d. per lb.; the demand has been poor; prices as quoted are not firm. **Methyl Salicylate,** about 2s. 6d. per lb.; this item keeps quite steady, with a fair business passing. **Methyl Sulphonal,** about 15s. per lb.; little or no inquiry received; quoted rates unchanged. **Paraformaldehyde,** about 3s. 6d. per lb.; the market is a shade easier this week, with business still quiet. **Paraldehyde,** 1s. 5d. to 1s. 6d. per lb.; some limited inquiry has been dealt with at about these prices. **Phenacetin,** about 6s. per lb.; this market seems to have recovered a little of its fall recorded last week. **Phenazone,** 7s. 3d. to 7s. 6d. per lb.; spot offers are at about these figures, with business quiet. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; the market is well maintained at these prices, with business small. **Potassium Bromide,** B.P., crystals and granular, 6d. to 7d. per lb.; offers appear to be ample, with buyers scarce; prices are unsteady. **Potassium Permanganate,** B.P., about 10d. per lb.; a fair business continued here, with values quite steady. **Potassium Sulphoguaiacolate,** 5s. 6d. per lb.; prices mentioned are easier this week, but there is hardly any business about. **Sodium Benzoate,** about 2s. 6d. per lb.; nominal on an idle market. **Sodium Diethylbarbiturate,** about 18s. 6d. per lb.; quoted rates for spot material are unchanged; business very limited. **Sodium Bromide,** B.P., crystals and granular, about 7½d. per lb.; this material seems to have improved a little on spot, but some cheaper offers may still be found. **Sodium Salicylate,** powder, about 2s. 5½d.; crystals, about 2s. 8d. per lb.; at these levels the spot market keeps very steady, with fair inquiry on hand, and supplies rather limited. **Sulphonal,** about 14s. 6d. per lb.; this market has been quiet; values unchanged. **Terpin Hydrate,** about 1s. 9d. per lb.; the position keeps very steady, with occasional small business passing. **Thymol,** about 15s. per lb.; spot holders' quotations are maintained at this figure. **Vanillin,** 100%, about 23s. 3d. per lb.; the market keeps steady at this price.

Coal-tar Products, Intermediates, Etc.—The only change of importance to record here is a sharp fall in the price of pitch, which remains quiet. Other items are about the same, with business restricted. **Aniline Oil,** 9d. to 9½d. per lb., drums free; the market has been quiet, with quoted values unchanged. **Aniline Salt,** 9½d. to 10d. per lb., casks free; prices asked are about the same, with little inquiry on the market. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; inquiry is still slow, and prices quoted are unaltered. **Benzol,** 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; this item keeps very steady, although the demand remains slow. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; there has been no improvement in demand; makers' prices are unaltered. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; dealers' prices are level on the week, with little doing. **Naphtha,** about 1s. 4d. per gallon; this market is dull, and prices as quoted are not at all firm. **Solvent Naphtha,** 90/160, 1s. 3d. per gallon, drums extra; the easier prices recorded last week are maintained, with the market dull. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; prices show no further falling-off, but business remains very quiet. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; this market is unchanged, and keeps steady. **Burning Oil,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; prices are steady, with the market quiet. **Creosote Oil,** about 9½d. per gallon, f.o.b.; merchants offering at this unchanged price find little business about. **Carbolic Acid,** crystals, about 1s. 2d per lb., f.o.b.; this is about the lowest price now being quoted; the market is steadier and a little more active. **Naphthalene,** about £19. 10s. to £20. per ton; the tone has improved a little after last week's easier feeling, but there is still but little business doing; crude, £5. to £11.; crystals £23.; powder, £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; demand remains slow, with quoted values unchanged. **Pyridine,** 20s. per gallon; the spot position holds very firm, with inquiry good, and supplies available very limited. **Hexamethylene,** about 3s. 9d. per gallon; prices are a shade easier this week, with business on the quiet side. **Pure Methyl Alcohol,** £100. per ton, ex wharf London; this item keeps very steady, and fair business is being done. **Pitch,** about 125s. per ton, East Coast; the quotation is easier this week, with very little business being dealt with. **Sulphate of Ammonia,** home trade, 25¾%, about £14. 10s. per ton, delivered buyers' nearest station.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £62. 2s. 6d. to £62. 5s., cash; £62. 15s. to £62. 17s. 6d., three months; electrolytic, £67. 10s. to £68. **Tin**: Standard, £198. 2s. 6d. to £198. 5s., cash; £198. 15s. to £198. 17s. 6d., three months; Straits, £202. 2s. 6d.; English, £199. **Lead,** soft foreign, £25. 7s. 6d., prompt; English, £26. 15s.; chemical sheet, 34s. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 2s. 6d.; hard, £27. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium,** 98—99%, £115.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £8. 15s. to £8. 17s. 6d. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. to 12s. 6d. per unit. c.i.f. U.K. or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand generally for heavy chemicals during the past week has been rather better, but values as a whole show no signs of improvement. For alkali products, quotations continue unchanged at recent rates—namely: **Caustic Soda,** 70%, £17. 17s. 6d.; 58% **Alkali,** £7. 12s. 6d.; **Soda Crystals,** £5. 5s. **Bicarbonate of Soda,** 2cwt. bags, £10. 10s., all carriage paid. **Bleaching Powder,** softwoods, unchanged at £11. 5s. on rails for spot orders. The inquiry for **Chlorates** is on the small side—**Potash** at 3d., and **Soda** 2¾d. per lb., carriage paid. **Bichromates** are unaltered. There is little call for **Copper Sulphate,** and quotations remain nominal at £25. 10s. to £26., f.o.b. Liverpool. American **Rock Sulphur,** steady at £5. 5s. on rails. **Phosphate of Soda,** weak at £14. 10s., ex store. **Commercial Hyposulphite of Soda,** £9. 10s., on rails makers' works. **Nitrite of Soda,** firm at £26. 10s., ex store. **Concentrated Sodium Sulphide,** in good supply at £14., carriage paid. White powdered **Arsenic,** lower at £65., on rails Cornish works, with only small inquiry. **Yellow Prussiate of Potash,** weaker at 1s. 0¾d. per lb.; **Soda,** 5¾d. per lb., both carriage paid. **Caustic** and **Carbonate of Potash** have a lower tendency. Grey **Acetate of Lime,** easier at £21. 10s., carriage paid; brown unchanged at £11. 10s. per ton **Acetic Acid,** firmly maintained at recent rates. **Acetate of Soda,** dull at £24. 5s. to £24. 10s., ex store. Miscible **Wood Naphtha,** quiet at 6s. 6d. per gallon, carriage paid. **Acetone,** lower at £127. per ton. **Lead Salts** are firm; white **Acetate** at £42., brown £43.; and **Lead Nitrate** £42. per ton, carriage paid. **Green Copperas** is in fair re-

quest at recent rates. **Barium Chloride,** steady at £14. 10s. per ton. **Oxalic Acid** neglected at 5¾d. to 6d. per lb., carriage paid. **Permanganate of Potash,** firm at 9½d. per lb. for B.P. crystals.

SWANSEA MARKET REPORT. Wednesday.

Tinplates maintained their firmness, and business was steady on the basis of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets** were in good demand, quotations being based on £18. 17s. 6d. per ton, f.o.b. **Copper** rather easier, with prompt at £62. 7s. 6d., and three months £63. 2s. 6d. per ton. **Tin,** prices somewhat irregular and easier at £193. 7s. 6d. per ton cash, and £194. 7s. 6d. three months. **Lead** in fair demand, and steady at £25. 12s. 6d. per ton prompt, and £25. 2s. 6d. forward; English, £27. **Spelter** rather weaker, with prompt at £32. 12s. 6d. per ton, and forward £32. 17s. 6d. **Zinc Sheets,** in good demand at £39. 7s. 6d. per ton, on truck at makers' works. **Pitch** quiet, with downward tendency at £6. 10s. 6d. per ton. **Oxalic Acid,** slow trading at 6¼d. per lb., f.o.b. **Sulphate of Ammonia** slow, with improved inquiry at the fixed prices. **Sulphate of Copper,** at £26. 2s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda,** quiet at £13. 5s. 6d. per ton, prompt; and £13. 12s. 6d. forward. **Bonemeal** better sought for; Indian, prompt, £9. 2s. 6d. per ton, in bags. **Arsenic,** very quiet at £69. 2s. 6d. per ton for white powdered. **Copperas** rather quiet at £2. 2s. 6d. per ton, delivered London or equal. **Benzol,** quieter at 1s. 4d. per gallon. **Creosote Oil,** quiet at about 9¾d. per gallon, f.o.b. **Turpentine** steady, with American, prompt, at £3. 17s. 3d. per cwt. **Linseed Oil,** raw, £2. 4s. 3d.; and boiled, £2. 6s. 9d. per cwt. **Cottonseed Oil,** common edible £2. 2s. 9d.; deodorised, £2. 5s. 9d. **Coconut Oil** firm, with Ceylon at £2. 4s. 3d. per cwt. **Olive Oil,** very quiet at £63. 17s. 6d. per ton. **Palm Oil** held firmly, with Lagos at £37. 2s. 6d.; softs, £36. 17s. 6d.; mediums, £36. 15s.; and hards, £37. 2s. 6d. **Coal** prices steady: Best Admiralty smokeless, £1. 8s. 3d.; seconds, £1. 6s. 6d.; ordinaries, £1. 6s., all per ton, f.o.b. **Anthracite** qualities in good call; best large, £2. 10s. 3d.; seconds, £2.; Paris, £3. per ton, f.o.b. **Patent Fuel** prices were upheld at £1. 10s. to £1. 13s. per ton. **Cokes** offered freely, with easier terms at £2. 2s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, in trucks at ovens.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Business in chemicals of the heavier class has again been very fair in the home branch of the trade, the demand for some products being more active. In the export branch shipments, on the whole, have been on a larger scale, and are proceeding briskly at date. **Bleaching Powder** has been rather more in request, and is £10. 5s. to £10. 7s. 6d. per ton for the home trade, and £11. 5s. to £11. 17s. 6d. per ton for export. **Chloride of Calcium** has had a moderate inquiry, and is £5. 12s. 6d. per ton. **Caustic Soda** has been in fair demand for use in the United Kingdom, and has been shipped more freely for foreign ports; it is £19. to £20. per ton for 76%, carriage paid, for the home trade. **Bicarbonate of Soda** has sold rather freely for use in the United Kingdom, and has had a fairly large shipment; it is £10. 10s. per ton, carriage paid, for home-trade uses. **Soda Crystals** have again been in very fair demand for use in the United Kingdom, but have been quiet in the export branch; they are £5. 5s. per ton, carriage paid, for the home trade. **Nitrate of Soda** has been but little called for, and is £13. 5s. to £13. 10s. per ton. **Borax** has been in steady demand; commercial crystals are £25. per ton, and powdered £26.; higher grade crystals are £29. per ton, and powdered £30.; superfine is £31. per ton. **Saltcake** has been in rather good request, and is £4. 10s. to £5. per ton for use by the home trade, and is £5. to £6. per ton for export. **Bichromate of Soda** has been in very fair demand, and is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has had a somewhat free sale for home-trade use, and has been shipped more largely for export; it is £7. 12s. 6d. per ton for the United Kingdom, and £8. per ton for export, this price varying somewhat according to destination. **Hyposulphite of Soda** has been quieter; it is £10. to £10. 10s. per ton, in 2cwt. bags, for commercial; and £15. to £16. per ton for the photographic quality, in 1cwt. kegs, according to quantity. **Sulphide of Soda** has been rather more in request; solid is £14. 10s. to £15. per ton, and crystals £8. 10s. to £9. per ton. **Chlorate of Soda** has been but little called for, and is 3d. to 3¼d. per lb. **Phosphate of Soda** has been very quiet, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been inactive, and is 6½d. per lb. **Yellow Prussiate of Potash** has been in quietly steady demand, and is 1s. 1d. per lb. **Red Prussiate** has been but little called for, and is 3s. per lb. **Carbonate of Potash** has had a very fair inquiry, and is £25. to £31. per ton, according to quality. **Nitrate of Potash** has been in quietly steady demand, and is £29. to £30. per ton. **Chlorate of Potash** has been very quiet, and is 3½d. to 4d. per lb. **Caustic Potash** has had a fair inquiry, and is £29. to £30. per ton. **Permanganate of Potash** has had a rather free sale, and is 9½d. to 9⅝d. per lb. **Bichromate of Potash** has been more in request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in moderate demand; first quality is £60. per ton, and second quality £57. per ton. **Sulphate of Ammonia** has had a very limited inquiry on home-trade account, but has again been shipped on a large scale for exportation; neutral of 25¾% is £14. 10s. per ton, and ordinary of 25¼% £13. 7s. per ton, for use in the United Kingdom. **Carbonate of Ammonia** has been more in request, and is 4d. per lb. **Muriate of Ammonia** has been quiet; grey is £32. per ton. **Magnesia** continues in very fair demand; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been quiet; for the home trade £12. per ton is quoted, and for export £11. to £11. 10s. per ton. **Sulphate of Alumina** has been in moderate demand, and is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been in fair request; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s., and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has been quieter, and is 1s. 2d. to 1s. 2½d. per lb. **Cream of Tartar** has been steadily called for, and the price has eased; it may be given as £4. 10s per cwt. **Boric Acid** has been rather quiet; commercial crystals are £48. per ton, and powdered £51. per ton in bags, and £2. per ton more if in casks. **Citric Acid** has been quieter, and the price is lower; it is 1s. 6½d. to 1s. 7d. per lb. **Oxalic Acid** has moved but slowly, and is slightly cheaper; it is 6d. per lb. **White Acetate of Lead** has been but little called for, and is £42. to £43. per ton. **Sulphate of Copper** continues very quiet for the home trade and for export; the price is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been rather more in request, and is £68. to £70. per ton for white powdered.

WEST OF SCOTLAND CHEMICALS. Wednesday.

Demand on home-trade account has been fairly steady during the past week, but export inquiries are limited, with little prospect of immediate improvement. Such trade as there is in the export branch is mainly the fulfilment of orders booked over long periods for standard commodities. Prices generally are steady, and quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, lower at £73. per ton on spot; new supplies coming in are round about £70. per ton; a quiet market. **Barium Chloride,** £15. per ton; this figure is unchanged, and there is nothing of interest to record. **Bleaching Powder,** a shade lower at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under these figures. **Boric Acid,** crystals, £48. per ton, makers' prices; demand rather poor. **Borax,** crystals, fairly steady at the recently reduced figure of £25. per ton, delivered; granulated, £24. 10s. per ton. **Calcium Chloride,** 70—75%, solid, £5. 12s. 6d. per ton on spot; Continental material quoted at slightly below this figure. **Citric Acid,** reduced to 1s. 6d. per lb., less 5%; little business about at the easier quotation. **Copper Sulphate,** £27. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar,** £4. 5s. per cwt. for 99% at Glasgow; quotation unchanged, and inquiry small. **Lead Acetate,** white, £41. 10s. per ton on spot; brown, more inquiry at £42. 10s. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 10s. per ton, ex store; a rather better tone is noticeable in this market, although foreign supplies now arriving are quoted at under this figure **Oxalic Acid,** quiet at about 6¾d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** lower at 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. 2½d. per lb.; this

is a dull market, in spite of the reduction of ½d. on the week. **Salammoniac,** first and second lump, £60. and £57. per ton respectively; crystals, £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 10s. per cwt., net; a better market, with quotation rising. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate,** £9. 15s. per ton, in 2cwt. bags; £11. 10s. per ton in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; rather easier, and inclined to be dull. **Tartaric Acid,** 1s. 2d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls.		Qnty.	Quantity (otherwise	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.	or Glns.	Gallons.		undeclared).	lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending September 15.

BARYTES—
Antwerp, 600 bgs.

CREAM OF TARTAR—
Barcelona, 25 cs.
Bordeaux, 12 cks.

DYESTUFFS (NATURAL)—
Logwood
New York, 170 cks.

GLUE—
Antwerp, 101 bls.

IRON OXIDE—
Gijon, 139 bgs.
Malaga, 41 pkgs., 254 brls.

LITHOPONE—
Antwerp, 20 cks.

OCHRE—
Malaga, 50 brls.
New York, 2 brls.

PLUMBAGO—
Colombo, 267 bgs.

POTASH SALTS—
Antwerp, 1,000 bgs., and 60 t.

ROSIN—
Bordeaux, 36 cks.
Lisbon, 616 brls.

SOAP—
Melbourne, 600 cs.

STEARINE—
New York, 212 brls.

TANNING MATERIALS—
Wattle
Natal, 3,250 bgs.
Unspecified
Natal, 107 bgs.

WHITE LEAD—
Antwerp, 5 brls.

ZINC OXIDE—
Antwerp, 25 cks.

GOOLE.

Week ending September 15.

HYDROGEN PEROXIDE
Ghent, 80 crbys.

MAGNESITE—
Amsterdam, 250 bgs.

GRANGEMOUTH.

Week ending September 15.

ACETIC ACID—
Rotterdam, 13 cks.

BONE PHOSPHATE—
Rotterdam, 508 bgs.

COAL TAR PRODUCTS—
Creosote Oil
Blaye, 1,002 t.

TALLOW—
Norway, 30 brls.

GRIMSBY.

Week ending September 15.

CHEMICALS (*otherwise undescribed*)
Rotterdam, 890 drms.

GLUE—
Antwerp, 76 bls.

TANNING MATERIALS—
Unspecified
Antwerp, 24 cks.

HULL.

From the return for week ending August 31, deduct—

TALLOW—
Christiania, 10 t.

Week ending September 15.

CALCIUM CARBIDE—
Antwerp, 10 t.; Christiania, 40 t.; Christiansand, 7 t.; Rotterdam, 50 t.

CAUSTIC POTASH—
Antwerp, 10 t.
Bremen, 10 t.

CHEMICALS (*otherwise undescribed*)
Antwerp, 14 t. 19 c.; Copenhagen, 5 c.; Genoa, 22 t.; Hamburg, 99 t. 19 c.; Naples, 1 t.; Rotterdam, 1 t.

CRYOLITE—
Copenhagen, 20 t.

DEXTRINE—
Rotterdam, 9 t. 17 c.

FERRO CHROME—
Antwerp, 16 t.
Gothenburg, 7 t.

FERRO SILICON—
Arendal, 1 t. 7 c.

GLUE—
Rotterdam, 1 t. 2 c.

KIESELGUHR—
Algiers, 10 t. 8 c.

MAGNESITE—
Hamburg, 25 t.

POTASSIUM CARBONATE—
Bremen, 5 t.

POTASSIUM PRUSSIATE—
Rouen, 1 t. 17 c.

ROSIN—
Bordeaux, 15 t. 3 c.; Gothenburg, 3 t. 9 c.; New Orleans, 18 t.; Rotterdam, 122 t. 11 c.; Valencia, 27 t.

SALT—
Hamburg, 100 t.

SOAP—
Copenhagen, 3 t.; Genoa, 10 t. Hamburg, 1 t. 3 c.

STEARINE—
Antwerp, 3 t.
Buenos Aires, 61 t.

TANNING MATERIALS—
Myrabolans
Calcutta, 295 t.
Quebracho Extract
Buenos Aires, 525 t.
Valonia
Smyrna, 40 t.

LEITH.

Week ending September 15.

CARBON BLACK—
Baltimore, 10 cs.

CASEIN—
Dunkirk, 201 bgs.

CRYOLITE—
Copenhagen, 500 bgs.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 475 bxs.
Madder
Dunkirk, 4 bls.

FERRO SILICON—
Gothenburg, 118 brls., 10 cs.

GLUCOSE—
Amsterdam, 10 cks.

GLUE—
Antwerp, 10 bgs.

LACTIC ACID—
Rotterdam, 25 cks.

LITHOPONE—
Rotterdam, 100 cks.

METHYL CHLORIDE—
Dunkirk, 2 cylds.

OCHRE—
Baltimore, 623 brls.

PHOSPHATE—
Bona and Aguilas, 3,000 t.

POTASSIUM SALTS (*otherwise undescribed*)—
Antwerp, 4,000 bgs.

RED LEAD—
Amsterdam, 31 cks.

ROSIN—
Hamburg, 96 brls.

SOAP—
Copenhagen, 9 cs.

STEARINE—
Antwerp, 25 bgs.

ZINC OXIDE—
Rotterdam, 10 cs., 5 cks.

LIVERPOOL.

Week ending September 15.

ACETONE—
Austria, 21 drms.

AMMONIA—
Germany, 34 cylds.

ANTIMONY REGULUS—
China, 20 t.

ARGOLS—
Portugal, 278 bgs.

ARSENIC—
Australia, 15 cks.; Japan, 160 cs.; U.S., 60 cs.

BARYTES—
Germany, 49 t.
Spain, 99 t.

BEESWAX—
Chile, 73 bgs.

BISMUTH ORE—
China, 1 t. 8 c.

CALCIUM CARBIDE—
Italy, 600 drms.

CARBON BLACK—
U.S., 198 cs.

CARNAUBA WAX—
Brazil, 112 bgs.

CAUSTIC POTASH—
Germany, 5 t. 18 drms.

CHEMICALS (*otherwise undescribed*)
Portugal, 2 cs.

COPPER ORE—
Chile, 235 t.

CREAM OF TARTAR—
Spain, 33 cks., 70 kgs.
U.S., 20 kgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Canada, 1 cs.

DYESTUFFS (NATURAL)—
Cutch
East Indies, 500 bgs., 100 bxs.
Fustic
France, 30 cks.
Logwood
France, 25 cks.

FERRO CARBON TITANIUM—
U.S., 187 cs.

FERRO PHOSPHORUS—
France, 10 t.

FORMALDEHYDE—
Germany, 50 cks.

GELATINE—
Germany, 5 cs.
Holland, 20 bls.

GLYCERINE—
Holland, 11 drms.

INFUSORIAL EARTH—
U.S., 75 t.

IRON OXIDE—
Belgium, 20 cks.

LITHOPONE—
Holland, 42 t.

MAGNESITE—
Austria, 227 bgs.
Holland, 10 t.

MAGNESITE (CALCINED)—
Holland, 9 t. 17 c., and 611 bgs.

MAGNESIUM (METAL)—
Germany, £79.

MAGNESIUM SULPHATE—
Germany, 100 bgs.
Holland, 204 bgs.

MANGANESE ORE—
East Indies, 3,400 t.

METHYLIC ALCOHOL—
Germany, 35 drms.

OCHRE—
France, 33 cks.

PARAFFIN WAX—
U.S., 132 cs.

PITCH—
Switzerland, 11 cks.

POTASSIUM CARBONATE—
Germany, 48 cks.

POTASSIUM CHLORATE—
Switzerland, 100 kgs.

POTASSIUM SULPHATE—
Germany, 280 t.

RED LEAD—
Germany, 37 cks.

ROSIN—
France, 25 cks.
U.S., 1,000 brls.

SALAMMONIAC—
Germany, 5 cks.

SALTPETRE—
Holland, 60 kgs.

SOAP—
Australia, £112.
U.S., 70 brls.

SODIUM ACETATE—
Belgium, 36 cks.

SODIUM NITRATE—
Chile, 485 t., 5,697 bgs.

STEARINE—
Germany, 67 bgs.
Holland, 20 bgs.

SULPHUR—
Italy, 190 bgs.

TALLOW—
Argentine, 29 cks.; Australia, 150 cks.; Holland, 181 brls.

TANNING MATERIALS—
Chestnut
France, 1,195 cks.
Italy, 20 cks., 52 cs.
Divi Divi
East Indies, 29 t.
Gambier
East Indies, 456 cs.
Myrabolans
East Indies, 4,000 pkts., 50 t.
Oak
Switzerland, 40 cks.
Sumac
Italy, 500 bgs.
Spain, 125 bgs.
Wattle
E. Africa, 1,380 bgs., 824 bls.
Unspecified
U.S., 5 cks.

TIN ASHES—
Spain, 1 t.

TIN OXIDE—
Portugal, 22 t.

TITANIUM ORE—
Portugal, 10 t.

ULTRAMARINE BLUE—
France, 4 cks.

WHITE LEAD—
Germany, 37 cks.

WOLFRAM ORE—
China, 175 t.; East Indies, 40 t.; Portugal, 16 t.; Spain, 12 t.

ZINC ASHES—
U.S., 99 t.

ZINC OXIDE—
Belgium, 40 brls.; Holland, 35 cks.; U.S., 5 brls.

LONDON.

Week ending September 15.

ACETIC ACID—
Austria, 41 pkgs. R. E. Green
,, 283 crbys. V. Blagden
Germany, 70 V. Blagden

ACETONE—
Czecho-Slovakia, 8 t. V. Blagden
Germany, 20 1 c.

ALUMINIUM HYDRATE—
Germany, 5 pkgs. Lavington

ALUMINIUM SULPHATE—
France, 500 pkgs. J. Bailey
Spain, 5 t. MacAndrews

AMMONIUM PHOSPHATE—
Germany, 50 pkgs. H. G. Harper
,, 10

AMMONIUM SALTS (*otherwise undescribed*)—
Germany, 20 pkgs. Bush, Beach & Gent.

ARGOLS—
France, 339 pkgs.
Spain, 2,054

ARSENIC—
Germany, 10 c.
,, 19 Gough, Kidstone
Japan, 12 t. 7 c.
U.S.A., 13 A, H, Pickering

ARSENIOUS ACID—
Japan, 200 pkgs. W. & S. Bowditch

BARYTES—
Germany, 150 bgs. W. Harrison
,, 66 cks.
,, {50 bgs. / 20 cks. Felton & Crepin

BEESWAX—
B.W.I., 1 pkg. Weber, Smith & Hoare
Czecho-Slovakia, 5 bgs.
France, 36 bgs.
Germany, 23 pkgs. Scheuer
Tanganyika, 121 bgs. Leach

BORATE OF LIME—
Chile, 23 t. 5 c. Borax Consol.

BORAX—
U.S.A., 165 t. W. W. Jones, Dooly

BORIC ACID—
France, 294 pkgs. Burton Baker
Italy, 224 Borax Consol.

BUTYRIC ACID—*
——— £232.

CALCIUM CARBIDE—
Norway, 50 t.
,, 10 C. J. Quirk
,, 5 J. Spurling
Poland, 5 c. Billiard Resdell
Switzerland, 393 pkgs.
S.C.S. State, 100 t.

CALCIUM CHLORIDE—
Germany, 411 pkgs. Petri
,, 14 t. 18 c. Bush, Beach & Gent.

CAMPHOR—
China, {15 drms. / 50 cs. W. M. Smith
Japan, 300 cs. S. Warner
,, 25 cs. W. M. Smith

CANDELILLA WAX—
U.S.A., 16 bgs. Leach

CARBON BISULPHIDE—
Germany, £300. Roberts, Brining

CARBON BLACK—
U.S.A., 175 cs. Anchor Chem.
,, 108 Hughes & Hughes
,, 45 Payne
,, 100 Binney & Smith
,, 40 Typke & King
,, 40

CARBON TETRACHLORIDE—*
——— £299.

CARNAUBA WAX—
Czecho-Slovakia, 3 bgs.

CASEIN—
Brit. India, £300. W. France Fenwick
France, £65. P. Le Brun
Germany, £610. Cox, Fallas, Eves

CAUSTIC POTASH—
Germany, 6 drms. M. Steel

CERESINE WAX—
Czecho-Slovakia, 86 bgs.

CHEMICALS (*otherwise undescribed*)
Belgium, £45.
Canada, £1,500. G. W. Sheldon
Czecho-Slovakia, £25. T. P. Priestley
France, £16.
,, £9. E. A. Kimpton
,, £34. Mory
Germany, £49. E. Friedlander
,, £21. J. Schnurmann
,, £43. F. N. Riches
,, £91. Petri
,, £58. H. Smart
,, £78.
,, £96. Cazaly Mills
,, £41. H. W. Winter
,, £45. Braes, Halliday
,, £30. Beck & Pollitzer
Poland, £19. H. Keller
Sweden, £311. C. B. Gobey

CHEMICALS (*otherwise undescribed*)
U.S.A., £105.

CHEMICALS (*otherwise undes.*)—*
——— £894.

COAL TAR PRODUCTS—
Creosote
Holland, £85. Scheuer

COBALT OXIDE—
Canada, £2,992. Chance & Hunt

CREAM OF TARTAR—
Italy, 40 pkgs. McDougall & Bonthron

DEXTRINE—
Germany, 19 t. 14 c. K. J. Mulder
Holland, 2 F. G. Angel
,, 10 J. Spurling
,, 2 9 Dunlop
Latvia, 24 K. J. Mulder

DYESTUFFS (ARTIFICIAL)—
Unspecified
Germany, £83.
,, £306. Greeff

DYESTUFFS (NATURAL)—
Annatto
Denmark, 10 pkgs.
U.S.A., 10
Cutch
Burmah, 60 pkgs. Leach
Indigo
Brit. India, 13 chts.

FERTILISERS (*otherwise undes.*)—
Belgium, 55 t. C. Page
,, 120 C. S. Lovell
,, 50 W. M. Smith
China, 100 bls. ,,
Holland, 35 t. C. Page
S. America, 200

FORMALDEHYDE—
U.S.A., 75 pkgs. V. Blagden
Germany, 32 cks. Greeff

FUSEL OIL—
Greece, 12 drms. W. J. Bush

GELATINE—
France, £6. R. & J. Park
,, £90. Rubeck Thew
,, £4,330. Soc. des Prod. Chim.
Germany, £475. Crowli
,, £20. C. W. Hartrodt
,, £175. C. Zimmermann
Switzerland, £37. Europ. & Gen. Exp.

GLUE—
Austria, £314. P. Ingenlath
Belgium, £520. ,,
,, £50. H. H. Poole
,, £55. A. J. Malicet
,, £15.
France, £699. Soc. des Prod. Chim.
,, £160. Symons
,, £165. O. Murray
,, £124. A. J. Malicet
,, £1,120. Van Oppen
Germany, £46. Dixons White
,, £419. H. Smart
Holland, £5. United Kingdom Tobacco
,, £165.
Italy, £632. Union Glue & Gel.
U.S.A., £201. C. S. Lovell
,, £175. Duche & Knight

GLYCERINE—
Holland, £37.

HYDROGEN PEROXIDE—
U.S.A., 19 c. Allen & Hanbury

ISINGLASS—
Japan, 55 bls. W. M. Smith
,, 30
,, 10 R. Warner
Straits Setts., 12 cs. E. Bonstead

KIESELGUHR—
Germany, 10 t. 10 c.
U.S.A., 9 Martinaeus
,, 38 T. Meadows

LEAD ACETATE—
Germany, £401.

LITHARGE—
France, 12 cks. G. T. Symons

LITHOPONE—
Belgium, 80 cks.
,, 109 Taylor & Cox
Germany, 12 cks. Petri
,, 60 M. Ashby
Holland, 100 F. T. H. Nye

MAGNESITE—
Brit. India, £175. Morgan Crucible
Holland, £47.
,, £98. Ray

METHYL ETHYL KETONE—
Germany, £450. Chance & Hunt

MINERAL COLOURS (*otherwise undescribed*)—
France, 22 cks. Taylor
Germany, 50 bgs. H. Smart
,, 30 cks. Burrell
,, 60 Brit. Fibro-Cement
Spain, 20 brls. Pinchin, Johnson

OCHRE—
France, 27 cks. L. Le Personne
Spain, 75 brls. Jenson & Nicholson

OZOKERITE—
Austria, 580 bgs. T. H. Mims
Germany, 5 Holroyds Oil & Ceresine
Czecho-Slovakia, 20

PARAFFIN WAX—
Germany, 9 t. 17 c. Poth Hille
Spain, 2 8 Leach
U.S.A., 16 18 H. Hill
,, 65 Anglo-Amer. Oil
,, 22 7 Prices' Pat. Candle
,, 94 15 A. C. E. Garnham

PLUMBAGO—
Germany, 22 bgs. L. G. Smith
,, 52 J. G. Denis
,, 67 E. Friedlander
U.S.A., 52 cs. C. R. Averill
,, 18 kgs. ,,
,, 55 brls. ,,
,, 11 Pitt & Scott

POTASSIUM CARBONATE—
Germany, 5 brls. Petri
,, 18 pkgs. Beck & Pollitzer

POTASSIUM CHLORATE—
Sweden, 80 pkgs. J. J. Masters

POTASSIUM NITRATE—
Brit. India, 257 pkgs. G. & H. Green
Belgium, 20
Germany, 1,000 Nobel Indust.

PRUSSIAN BLUE—
Holland, 8 cks. Taylor & Cox
,, 10

RED LEAD—
France, 4 cks. L. Bucknell

ROSIN—
France, 100 cks. Bigland & Jeffreys
,, 35
,, 26 Langley Smith
Portugal, 36 ,,
Sweden, 80 brls. R. E. Green
U.S.A., 150 Rosin & Turps.
,, 450 Biglands & Jeffrey
,, 300
,, 230 Thornett & Fehr

SALAMMONIAC—
Germany, 28 pkgs. Bush, Beach & Gent.

SALT—
Germany, 55 t.

SHELLAC—
Brit. India, 12 t. 19 c. Litchfield & Saundy
,, 5 18 J. W. Cook
Straits Setts. 14 J. W. Cook

* Entered under the Safeguarding of Industries Act.

SOAP—
Belgium, £15. S. Kalisky
Canada, £2,503. Gerhard & Hey
Denmark, £100. Beck & Pollitzer
,, £114.
France, £20. Rootham Woodward
,, £40. T. E. Fox
,, £88. F. Papazoglan
,, £93. E. E. Mayer
,, £18. C. W. Johnson
,, £341.
,, £35. Pronk Davis & Rushby
,, £27. W. H. Muller
,, £56. Symons
,, £10. P. Le Brun
Germany, £28. W. H. Muller
,, £29.
,, £40. Scheukers
Victoria, £40. Stockwell
U.S.A., £1,200. L. F. Smith
,, £750. Simpson, Spence & Young

SODA CRYSTALS—
Belgium, 10 t. P. Winn
,, 10
Spain, 2 J. M. Steel

SODIUM BICHROMATE—
U.S.A., 7 t.

SODIUM HYPOSULPHITE—
France, 29 t. 4 c.

SODIUM SALTS (*otherwise undes.*)
U.S.A., 2 c. Greeff

STEARINE—
Belgium, 38 bgs. Rubeck, Thew
,, 26 H. Hill
N.S.W., 24 cks. Loders & Nucoline
Uruguay, 146 tres.

SULPHUR—
France, £8. W. H. Muller

TALLOW—
Argentine Republic, 24 t. 15 c. T. H. Harris
,, 50
B.W.I., 17
Norway, 121 J. Knight
,, 16 14 Nickoll & Knight
N.Z., 23 6 Lever
,, 105 16
Queensland, 26 8
W. Aust. 340 16
U.S.A., 27 11 Thornett & Fehr

TANNING MATERIALS—
Chestnut Extract
France, 50 pkgs.
U.S.A., 75
,, 140 W. Aitken
Gambier
Straits Setts, 108 pkgs. A. Everingham
,, 255 Humphreys P. Ellis
,, 50 Hoare Wilson
,, 340 A. J. Humphrey
Unspecified
France, 10 pkgs. E. A. Kimpton
Cape, 50 t.

TANNING MATERIALS—
Unspecified
Germany, 37 pkgs.
Natal, 11 t.
,, 11 J. J. Williamson

TAR (*otherwise undescribed*)—
Holland, 56 brls. H. Knight
Poland, 97 brls. White Sea & Baltic
,, 13 t. Fairclough, Dodd & Jones
Sweden, 16 brls. E. S. Walkinshaw

THORIUM NITRATE—*
——— £475.

TURPENTINE—
France, 25 brls. Lowden, Connell
Germany, 2 Stromwall
Sweden, 19 Perry & Hope
U.S.A., 360
,, 100 Bigland & Jeffreys
,, 250 Rosin & Turp. Imp.

ULTRAMARINE—
Belgium, 2 cks. Henderson, Craig
,, 2 brls.
France, 1 ck. Stockwell
Germany, 40 cs.
,, 1 Stancourt & Muir

WHITE LEAD—
Germany, 53 cks. H. Smart
,, 91 Pallister Luck
,, 37
Holland, 40 brls. Chance & Hunt
U.S.A., 56 Greeff

ZINC OXIDE—
Germany, 250 cks. H. G. Atkinson

MANCHESTER.

OFFICIAL AMENDMENT.

To return for week ending August 25 add

IRON PYRITES—
——— 12 t.

Week ending September 15.

ACETATE OF LIME—
Antwerp, 165 bgs.

ACETIC ACID—
Hamburg, 91 crbys., 82 blns.; Montreal, 742 brls.; Rotterdam, 15 cks.

AMMONIUM SULPHATE—
Marseilles, 540 bgs.

BARYTES—
Bremen, 22 cks., 230 bgs.

BEESWAX—
New York, 5 cs.

BLEACHING POWDER—
Hamburg, 40 cks.
Genoa, 80 brls.

CALCIUM CARBIDE—
Amsterdam, 400 drms.; Gothenburg, 600 drms.; Skien, 40 drms.

CALCIUM CHLORIDE—
Hamburg, 162 drms.

CAUSTIC POTASH—
Hamburg, 35 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 1 cs., 41 cks.
Hamburg, 193 cks.

CITRIC ACID—
Marseilles, 50 cks.

CREAM OF TARTAR—
Marseilles, 50 brls., 22 cks.

DEXTRINE—
Bremen, 12 cks.
Hamburg, 150 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bremen, 30 cks.
Hamburg, 2 pkgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 167 cks.

FELSPAR (POTASH)—
Christiania, 400 bgs.

FERRO CHROME—
Trondhjem, 250 cs.

FERRO SILICON—
Skien, 301 cs., 109 drms.

FORMALDEHYDE—
Bremen, 15 crbys.; Hamburg, 339 crbys.; Rotterdam, 27 crbys.

GLUCOSE—
New York, 25 brls.
Rotterdam, 105 cks.

GLUE—
Antwerp, 45 bls.; Hamburg, 21 bgs.; Rotterdam, 4 cks.

GLYCERINE—
Rotterdam, 3 drms.

INFUSORIAL EARTH—
Hamburg, 326 bgs.

LEAD ACETATE—
Rotterdam, 2 cks.

LITHOPONE—
Bremen, 40 cks.
Rotterdam, 420 cks.

MAGNESITE—
Amsterdam, 200 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 722 drms.

MAGNESIUM SULPHATE—
Rotterdam, 717 bgs.

NICKEL SULPHATE—
Treport, 23 cks.

OXALIC ACID—
Hamburg, 5 brls.

PARAFFIN WAX—
New York, 153 cs., 130 brls.

PARALDEHYDE—
Hamburg, 1 cs.

PHOSPHORUS—
Montreal, 400 cs.

POTASSIUM BROMATE—
Bremen, 3 cs.

POTASSIUM CHLORATE—
Hamburg, 50 brls.

POTASSIUM PERMANGANATE—
Hamburg, 200 drms.

PRUSSIAN BLUE—
Rotterdam, 6 cks.

SALT—
Hamburg, 465 bgs.

SOAP—
Marseilles, 10 cs.
Valencia, 50 cs.

SODIUM ACETATE
Jersey and Rouen, 24 cks.
Hamburg, 27 cks.

SODIUM BICHROMATE—
Baltimore, 113 cks.

SODIUM CHLORATE—
Hamburg, 100 cks.

SODIUM HYPOSULPHITE—
Hamburg, 5 cks.

SODIUM NITRATE—
Hamburg, 145 cks.

SODIUM PRUSSIATE—
Rotterdam, 34 cks.

SODIUM SULPHIDE—
Hamburg, 16 cks.

STEARINE—
Antwerp, 41 bgs.

TANNING MATERIALS—
Unspecified
Baltimore, 55 brls.
New York, 10 brls.

TARTARIC ACID—
Amsterdam, 40 kgs.

THIOCARBANILID—
New York, 8 brls.

ZINC DUST—
Antwerp, 100 cks.

NEWCASTLE-ON-TYNE

Week ending September 15.

ACID (*otherwise undescribed*)—
Rotterdam, 25 cks.

BARYTES—
Cartagena, 140 brls.
Hamburg, 35 brls.

CALCIUM CARBIDE—
Christiania, 180 bls.

COAL TAR PRODUCTS—
Tar
Hamburg, 50 brls.

CREAM OF TARTAR—
Cartagena, 23 cks.

KIESELGUHR—
Antwerp, 160 bgs.

LITHARGE—
Rotterdam, 15 cks.

LITHOPONE—
Rotterdam, 20 cks.

MAGNESITE—
Hamburg, 26 bgs.
Rotterdam, 100 bgs.

STEARINE—
Antwerp, 25 bgs.

ZINC OXIDE—
Antwerp, 40 brls.

N. & S. SHIELDS.

Week ending September 14.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending September 15.

AMMONIA—
Auckland, 1 t. 3 c.

AMMONIUM SULPHATE—
Malaga, 147 t. 6 c.

CARBON BLACK—
Brisbane, 5 c.

CHEMICALS (*otherwise undescribed*)
Abadan, 194 pkgs.; Aden, 20 pkgs.; Algoa Bay, 1 pkg.; Auckland, 120 pkgs.; Bombay, 90 pkgs.; Cape Town, 14 pkgs.; Dunedin, 10 pkgs.; Kilindini, 40 pkgs.; Lyttleton, 10 pkgs.; Montreal, 152 pkgs.; New York, 120 pkgs.; Pt. Swettenham, 5 pkgs.; Punta Arenas, 20 pkgs.

CHEMICALS (*otherwise undescribed*)
Valparaiso, 862 pkgs.;
Wellington, 40 pkgs.;
Zanzibar, 100 pkgs.

COAL TAR PRODUCTS—
Pitch
Karachi, 3 t. 15 c.
Tar
Aden, 2 t. 3 c.; Basra, 13 c.; Cape Town, 11 t. 2 c.; Karachi, 11 t. 5 c.; Mossel Bay, 1 t. 10 c.; New York, 15 t. 4 c.; Palembang, £186.; Penang, £600.; Singapore, £45.; Zanzibar, 5 c.
Tar Oil
Penang, £10.
Unspecified
Antofagasta, £49.
Malta, 2 t. 7 c.

DISINFECTANTS (*otherwise undes.*)
Cape Town, 3 t. 2 c.; East London, 9 c.; Karachi, 2 t. 10 c.; Wellington, 11 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Lyttleton, 4 kgs.

GLUE—
Barcelona, 5 c.

MAGNESIA—
Singapore, £31.

PARAFFIN WAX—
Antofagasta, £1,206.; Genoa, 12 t. 10 c.; Gijon, 10 t.; Leghorn, 15 t.; Mollendo, £82.; Pt. Said, £200.; Tarragona, 10 t.; Trieste, 20 t.; Valparaiso, £199.; Valencia 2 t. 10 c.; Venice, 125 t.

POTASSIUM BICHROMATE—
Auckland, 19 c.; Bombay, 10 c.; Karachi, 5 c.

RED LEAD—
Bombay, 15 t. 4 c.

ROSIN OIL—
Hamburg, 9 t. 18 c.

SHEEP DIP—
Buenos Aires, 64 t. 4 c.; Lyttleton, 25 t. 2 c.; Mollendo, £16.

SOAP—
Abadan, 16 c.; Algoa Bay, 2 t. 4 c.; Bombay, 5 t. 10 c.; Buenos Aires, 11 c.; Gothenburg, 19 c.; New York, 4 c.

SODIUM BICHROMATE—
Bombay, 2 t. 8 c.

SODIUM CARBONATE—
New York, 3 c.

SPERMACETTI WAX—
Hamburg, 1 t. 9 c. 2 qrs.

SULPHURIC ACID—
Basra, 15 c.

TANNING MATERIALS—
Sumac
New York, 2 t. 19 c.

ZINC ASHES—
Antwerp, 6 t. 14 c.

GRANGEMOUTH.

Week ending September 15.

COAL TAR PRODUCTS—
Creosote Oil
Galveston, 397,790 galls.
Pitch
Trondhjem, 10 t.

DYESTUFFS (NATURAL)—
Cutch
Rotterdam, 5 t.

MAGNESIUM OXIDE—
Rotterdam, 19 c.

PARAFFIN WAX—
Antwerp, 5 t.

POTASSIUM BICHROMATE—
Bergen, 8 c.

HULL.

Week ending September 11.

ALUM—
San Francisco, 101 brls.

AMMONIUM SULPHATE—
Amsterdam, 508 bgs.

CAUSTIC SODA—
Kotka, 200 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 30 cs., 50 pkgs., 12 drms.: Christiansand, 2 kgs.; Christiania, 21 cs., 8 cks., 8 pkgs., 13 drms.; Gothenburg, 43 cks., 4 brls.; Harlingen, 8 drms.; Helsingfors, 320 cks., 2 cs., 192 drms.; Kotka, 1 cs.; Newfairwater, 14 cks.; Rotterdam, 4 cks., 30 drms.; Wiborg, 497 drms.

COAL TAR PRODUCTS—
Benzol
Bremen, 642 drms.
Creosote
San Francisco, 20 drms.
Sydney, 100 drms.
Mirbane Oil
Newcastle, 2 drms.
Tar
San Francisco, 5 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Brisbane, 5 cs.
Melbourne, 25 kgs.

GLUE—
Christiania, 2 brls.; Helsingfors, 43 bgs.; Rotterdam, 20 bgs.

MINERAL WHITE—
Antwerp, 110 bgs.

RED LEAD—
Gibraltar, 3 kgs.

SALT—
Amsterdam, 121 cs.

SOAP—
Christiania, 4 cks., 2,862 cs.; Gothenburg, 3 cks., 1 cs.; Harlingen, 4 cs.; Malta, 24 drms.; Riga, 1 cs.; Santa Marta, 5 hmprs.

TALLOW—
Revai, 14 brls.

TURPENTINE—
Antwerp, 2 cks.

WHITE LEAD—
Kotka, 2 kgs.

LEITH.

Week ending September 15.

DYESTUFFS (NATURAL)—
Cutch
Amsterdam, 20 bxs.

IRON OXIDE—
Copenhagen, 100 bgs.
Hamburg, 150 bgs.

MAGNESIUM CARBONATE—
Nantes, 200 bgs.

PARAFFIN WAX—
Copenhagen, 32 bgs.
Nantes, 80 bgs.

POTASSIUM BICHROMATE—
Copenhagen, 15 cks.

SHEEP DIP—
Arnarstapa, 15 drms.; Hallgeirsey, 5 cs.; Hollsos, 2 cs.

SOAP—
Eskefjord, 2 cs.: Kroksfjardarnes 3 cs.; Stykkisholm, 6 cs.; Reykjavik, 5 cs., 2 cks.

SODA—
Stykkisholm, 4 bgs.

TALLOW—
Rotterdam, 160 cks.

LIVERPOOL.

Week ending September 13.

ACETIC ACID—
Las Palmas, 7 c. 2 qrs., £40.

ALBUMEN—
Sydney, 10 c., £89.

ALUM—
Aden, 1 t., £12.
Callao, 2 t. 19 c., £29.

ALUMINIUM SULPHATE—
Bombay, 13 t., £129.; Calcutta, 75 t., £661.; Sydney, 5 t., £45. Melbourne, 5 t., £45.

AMMONIA—
Bombay, 5 t. 5 c., £89.

AMMONIA (ANHYDROUS)—
Durban, 2 t. 1 c., £287.

AMMONIUM CARBONATE—
Buenos Aires, 2 t. 9 c., £83.; Barcelona, 1 t. 19 c., £69.; Batavia, 2 t. 10 c., £93.: Copenhagen, 1 t. 9 c., £44.; Constanza, 1 t. 19 c., £47.; Corunna, 10 c., £20.; Genoa, 15 c., £22.; Karachi, 1 t., £38.; Piraeus, 1 t., £31.; Rotterdam, 1 t. 4 c., £33.; Vigo, 1 t., £35.

AMMONIUM CHLORIDE—
Calcutta, 5 t., £203.; Karachi, 6 t. 5 c., £254.; Newcastle, 15 t., £600.; Rouen, 14 t. 19 c., £456.

AMMONIUM PHOSPHATE—
Durban, 2 t. 3 c., £131.

AMMONIUM SULPHATE—
Demerara, 434 t. 2 c., £6,450.; Kobe, 100 t., £1,800.; Las Palmas, 148 t., £2,365.; Orotava, 15 t., £232.; Samarang, 300 t. 3 c., £4,444.; Sourabaya, 275 t. 4 c., £4,080.; Teneriffe, 20 t., £310.; Tarragona, 198 t. 1 c., £2,850.

ANTIFOULING PAINT—
Kobe, 3 t. 10 c., £332.
Valencia, 1 t. 9 c., £95.

ARSENIC—
Buenos Aires, 4 t. 9 c., £325.

BARIUM CARBONATE—
Kobe, 1 t. 1 c., £20.

BARIUM CHLORIDE—
Calcutta, 1 t., £19.
Rouen, 20 t., £310.

BLEACHING POWDER—
Bombay, 25 t., £300.; Bilbao, 5 t. 7 c., £54.; Calcutta, 30 t., £290.; Rio de Janeiro, 30 t. 1 c., £360.; Santos, 10 t., £120.

BOILER COMPOSITION—
Brisbane, 2 t., £107.
Pasages, 18 c., £14.

BONE SUPERPHOSPHATE—
Las Palmas, 4 t., £27.

BORAX—
Dantzig, 6 t. 17 c., £189.; Fremantle, 1 t., £28.; Havana, 6 c., £8.; Lagos, 4 c., £5.; Manzanillo, 5 c., £7.; Madras, 2 t. 5 c., £60.; Rouen, 1 t., £27.; Rotterdam, 1 t., £26.; Rangoon, 1 t. 5 c., £35.; South Africa, 2 c., £5.; Sao Paulo, 5 t., £132.; Sydney, 7 t. 3 c., £182.; Valparaiso, 2 t. 19 c., £81.; Wasa, 10 c., £13.

BORAX GLASS—
Barranquilla, 1 t., £75

BORIC ACID—
Amsterdam, 4 c., £10.; Camperico, 2 c., £9.; Durban, 1 c., £4. 5s.; Fremantle, 3 c., £9.

CALCIUM CARBIDE—
Accra, 8 c. 2 qrs., £10.; Punta Arenas, 1 t. 15 c., £30.

CALCIUM CHLORIDE—
Brisbane, 10 t. 3 c., £58.; Fremantle, 13 t. 14 c., £83.; Melbourne, 18 t. 8 c., £111.; Newcastle, 10 t. 3 c., £59.; Punta Arenas, 3 t., £18.; Rio de Janeiro, 5 t. 1 c., £32.; Sydney, 8 t. 2 c., £53.

CHEMICALS (*otherwise undescribed*)
Alexandria, 1 t., £27.; Calcutta, 3 t. 19 c., £73.; Durban, 51 t. 6 c., £368.; Genoa, 3 t. 1 c., £172.; Lyttleton, 24 t. 19 c., £62.; Melbourne, 3 t. 5 c., £1,421.; New York, 18 t. 8 c., £46.; Santos, 13 c. 2 qrs., £48.; Wanganui, 10 c., £17.; Wyborg, 10 t. 5 c., £25.

CHLORINE—
Bombay, 1 t. 6 c., £34.
Melbourne, 5 c., £12.

CHROMIUM ACETATE—
Copenhagen, 10 c., £29...

CHROMIUM OXIDE—
Antwerp, 2 c., £13.
Valencia, 2 c., £14.

CITRIC ACID—
Durban, 5 c., £47.

COAL TAR PRODUCTS—
Beta Naphthol
Calcutta, 1 c. 2 qrs., £10.
Carbolic Acid
Calcutta, 1 t. 10 c., £65.; Genoa, 2 t. 10 c., £343.; Hamburg, 6 t. 12 c., £782.; Kobe, 5 t., £612.; Petrograd, 18 t., £2,310.; Sydney, 2 t., £78.
Creosote
Antwerp, 1 t. 18 c., £41.; Christiania, 8 c., £10.; Durban, 6 t. 8 c., £163.; Fremantle, 1 t. 3 c., £39.; Kobe, 5 t. 2 c., £226.; New York, 24 t. 4 c., £740.; Philadelphia, 1 t. 9 c., £40.; Sydney, 1 t. 4 c., £36.
Mirbane Oil
Valparaiso, 6 c., £20.
Naphthalene
New York, 38 t. 2 c., £457.
Paradichlor-benzol
Brisbane, a qty.
Paranitraniline
Calcutta, 1 c., £13.
Pitch
Demerara, 12 t. 3 c., £117.
Pyridine
New York, 2 t. 5 c., £308.
Tar
Alexandria, 4 t. 2 c., £43.
Sekondi, 1 t. 15 c., £22.
Unspecified
Dantzig, 10 t., £1,213.
Rotterdam, 2 t. 6 c., £288.

COBALT CHLORIDE—
Perth, 1 c., £21.

COBALT OXIDE—
Hankow, 9 c., £462.; Kobe, 1 t. 11 c., £1,593.; Paranagua, 1 c., £31.; Valencia, 4 c., £210.; Sydney, 1 c. 2 qrs., £80.

COPPER SULPHATE—
Barbados, 10 c., £13.; Colombo, 8 c., £11.; Madeira, 5 c., £6.; Monte Video, 14 t. 15 c., £368.; Nyasaland, 5 c., £7.: Pimental, 1 c., £2 10s.; Vancouver, 5 t., £120.

CREAM OF TARTAR—
Adelaide, 6 t., £555.: Brisbane, 5 t. 10 c., £508.: Fremantle, 4 t., £370.; Sydney, 2 t., £185.

DISINFECTANTS (*otherwise undes.*)
Alexandria, 16 t. 11 c., £1,025.; Bombay, 7 c., £11.; Calcutta, 2 c. 3 qrs., £16.; Copenhagen, 4 t. 18 c., £271.; Colombo, 15 c., £12.; Dunedin, 15 c., £32.

DISINFECTANTS (*otherwise undes.*)
Guayaquil, 1 t. 18 c., £50.; Hamburg, 10 t. 1 c., £574.; Hong Kong, 10 t. 7 c., £327.; Kobe, 11 t. 11 c., £856.; Lome, 2 c. 2 qrs., £28.; Melbourne, 3 c. 2 qrs., £55.; Opobo, 5 c., £23.; Penang, 4 c., £42.; Pt. Swettenham, 1 t. 19 c., £31.; Rangoon, £20.; Singapore, 5 c., £12.; Trinidad, 2 t. 3 c., £63.

DYESTUFFS (ARTIFICIAL)—
Alizarine
New York, 1 t., £128.
Sourabaya, 4 t. 8 c., £629.
Indigo
Chefoo, 5 t. 19 c., £775.: Hankow, 23 t. 16 c., £3,100.; Shanghai, 1 t. 15 c., £495.
Unspecified
Algoa Bay, 2 qrs., £10.; Auckland, 11 c., £93.; Bombay, 7 t. 1 c., £1,313.; Barcelona, 12 c., £327.; Boston, 3 t. 14 c., £1,207.; Calcutta, 1 t., £434.; Cape Town, 2 c., £32.; Kobe, 15 lb., £19.; Karachi, 10 c., £149.; Lisbon, 2 qrs., £12.; Melbourne, 2 c., £20.; Montreal, 1 t. 17 c., 2 qrs., £558.; Pt. Elizabeth, 1 c., £16.; Sydney, 3 t., £1,045.; Shanghai, 1 t. 15 c., £495.; Wellington, 10 c., £84.

DYESTUFFS (NATURAL)—
Fustic
Cape Town, 2 qrs., £17.

ESSENTIAL OILS—
Synthetic
Durban, 5 c., £296.; Kobe, 3 c. 2 qrs., £238.; Switzerland, 1 qr., £19.; Wellington, 1 c., £69.

FERTILISER (NITROGENOUS)—
Baltimore, 100 t., £600.

FERTILISER (*otherwise undes.*)—
Demerara, 1 t. 19 c., £14.

FORMALDEHYDE—
Barcelona, 2 t., £300.

GLYCERINE—
Bombay, 6 t. 14 c., £577.; Bourgas, 12 c., £47.; Calcutta, 6 t., £520.; Copenhagen, 3 t. 18 c., £273.; Dantzig, 2 t. 1 c., £174.; Kobe, 68 t. 15 c., £5,058.; Las Palmas, 15 c., £62.; Melbourne, 3 c., £13.; Valparaiso, 1 t. 3 c., £104.

HYDROFLUORIC ACID—
Hong Kong, 8 c., £30.

IRON PERCHLORIDE—
Montreal, 2 t., £40.

LACTIC ACID—
Melbourne, 2 t. 2 c., £107.
Sydney, 1 t. 2 c., £53.

LEAD NITRATE—
Sydney, 2 t. 1 c., £85.

MAGNESIA (CALCINED)—
Maracaibo, 2 qrs., £17.
Tampico, 5 c., £39.

MAGNESIUM BISULPHITE—
Montreal, 5 t. 6 c., £82.

MAGNESIUM CARBONATE—
Sydney, 2 t., £72.

MAGNESIUM SULPHATE—
Addah, 2 c., £2. 10s.; Bolivia, 5 c. 2 qrs., £7.; Durban, 2 c., £2. 10s.; Half-Assinie, £2.; Las Palmas, 14 c., £32.; Otago, 10 c., £27.; Pimental, 2 c., £2.; Pt. Harcourt, 4 c., £5.; Sherbro, 2 c. 2 qrs., £3.

MANGANESE CHLORIDE—
Calcutta, 5 c., £12.

NICKEL SULPHATE—
Melbourne, 5 c., £11.
Oporto, 4 c., £18.

NITRIC ACID—
Zanzibar, 4 c., £15.

PHOSPHORUS SESQUISULPHIDE
Gothenburg, 7 t. 17 c., £1,613.
Monte Video, 10 c., £108.

PITCH (*otherwise undescribed*)—
Gijon, 2 t. 9 c., £60.; Rotterdam, 6 t. 8 c., £115.; Rouen, 27 t. 8 c., £488.

PLATING SALTS—
Kobe, 6 c., £25.
Valparaiso, 2 c. 2 qrs., £35.

POTASH CHROME ALUM—
Shanghai, 15 t., £444.

POTASSIUM BICHROMATE—
Alexandria, 17 t. 7 c., £835.; Oporto, 7 c., £20.; Palermo, 10 c., £22.

POTASSIUM PRUSSIATE—
Hamburg, 5 t., £540.

POTASSIUM SILICATE—
Buenos Aires, 2 t. 2 c., £42.

POTASSIUM SULPHATE—
Las Palmas, 3 t., £35.

SALTCAKE—
Buenos Aires, 4 t. 17 c., £33.; Gothenburg, 338 t. 17 c., £1,409.; Naples, 25 t., £377.; Norrkoping, 149 t. 14 c., £640.; Stockholm, 200 t., £925.

SHEEP DIP—
Buenos Aires, 38 t. 18 c., £1,871.; Corral, 16 c. 2 qrs., £38.; Curacao, 3 c., £12.; Monte Video, 1 t. 17 c., £30.; Puerto Deseado, 11 t. 9 c., £875.; Rio Gallegos, 7 t. 18 c., £340.; Rosario, 8 t. 1 c., £318.; San Julian, 11 t. 9 c., £875.; Sydney, 12 t. 10 c., £411.; Santa Cruz, Argent., 9 t. 16 c., £420.; Yokohama, 8 c., £26.

SULPHURIC ACID—
Delagoa Bay, 6 c. 2 qrs., £24.

SUPERPHOSPHATE—
Demerara, 5 t. 17 c., £25.
Seville, 148 t. 14 c., £478.

TANNING MATERIALS—
Oak
Havre, 1 t., £10.
Unspecified
Antwerp, 2 t. 3 c., £60.; Alexandria, 2 t. 4 c., £49.; Copenhagen, 2 t. 13 c., £48.; Dantzig, 1 t. 1 c., £27.; Hamburg, 8 t. 8 c., £397.; Lyttleton, 3 t. 12 c., £47.; Melbourne, 6 t. 15 c., £198.; Malmo, 7 t. 14 c., £208.; Montreal, 13 t. 10 c., £180.; Rotterdam, 11 t. 4 c., £134.; Sydney, 2 t. 5 c., £75.

TAR (*otherwise undescribed*)—
Bilbao, 8 c. 2 qrs., £31.

TARTARIC ACID—
Adelaide, 2 t., £259.; Brisbane, 15 c., £97.; Christchurch, 16 c., £97.; Melbourne, 2 t. 5 c., £297.; Rangoon, 2 c., £17.; Sydney, 10 c., £65.; Singapore, 5 c., £33.

TIN CHLORIDE—
Demerara, 19 c., £103.

TIN OXIDE—
Paranagua, 6 c., £69.; Rio de Janeiro, 19 c., £228.; Sydney, 7 c. 2 qrs., £87.

VANILLIN—
Fremantle, 2 qrs., £53.
Melbourne, 5 c. 2 qrs., £627.

WOOD PRESERVATIVE—
Auckland, 2 t., £47.; Barbados, 1 t. 7 c., £38.; Panama, 14 c., £20.; St. John's, N.F., 1 t. 5 c., £40.; Sarawak, 10 c., £16.; Wellington, 4 t., £93.

ZINC OXIDE—
Melbourne, 3 t., £132.
New York, 4 t. 19 c., £205.

Week ending September 14.

CALCIUM CHLORATE—
Buenos Aires, 342 pkgs.
Montreal, 112 pkgs.

CAUSTIC POTASH—
Wellington, 62 drms.

CAUSTIC SODA—
Adelaide, 213 drms.; Alexandria, 34 drms.; Auckland, 107 drms.; Bangkok, 24 drms.; Bari, 188 drms.; Batavia, 73 pkgs., 50 drms.; Beira, 30 drms.; Bergen, 20 drms.; Bourgas, 60 drms.; Brisbane, 32 drms.; Buenos Aires, 37 pkgs., 85 drms.; Calcutta, 87 drms.; Christiania, 80 pkgs., 20 drms.; Cheribon, 25 drms.; Cochin, 100 drms.; Copenhagen, 45 drms.; Corfu, 12 pkgs.; Delagoa Bay, 18 cs.; Dar-es-Salaam, 14 pkgs. Drammen, 40 pkgs.; Durban, 436 pkgs., 267 drms.; Dunedin, 47 drms.; Geffe, 25 pkgs.; Gothenburg, 20 pkgs., 34 drms.; Hamburg, 170 drms.; Helsingor, 20 pkgs.; Jaffa, 115 drms.; Las Palmas, 50 drms.; Lyttleton, 64 drms.; Madras, 212 drms.; Mazatlan, 69 drms.; Melbourne, 334 pkgs.; Monte Video, 1,180 drms.; Naples, 34 drms.; Petone, 60 drms.; Oporto, 42 drms.; Padang, 72 pkgs.; Penang, 20 drms.; Pt. Said, 2 cs.; Pt. Swettenham, 20 drms.; Samarang 51 drms.; Rockhampton, 15 drms.; Rotterdam, 34 drms.; Salonika, 51 drms.; Sydney, 654 drms.; Tampico, 415 drms.; Tuticorin, 40 drms.; Townsville, 15 drms.; Valparaiso, 66 drms.; Zanzibar, 20 drms.

FERRO ALUMINIUM—
Stockholm, 2 pkgs.

FERRO MANGANESE—
Baltimore, 195 t.; Calcutta, 30 t.; Gothenburg, 10 t.; New Orleans, 605 t.; Philadelphia, 420 t.; Santos, 5 t.; Sydney, 1 t.

FERRO VANADIUM—
Havre, 10 drms.

GLUE, SIZE, AND GELATINE—
Adelaide, 10 pkgs.; Auckland, 20 pkgs.; Barranquilla, 16 bgs.; Bombay, 20 kgs.; Boston, 100 bgs.; Calcutta, 16 pkgs.; Cape Town, 35 pkgs.; Delagoa Bay, 10 pkgs.; Hong Kong, 15 pkgs.; Kingston, 12 pkgs.; Melbourne, 10 bgs.; Pt. Elizabeth, 5 cks.; Perth, 1 pkg.; Pto. Cabello, 3 bgs.; Pt. Harcourt, 2 bgs.; Rangoon, 21 pkgs.; Shanghai, 24 cs.; Sydney, 10 cks.; Trinidad, 20 bgs.

LEAD (ANTIMONIAL)—
Stockholm, 3 t.

PARAFFIN WAX—
La Guaira, 200 bgs.; Pto. Colombia, 160 bgs.; Talcahuano, 534 bgs.; Valparaiso, 801 bgs.

PLUMBAGO—
Pt. Swettenham, 2 cks.

RED LEAD—
Rio de Janeiro, 3 kgs.

SALT—
Auckland, 45 t.; Calcutta, 3,208 t.; Cape Town, 7 t.; Dunedin, 17 t.; Durban, 20 t.; Gothenburg, 100 t.; Libreville, 5 t.; Lyttleton, 13 t.; Opobo, 10 t.; Puerto Barrios, 15 t.; Pt. Harcourt, 21 t.; Rio de Janeiro, 1 t.; Skien, 50 t.; Wellington, 24 t.

SOAP—
Accra, 484 bxs.; Addah, 124 bxs.; Alexandria, 1,280 pkgs.; Ampenam, 100 pkgs.; Amboina, 50 pkgs.; Antwerp, 100 pkgs.; Auckland, 133 bxs.; Bahia, 2 pkgs.; Banda Neira, 106 bxs.; Bandjermassin, 525 bxs.; Bangkok, 450 pkgs.; Bandjoewangie, 100 bxs.; Barcelona, 2 cks.; Batavia, 650 bxs.; Beira, 165 bxs.; Belawan, 186 bxs.; Benkoelen, 75 cs.; Black River, 258 bxs.; Boela, 50 bxs.; Bombay, 3,986 pkgs.; Brisbane, 20 cs.; Buenos Aires, 99 pkgs., Calcutta, 620 bxs.; Callao, 300 bxs.; Cape Town, 25 bxs.; Cayenne, 500 bxs.; Christiania, 1,000 pkgs.; Colon, 25 bxs.; Colombo, 18 bxs.; Colon, 550 pkgs.; Copenhagen, 2 bxs.; Coquimbo, 50 bxs.; Dobo, 50 bxs.; Dominica, 262 pkgs.; Dongala, 100 bxs.; East London, 6 bxs.; Geser, 50 pkgs.; Gibraltar 175 pkgs.; Gijon, 36 pkgs.; Gorontalo, 100 pkgs.; Hankow, 5 bxs.; Hong Kong, 25 bxs.; Karachi, 618 pkgs.; Kilindini, 140 pkgs.; Kingston, 1,876 pkgs.; Koko, 18 pkgs.; Kokas, 25 pkgs.; Kota Baroe, 25 pkgs.; Lagos, 5 bxs.; Langsa, 25 pkgs.; Las Palmas, 616 pkgs.; Lome, 20 pkgs.; Macassar, 166 pkgs.; Madras, 628 pkgs.; Malta, 152 pkgs.; Malmo, 2 bxs.; Melbourne, 4 cs.; Meranke, 100 bxs.; Mangalore, 3 cs.; Mombasa, 732 pkgs.; Mossel Bay, 2 cs.; Olchleh, 100 bxs.

SOAP—
Opobo, 500 cs.; Palembang, 200 bxs.; Panarockan, 100 bxs.; Penang, 1,559; Pimental, 30 cs.; Piraeus, 15 bxs.; Pontianak, 320 bxs.; Pto. Barrios, 15 cs.; Pt. Elizabeth, 2 bxs.; Pt. Gentil, 40 cs.; Pt. Harcourt, 10 cs.; Pt. Louis, 7 cs.; Pt. Said, 300 bxs., 48 cs.; Pt. Sudan, 53 cs.; Pt. Swettenham, 749 bxs., 9 cs.; Punta Arenas, 53 cs.; Rangoon, 226 cs.; Rotterdam, 11 bxs.; Saltpond, 1 cs.; Samarang, 70 bxs.; Saparoca, 50 bxs.; Sav-la Mar, 162 bxs.; Sekondi, 69 pkgs.; Sapele, 7 bxs.; Shanghai, 5 cs., 2,000 bxs.; Sherbro, 10 bxs.; Sibolga, 20 bxs.; Sierra Leone, 4 cs.; Singapore, 2,311 bxs.; Sinoc, 100 bxs.; Sourabaya, 385 bxs.; St. John's, N.F., 5 bxs.; St. Kitts, 212 cs.; St. Lucia, 60 cs.; St. Vincent, 125 cs.; Suez, 27 cs.; Switzerland via Antwerp, 91 bxs.; Sydney, 2 cs.; Talfal, 75 bxs.; Teneriffe, 374 pkgs.; Ternate, 226 bxs.; Tortola, 12 bxs.; Tuticorin, 1 cs.; Trinidad, 402 cs.; Warri, 160 pkgs.; Valparaiso, 4 bxs.; Wellington, 54 pkgs.; Winnebah, 5 cs.; Zanzibar, 40 bxs.

SODA ASH—
Auckland, 39 pkgs.; Barranquilla, 40 cks.; Brisbane, 59 bgs., 18 pkgs.; Buenos Aires, 1,213 cks.; Calcutta, 5,080 pkgs.; Christiania, 550 pkgs.; Colombo, 1,000 bgs.; Copenhagen, 750 pkgs.; Curacao, 12 pkgs.; Delagoa Bay, 75 pkgs.; Dunedin, 19 pkgs.; Durban, 200 pkgs.; Gothenburg, 650 pkgs.; Iquique, 200 pkgs.; Kalmar, 200 pkgs.; Kingston, 34 pkgs.; Kobe, 19,918 pkgs.; Launceston, 4 pkgs.; Medellin, 45 bgs.; Moji, 7,844 bgs.; Monte Video, 250 cks.; New Orleans, 750 bgs.; Norrkoping, 650 bgs.; Pelotas, 100 cks.; Penang, 44 pkgs.; Pto. Colombia, 40 bgs.; Stockholm, 649 bgs.; Rockhampton, 34 cks.; Santos, 381 pkgs.; Sydney, 394 pkgs.; Tientsin, 4,971 bgs.; Vera Cruz, 250 bgs.; Yokohama, 4,598 bgs., 3,786 pkgs.

SODA CRYSTALS—
Beyrout, 25 kgs.; Demerara, 100 pkgs.; Kingston, 25 pkgs.; Durban, 20 pkgs.; Pt. Said, 40 pkgs.; Rangoon, 160 pkgs.; Singapore, 25 cks.

SODIUM ARSENITE—
Pt. Sudan, 5 drms.

SODIUM BENZOATE—
Calcutta, 20 cs.

SODIUM BICARBONATE—
Adelaide, 34 pkgs.; Aden, 25 bls.; Alexandria, 270 kgs.; Auckland, 123 pkgs.; Bari, 80 kgs.; Batavia, 50 kgs.; Bourgas, 180 kgs.; Brisbane, 123 pkgs.; Buenos Aires, 50 cks.; Callao, 30 pkgs.; Cochin, 400 pkgs.; Dunedin, 40 pkgs.; Durban, 20 pkgs.; Gibraltar, 20 pkgs.; Kingston (Ja.), 12 pkgs.; Launceston, 54 pkgs.; Leghorn, 80 pkgs.; Malta, 20 kgs.; Malmo 20 kgs.; Moji, 2,261 pkgs.; Nantes, 122 pkgs.; Naples, 75 pkgs.; Perth, 159 pkgs.; Piraeus, 80 pkgs.; Pt. Sudan, 5 pkgs.; Rio de Janeiro, 200 pkgs.; Sandakan, 15 pkgs.; Sydney, 34 kgs., 88 pkgs.; Tampico, 740 kgs.; Townsville, 20 pkgs.; Trieste, 50 kgs.; Trinidad, 40 kgs.; Varna, 80 pkgs.; Vera Cruz, 660 kgs.; Wellington, 440 pkgs.; Yokohama, 3,769 pkgs.

SODIUM CYANIDE—
Cartagena, 65 cs.

SODIUM SILICATE—
Buenos Aires, 64 cks.; Christiania 20 cks.; Durban, 91 pkgs.; Dar-es-Salaam, 3 pkgs.; Hong Kong, 50 pkgs.; Kobe, 166 pkgs.; Lyttleton, 10 pkgs.; Monte Video, 50 drms.; Pt. Said, 62 pkgs.; Sydney, 10 cks., 3 drms.; Wellington, 58 pkgs.

SODIUM SILICATE—
Zanzibar, 11 drms.; Yokohama, 486 pkgs.

SODIUM SULPHATE—
Hong Kong, 4 pkgs.

SODIUM SULPHIDE—
Auckland, 37 pkgs.; Genoa 185 pkgs.; Gothenburg, 79 pkgs.; Gisborne, 7 pkgs.; Lyttleton, 16 pkgs.

STEARINE—
Copenhagen, 24 bgs.; Malmo, 6 brls.; Pto. Cabello, 14 bgs.

TALLOW—
Danzig, 94 pkgs.; Gothenburg, 2 t.; Hamburg, 8 pkgs., 102 brls.; Helsingfors, 12 brls.; Shanghai, 14 cks.

TURPENTINE—
Alexandria, 1 ck.
Alexandretta, 1 brl.

ZINC DUST—
Hobart, 2 t.

LONDON.

OFFICIAL AMENDMENTS.

To Return for week ending September 8, 1923, Add—

CARNAUBA WAX—
Durban, 12 c.

CASEIN—
Havre, 5 t.

DYESTUFFS (NATURAL)—
Turmeric
Demerara, 8 c.
Unspecified
Hamburg, 13 c.
Pt. Elizabeth, £112.

GELATINE—
Dunedin, 1 t. 4 c.

GLUE—
Antwerp, 13 c.

ROSIN—
Danzig, €210.

SHELLAC—
Oporto, 5 c.

SOAP—
Rotterdam, 1 t. 2 c.

TALLOW—
Bremen, 48 t. 9 c.; Danzig, 55 t. 3 c.; Hamburg, 31 t. 9 c.; Oporto, 21 t. 3 c.; Rotterdam, 25 t. 3 c.

TURPENTINE—
Auckland, 2 t. 17 c.; Copenhagen, 2 t. 10 c.; Dunedin, 2 t. 17 c.; Lyttleton, 1 t. 18 c.; Malta, 5 c.

Week ending September 12.

ACETANILID—
Brisbane, 3 cs. (pt.), £11.

ACETIC ACID—
Auckland, 6 cs., £21.; Brisbane, 12 cs., £37.; Trinidad, 6 cks., £20.

ACETONE—
Suez, 1 drm., £6.

ACETYL SALICYLIC ACID—
Brisbane, 3 cs. (pt.), £51.; Calcutta, 1 cs. (pt.), £7.; Melbourne, 3 kgs., £50.; Shanghai, 1 cs. (pt.), £8.; Sydney, 1 ck., £38.

ALUM—
Bombay, 40 kgs., £40.; Madras, 1 cs., £11.; Paita, 5 kgs., £6.

ALUMINIUM SULPHATE—
Antwerp (F.), 150 bgs., £115.

AMMONIA—
Abonema, 3 cs., £5.; Accra, 19 cs., £32.; Beira, 3 cs., £6.; Calcutta, 14 cs., £25.; Cape Town, 19 cs., £36.; Channel Isles, 6 cs., £11.; Colombo, 6 cs., £11.; Delagoa Bay, 10 cs., £18.; Durban, 56 cs., £98.; Hong Kong, 4 cs., £10.; Lagos, 3 cs., £5.; Lome, 3 cs., £5.; Matadi, 5 cs., £7.; Mauritius, 2 cs., £5.; Pt. Elizabeth, 16 cs., £28.; Pt. Harcourt, 8 cs., £15.; Pt. Said, 4 cs., £7.; Singapore, 10 cs., £18.

AMMONIA (ANHYDROUS)—
Belewan, 200 cylds., £1,417.; Puerto Colombia, 6 cylds., £25.; Rio de Janeiro, 2 cylds., £10.; Shanghai, 15 cylds., £125.; Singapore, 20 cylds., £150.

AMMONIUM ACETATE—
Bombay, 1 cs., £6.

AMMONIUM BROMIDE—
Melbourne, 2 cs., £9.

AMMONIUM CARBONATE—
Bagdad, 4 c., £11.; Bangkok, 5 c., £17.; Calcutta, 1 t. 18 c., £170.; Colombo, 7 c., £17.; Hong Kong, 2 t., £125.; Paita, 2 c., £6.; Penang, 9 c., £25.; Rouen, 10 c., £18.; Singapore, 1 t. 12 c., £74.

AMMONIUM CITRATE—
Calcutta, 2 cs. (pt.), £13.

AMMONIUM MOLYBDATE—
Melbourne, 1 cs., £10.

AMMONIUM NITRATE—
Dunkirk, 30 t. 2 c., £722.

AMMONIUM SULPHATE—
Demerara, 150 t., £2,493.; Dunkirk, 211 t., £3,006.; Hong Kong, 150 t., £2,700.; Kobe, 1,050 t., £17,288.; Naples, 150 t., £2,475.; Yokohama, 160 t., £1,650.

ANTIMONY—
Kobe, 9 cks., £146.

BARIUM CARBONATE—
Alexandria, 3 cs., £11.

BARIUM HYPOPHOSPHITE—
New York, 1 kg., £16.

BARIUM SULPHATE—
Sydney, 1 cs., £10.

BISMUTH—
Calcutta, 2 cs., £5.

BISMUTH CARBONATE—
Auckland, 1 cs. (pt.), £36.; Calcutta, 5 cs. (pt.), £20.; Montreal, 1 cs., £62.; Sydney, 2 cs., £287.

BISMUTH SALTS (*otherwise undes.*)
Colombo, 1 cs. (pt.), £6.

BISMUTH SUBCARBONATE—
Cape Town, 1 cs. (pt.), £5.

BISMUTH SUBNITRATE—
Calcutta, 5 cs. (pt.), £17.; Montreal, 1 cs. (pt.), £14.; Sydney, 1 cs., £8.

BISULPHITE OF LIME—
Dunedin, 66 cks., £126.

BONE FERTILISER—
Amsterdam, 1 t., £10.; Benkoelen 100 bgs., £60.; Dunkirk, 2 t. 12 c., £40.; Hamburg, 4 t. 5 c., £63.

BORAX—
Copenhagen, 3 c., £14.; Delagoa Bay, 2 c., £5.; East London, 2 c., £5.; Pt. Elizabeth, 2 t. (F.), £49.

BORAX GLASS—
Benkoelen, 1 t. 7 c., £111.

BORIC ACID—
Bangkok, 10 c., £34.; Calcutta, 16 c., £61.; Colombo, 2 c., £7.; Durban, 1 c., £5.; Pt. Elizabeth, 3 c., £8.; Rio Janeiro, 2 c., £10.

BROMIDES (*otherwise undescribed*)
Sydney, 2 cs., £9.

CALCIUM ACID PHOSPHATE—
Yokohama, 40 kgs., £64.

CALCIUM CARBIDE—
Abadan, 9 t. 18 c., £180.; Beira, 10 cks., £10.; Bermuda (F.), 2 t. 10 c., £38.; Channel Islands (F.), 3 t., £16.

CALCIUM CHLORIDE—
Demerara, 21 drms., £45.
Shanghai, 13 c., £39.

CALCIUM LACTATE—
Montreal, 1 cs. (pt.), £6.

CARBON (RETORT)—
Cologne, 920 bgs., £180.

CARBON BISULPHIDE—
Cape Town, 3 cs., £11.
Durban, 4 cs., £6.

CARBON TETRACHLORIDE—
Calcutta, 1 drm., £7.

CAUSTIC SODA
Remagen, 2 t. 15 c., £50.; Rockhampton, 10 c., £19.; Townsville, 1 t. 13 c., £82.

CHEMICALS (*otherwise undescribed*)
Adelaide, 7 cs., £222.; Alleppy, 3 cs. (pt.), £5.; Auckland, 21 pkgs., £83.; Bagdad, 4 cs., £9.; Barbados, 2 drms., £6.; Beira, 30 pkgs., £79.; Beyrout, 2 cs., £7.; Bombay, 12 pkgs., £46.; Brussels, 1 cs., £22.; Buenos Aires, 112 pkgs., £886.; Calcutta, 23 pkgs. (pt.), £76.; Canterbury, 5 pkgs., £18.; Canton, 6 pkgs., £27.; Cape Town, 10 cks., £31.; Colombo, 8 pkgs. (pt.), £15.; Delagoa Bay, 162 cs., £574.; Demerara, 6 cs. (pt.), £15.; Dunedin, 3 pkgs., £7.; Durban, 6 pkgs., £20.; East London, 6 kgs., £12.; Gothenburg, 15 pkgs., £40.; Hamburg, 235 pkgs. £574.; Kalmar, 23 cs. (pt.), £85.; Lyttleton, 3 cs., £9.; Madras, 34 pkgs., £74.; Mauritius, 4 pkgs., £9.; Melbourne, 5 cs. (pt.), £49.; Montreal, 7 pkgs. (pt.), £8.; Mossamedes, 4 cs., £12.; Mossel Bay, 11 cs., £19.; New York, 3 cs. (pt.), £18.; Oruro, 1 cs. (pt.), £10.; Penang, 14 pkgs., £26.; Pt. Elizabeth, 8 pkgs., £24.; Pt. Said, 20 cs., £91.; Rio de Janeiro, 2 cks., (pt.), £6.; Rotterdam, 40 pkgs., (F.), £158.; Rotterdam, 15 pkgs. £39.; Sekondi, 3 cs., £11.; Shanghai, 6 cs. (pt.), £15.; Sydney, 33 pkgs. (pt.), £1,137.; Trinidad, 8 cs. (pt.), £14.; Valparaiso, 1 cs. (pt.), £5.; Wellington, 22 pkgs. (pt.), £248.

CHROMIUM OXIDE—
Ponta Delgada, 1 kgs., £6.

CITRIC ACID—
Adelaide, 1 c., £9.; Auckland, 1 c., £18.; Calcutta, 4 c., £48.; Colombo, 1 c., £10.; Copenhagen, 1 c., £9.; Copenhagen, 1 cs. (pt.), (F.), £7.; Durban, 1 c. (F.), £7.; Karachi, 2 c., £30.; Malta, 1 c., £9.; Melbourne, 10 c., £83.; Pt. Elizabeth, 1 c., £10.; Pt. Said, 7 c., £69.; Rangoon, 2 c. (F.), £30.; Rangoon, 15 c., £123.; Rio de Janeiro, 5 c., £61.; Riga, 1 t. (F.), £196.

COAL TAR PRODUCTS—
Carbolic Acid
Rio de Janeiro, 1 ck., £10.
Singapore, 5 drms., £7.
Creosote
Bremen, 15 cks., £55.; Calcutta, 2 cs. (pt.), £14.; Delagoa Bay, 5 drms., £28.
Creosote Oil
Beira, 35 drms., £9.
Delagoa Bay, 78 drms., £500.
Naphthalene
Cape Town, 5 cs., £6.
Lyttleton, 5 cs., £6.
Panama, 13 kgs., £34.
Rotterdam, 1,000 bgs., £1,225.
Nitronaphthalene
Brussels, 2 kgs., £8.
Pitch
Calcutta, 20 cks., £51.; Pt. Said, 280 brls., £342.; Pt. Swettenham, 100 brls., £217.
Pyridine
Durban, 7 drms., £242.; Helsingborg, 3 drms., £263.; Lyttleton, 2 cs., £13.
Tar
Beira, 40 drms., £19.; Delagoa Bay, 275 drms., £51.; Durban, 385 drms., £70.; East London, 125 drms., £20.; Singapore, 12 drms., £6.
Xylol
Madras, 2 cs., £6.

COBALT ACETATE—
Amsterdam, 1 cs., £14.; Copenhagen, 10 cs., £252.; Esbjerg, 2 cs., £50.

COBALT OXIDE—
Copenhagen (F.), 2 cs., £98.

COPPER OXIDE—
Dunkirk, 1 ck., £35.

COPPER SULPHATE—
Cape Town, 5 c., £7.
East London, 9 c., £15.

COPPERAS—
Montreal, 4 cks., £12.

CREAM OF TARTAR—
Bombay, 1 c. (F.), £7.; Bushire, 1 c. (F.), £8.; Calcutta, 3 c., £20.; Cape Town, 1 c. (F.), £8.; Delagoa Bay, 6 c. (F.), £42.; Durban, 4 c., £21.; Durban, 4 c. (F.), £28.; East London, 2 c., £12.; Fremantle, 1 t. 1 c., £149.; Karachi, 3 c. (F.), £18.; Madras, 1 c. (F.), £5.; Mossel Bay, 5 c. (F.), £35.; Pt. Elizabeth, 1 c. (F.), £7.; Pt. Elizabeth, 1 c. (F.), £7.; Pt. Said, 4 c., £18.; Rio de Janeiro, 1 c., £7.; Rotterdam, 10 c., £44.; Shanghai, 2 c. (F.), £15.; Vancouver, 10 c., £49.; Vancouver, 2 c. (F.), £10.; Wellington, 1 c., £5.

CUPROUS OXIDE—
Paris, 1 drm., £15.

DISINFECTANTS (*otherwise undes.*)
Alleppey, 4 c., £11.; Antwerp, 4 c., £15.; Auckland, 18 c., £28.; Barbados, 2 t. 3 c., £78.; Bathurst, 5 c., £8.; Bombay, 2 t. 14 c., £80.; Brussels, 4 c., £6.; Calcutta, 2 t. 1 c., £85.; Canton, 4 c., £26.; Cape Town, 41 t. 14 c., £1,396.; Carcavellos, 4 c., £7.; Ceuta, 2 t. 3 c., £66.; Christchurch, 2 t. 11 c., £479.; Corinto, 9 c., £13.; Delagoa Bay, 7 t. 14 c., £239.; Demerara, 18 c., £31.; Durban, 5 t. 1 c., £181.; Jamaica, 1 c., £5.; Lagos, 2 c., £19.; Lyttleton, 4 c., £7.; Melbourne, 2 t. 10 c., £139.; Mombasa, 14 c., £45.; Osaka, 8 t. 19 c., £318.; Panama, 1 t. 10 c., £40.; Penang, 2 t. 12 c., £79.; Pt. Elizabeth, 6 t. 17 c., £140.; Pt. Harcourt, 1 c., £6.; Puerto Barrios, 4 c., £7.; Rangoon, 2 t. 10 c., £17.; St. John's, N.F., 1 t., £25.; Sandakan, 10 c., £19.; Shanghai, 9 c., £20.; Singapore, 1 t. 3 c., £39.; Sydney, 11 c., £36.; Trinidad, 1 t. 5 c., £30.; Vancouver, 1 c., £6.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 532 pkgs., £3,255.
Nigrosine
Adelaide, 5 kgs., £83.
Unspecified
Adelaide, 15 kgs., £192.; Bombay, 2 cs., £8.; Cape Town, 1 cs., £23.; Christchurch, 1 cs., £39.; Hong Kong, 2 cs. (pt.), £8.; Melbourne, 20 drms., £252.; New York, 1 cs. (pt.), £8.; Perth (F.), 1 cs. (pt.), £7.; Pt. Elizabeth, 1 cs., £8.; Sydney, 1 cs., 2 cs. (pt.), £40.; Valparaiso, 1 cs. (pt.), £17.

ETHER—
Brisbane, 1 cs., £7.
Durban, 2 cs., £11.

ETHYL CHLORIDE—
Shanghai, 1 pkg., £10.
Vancouver, 1 cs., £12.

FERTILISERS (*otherwise undes.*)—
Baltimore, 100 t., £560.
Copenhagen, 2 t. 10 c., £63.
Channel Islands, 5 t. 10 c., £77.

FORMALDEHYDE—
Madras, 3 cs., £9.

GALLIC ACID—
Calcutta, 1 cs. (pt.), £7.

GLYCERINE—
Amsterdam, 29 t. 2 c. (F.), £1,700.; Calcutta, 1 c., £5.; Colombo, 10 c., £63.; New York, 2 c., £15.; Pt. Said, 1 c., £5.; Shanghai, 3 t., £270.; Trinidad, 2 c., £12.

HYDROBROMIC ACID—
Calcutta, 1 cs., £7.

HYDROCHLORIC ACID—
Benkoelen, 2 t. 4 c., £99.
Buenos Aires, 2 c., £7.
Madras, 2 c., £5.

HYDROFLUORIC ACID—
Hong Kong, 4 cs., £30.

HYDROGEN PEROXIDE—
Buenos Aires, 10 cs., £25.; Colombo, 3 cs., £13.; Durban, 20 cs., £33.; Santander, 2 cs., £17.

HYPOPHOSPHITES (*otherwise undescribed*)—
Oamaru, 2 cs., £29.

HYPOPHOSPHITE OF LIME—
Barcelona, 10 cs., £196.
Genoa, 6 cs., £118.

IODIDES (*otherwise undescribed*)—
Demerara, 1 cs. (pt.), £8.; Jamaica, 1 cs. (pt.), £10.; Trinidad, 1 cs. (pt.), £6.

IODINE—
Calcutta, 1 cs., £26.
Rio de Janeiro, 1 ck. (pt.), £50.

IODINE (RESUBLIMED)—
Alexandria, 2 cs. (pt.), £22.; Calcutta, 5 cs. (pt.), £7.; Sydney, 1 cs. (pt.), 1 cs., £80.

IRON AMMONIUM CITRATE—
Bombay, 1 cs. (pt.), 1 cs., £24.; Calcutta, 1 ck., £27.; Alleppey, 8 cs., £55.; Karachi, 2 cs. (pt.), £14.; Sydney, 1 cs. (pt.), £7.

IRON PERCHLORIDE—
Sydney, 1 cs., £134.

IRON SUBCARBONATE—
Karachi, 3 cs., £7.

LEAD ACETATE—
Brisbane, 5 kgs., £11.

LEAD SULPHATE—
Antwerp, 129 cks., £150.

MAGNESIA—
Auckland, 5 cs., £12.; Brisbane, 3 cs., £7.; Calcutta, 4 cs., £10.; Havana, 2 cs., £14.; Lyttleton, 4 cs., £10.; Wellington, 15 cs., £36.

MAGNESIA (CALCINED)—
Buenos Aires, 7 pkgs., £30.; Rio de Janeiro, 2 cs., £23.; Sydney, 2 cs., £13.

MAGNESIUM CARBONATE—
Bombay, 3 cs., £14.
Calcutta, 1 cs., £6.
Havana, 2 cs., £7.
Melbourne, 33 cs., £50.
Rio de Janeiro, 18 cs., £85.

MAGNESIUM CITRATE—
Barcelona, 20 cs., £300.; Gibraltar, 10 cs., £73.; Montreal, 1 cs., £8.; Vancouver, 3 cs., £18.

MAGNESIUM SULPHATE—
Accra, 3 c., £5.; Auckland, 10 c., £13.; Beira, 4 c., £5.; Beyrout, 13 c., £11.; Busreh, 4 c., £5.; Calcutta, 13 c., £35.; Cape Town, 4 c., £5.; Colombo, 1 t. 10 c., £26.; Delagoa Bay, 10 c., £13.; East London, 8 c., £9.; Fremantle, 35 c., £44.; Geraldton, 5 c., £6.; Jaffa, 5 c., £6.; Jamaica, 8 c., £6.; Karachi, 10 c., £12.; Lyttleton, 5 c., £6.; Madras, 6 c., £16.; Melbourne, 6 t. 17 c., £165.; Montreal, 2 t. 10 c., £30.; Mossel Bay, 10 c., £13.; New Plymouth, 10 t., £75.; Toronto, 10 c., £8.; Wellington, 1 t. 5 c., £29.

MANGANESE BORATE—
Paris, 12 c., £54.

MANGANESE HYDROXIDE—
Genoa, 4 cks., £56.

MERCURIALS (*otherwise undes.*)—
Calcutta, 3 pkgs., £71.
Jamaica, 1 cs. (pt.), £6.

MERCURY AMMONIUM CHLORIDE—
Sydney, 1 cs. (pt.), £7.

MERCURY BICHLORIDE—
Auckland, 1 cs., £8.

MERCURY CHLORIDE—
Havana, 1 cs. (pt.), £21.

MERCURY IODIDE—
Sydney, 1 cs., £134.

MERCURY OXIDE—
Rio de Janeiro, 1 cs. (pt.), £7.

METHYL SALICYLATE—
Bangkok (F.), 2 cs., £16.; East London (F.), 2 cs., £18.; Lyttleton (F.), 2 cs., £18.; Sydney, 2 drms., £28.

NICKEL SULPHATE—
Perth, 2 cs., £5.

NITRIC ACID—
Bagdad, 2 c., £8.; Colombo, 2 c., £7.; Madras, 4 c., £9.

PHOSPHORIC ACID—
Auckland, 6 cs., £18.; Calcutta, 1 cs., £5.; Cape Town, 1 cs., £6.; New Plymouth, 1 cs., £6.

PHOSPHORUS (AMORPHOUS)—
Talcahuano, 10 cs., £117.

POTASSIUM ACETATE—
Calcutta, 2 cs., £5.

POTASSIUM BICARBONATE—
Lyttleton, 2 kgs., £6.

POTASSIUM BROMIDE—
Sydney, 1 ck., 1 cs., £18.

POTASSIUM CITRATE—
Auckland, 2 cs., £27.; Bombay, 1 cs. (pt.), 3 cs., £49.; Brisbane, 2 cs., £15.; Sydney, 3 cs., £60.

POTASSIUM CYANIDE—
Auckland, 1 cs., £7.; Oruro, 5 cs., £71.; Townsville, 30 cs., £361.

POTASSIUM IODIDE—
Auckland, 1 cs. (pt.), £44.; Bangkok, 5 cs., £417.; Bombay, 1 cs., £88.; Brussels, 3 cs., £259.; Genoa, 6 cs., £374.; Jamaica, 3 cs. (pt.), £7.; Naples, 3 cs. (pt.), £86.; Sydney, 1 cs. (pt.), 1 cs., £111.

POTASSIUM METABISULPHITE
Dunedin, 4 kgs., £44.
Melbourne, 1 kg., £5.

POTASSIUM PERMANGANATE—
Sydney, 1 drm., £11.

POTASSIUM PRUSSIATE—
Alexandria, 3 cs. (pt.), £84.; Danzig, 25 cks., £530.; Melbourne 1 kg., 6 cks., £199.; Paris, 9 kgs., £155.

PRUSSIAN BLUE—
Amsterdam, 1 ck., £64.; Hamburg, 20 cks., £860.; Melbourne, 1 ck., £25.

ROCHELLE SALTS—
Hong Kong, 4 cs., £28.
Sydney, 2 c., £9; 1 ck., £5.

SALAMMONIAC—
Colombo, 5 kgs., £13.

SALICYLATES (*otherwise undes.*)—
Shanghai, 1 cs. (pt.), £7.

SALICYLIC ACID—
Auckland, 1 kg., £6.
Hong Kong, 1 cs., £22.

SALTPETRE—
Cape Town, 3 c., £6.; Copenhagen, 4 c., £22.; Durban, 9 c., £21.; Rio de Janeiro, 2 c., £7.; Santos, 2 t. 9 c., £98.

SHEEP DIP—
Delagoa Bay, 1 t. 2 c., £40.; Durban, 5 t., £212.; Panama, 4 c., £6.

SILVER NITRATE—
Fremantle, 1 cs., £29.
Hong Kong, 2 cs., £64.

SODA CRYSTALS—
Calcutta, 4 c., £5.
Mauritius, 1 t., £8.

SODIUM BENZOATE—
Madras, 4 c., £60
Rio de Janeiro, 2 cks. (pt.), £13.

SODIUM BICARBONATE—
Aden, 11 c., £32.; Alexandria, 1 c., £6.; Beyrout, 7 c., £11.; Cairns, 1 t., £13.; Calcutta, 1 t., £59.; Delagoa Bay, 10 c., £15.; Durban, 6 c., £7.; East London, 6 c., £8.; Fremantle, 10 c., £22.; Karachi, 2 c., £6.; Madras, 3 c., £10.; Manila, 1 c., £5.; Melbourne, 11 c., £16.; Mossel Bay, 4 c., £6.; Oruro, 1 t. 10 c., £51.; Shanghai, 2 t. 2 c., £27.; Townsville, 5 t., £49.

SODIUM BISULPHITE—
Copenhagen, 9 t., £180.
Sourabaya, 2 t., £38.

SODIUM BROMIDE—
Brisbane, 1 cs., £5.
Sydney, 1 cs., £8.

SODIUM CARBONATE—
Benkoelen, 8 c., £11.
Gothenburg, 4 c., £16.

SODIUM HYDROSULPHITE—
Paris, 1 c., £20.

SODIUM HYPOPHOSPHITE—
Amsterdam, 1 cs., £14.

SODIUM HYPOPHOSPHITE—
Barcelona, 5 cs., £112.
Genoa, 2 cs., £45.

SODIUM HYPOSULPHITE—
Madras, 6 c., £5.
Singapore, 2 c., £8.

SODIUM IODIDE—
Calcutta, 1 cs., £30.; Genoa, 3 cs., £295.; Naples, 3 cs. (pt.), £59.

SODIUM PERBORATE—
Bilbao, 10 c., £53.

SODIUM PHOSPHATE—
Calcutta (F.), 6 c., £16.

SODIUM PRUSSIATE—
Rio de Janeiro, 10 drms., £79.

SODIUM PYROPHOSPHATE—
Sydney, 15 c., £34.

SODIUM SALICYLATE—
Auckland, 1 kg., £14.; Sydney, (F.), 1 cs., £13.; Sydney, 1 ck., £15.; Wellington, 2 cs., £17.

SODIUM SALTS (*otherwise undes.*)
Dunedin, 5 c., £6.

SODIUM SULPHATE—
Auckland, 5 c., £7.; Beyrout, 12 c., £6.; Bilbao, 150 t., £844.; Demerara, 10 c., £7.; Hamburg, 10 t. 2 c., £120.; Mauritius, 1 t. 6 c., £26.; Wellington, 10 c., £5.

SODIUM SULPHIDE—
Bilbao, 3 t., £49.; Lyttleton, 4 t. 17 c., £58.; Wellington, 5 t. 13 c., £69.

SODIUM SULPHITE—
Dunedin, 10 c., £25.; Madras, 1 c., £5.; Melbourne, 3 t., £35.; Wellington, 2 t. 10 c., £64.

SODIUM TARTRATE—
Adelaide, 2 c., £7.
Calcutta, 1 c., £5.

SULPHUR—
Cape Town, 61 t. 8 c., £875.

SULPHUR (FLOWERS)—
Cape Town, 2 t. 5 c., £32.

SULPHURIC ACID—
Accra, 5 c., £19.; Beira, 2 t. £40.; Benkoelen, 1 cs., £14.; Channel Islands, 3 c., £6.; Colombo, 15 c., £26.; Calcutta, 6 c., £7.; Durban, 19 c., £44.; Gibraltar, 1 t. 1 c., £23.; Madras, 2 c., £6.; Pt. Said, 6 t., £111.; Pt. Sudan, 2 t. 7 c., £43.; Sekondi, 3 t. 8 c., £91.

TARTARIC ACID—
Aden, 2 c. (F.), £14.; Aden, 1 c., £5.; Calcutta, 4 c., £37.; Calcutta, 3 c. (F.), £29.; Durban, 12 c., £83.; Durban, 1 c. (F.), £5.; Delagoa Bay, 4 c., £39.; East London, 2 c., £17.; Hamburg, 1 t., £123.; Jamaica, 3 c., £24.; Karachi, 2 c., £19.; Mossel Bay, 3 c. (F.), £28.; Pt. Said, 1 c., £7.; Rangoon, 5 c., £32.; Singapore, 3 c. (F.), £19.; Vancouver, 10 c., £66.

THEOCINE SODIUM ACETATE—
Melbourne (F.), 1 cs. (pt.), £5.

TURPENTINE—
Durban, 3 drms., £13.
Melbourne, 7 cs., £53.

ZINC OXIDE—
Barcelona, 5 cs., £23.; Copenhagen, 60 cs., 340 cks., £1,319.; Calcutta, 1 cs., £11.; Hong Kong, 10 kgs., £25.; Ponta Delgada, 2 cks., £18.; Wellington, 13 pkgs., £31.

Week ending September 15.

ANTIMONY REGULUS—
Copenhagen, 10 c.

FULLER'S EARTH—
Barbados, 8 t.; Bombay, 10 t.; Montreal, 75 t.; New York, 63 t.; Treport, 1 t.

GLUE, SIZE, AND GELATINE—
Auckland, 10 c.; Bombay, 11 c.; Brisbane, 2 t. 16 c.; Callao, 11 c.; Calcutta, 4 t.; Colombo, 1 t. 7 c.; Constantinople, 1 c.; Delagoa Bay, 5 c.; Durban, 2 t.; Hong Kong, 2 t. 10 c.; Karachi, 3 t.

GLUE, SIZE, AND GELATINE—
Melbourne, 2 c.; Mauritius, 3 c.; New York, 4 c.; Pt. Elizabeth, 13 c.; Rio de Janeiro, 10 c.; Shanghai, 2 c.; Sourabaya, 2 c.; Stockholm, 4 c.; Sydney, 1 t. 6 c.; Toronto, 5 t.; Trinidad, 5 c.; Vancouver, 4 c.; Vera Cruz, 2 t.; Wanganui, 1 c.; Wellington, 10 t. 10 c.

LEAD (RESIDUE)—
Antwerp, 9 t. 10 c.

LEAD ASHES—
Antwerp, 4 t.

MINERAL WAX—
Adelaide, 4 t.

PARAFFIN WAX—
Fremantle, 2 t.

PLUMBAGO—
Bilbao, 3 t. 9 c.; Lisbon, 10 c.; Madras, 4 c.; Pt. Elizabeth, 6 c.; Tocopilla, 3 c.

QUININE—
Beirut, 256 oz.; Bombay, 5,492 oz.; Calcutta, 19,568 oz.; Colombo, 1,455 oz.; Genoa, 616 oz.; Karachi, 1,100 oz.; Melbourne, 200 oz.; Montreal, 150 oz.; Rio de Janeiro, 313 oz.; Shanghai, 960 oz.; Wellington, 50 oz.

SALT—
Bagdad, 6 c.; Bangkok, 1 c.; Colombo, 3 c.; Delagoa Bay, 6 c.; Fremantle, 16 c.; Helsingborg, 18 c.; Madras, 2 t. 11 c.; Mauritius, 6 c.; Paris, 2 c.; Pt. Elizabeth, 1 t. 15 c.; Pt. Said, 16 c.; Pt. Swettenham, 4 c.; Singapore, 16 c.

SHELLAC—
Vera Cruz, 3 c.

SOAP—
Abonema, 10 c.; Accra, 10 t.; Aden, 1 c.; Amsterdam, 16 c.; Antwerp, 3 c.; Auckland, 8 c.; Bangkok, 1 t. 6 c.; Barbados, 6 t. 10 c.; Basra, 7 c.; Beira, 5 c.; Bombay, 7 c.; Bonny, 11 c.; Brisbane, 1 c.; Buenos Aires, 4 c.; Calabar, 10 t. 3 c.; Calcutta, 2 t. 17 c.; Cape Town, 5 c.; Channel Islands, 2 c.; Christchurch, 10 c.; Cologne, 1 c.; Constantinople, 4 c.; Colombo, 1 t. 1 c.; Copenhagen, 5 c.; Dunedin, 5 c.; Durban, 2 c.; Galveston, 1 t.; Iquique, 2 c.; Italy, 16 c.; Kingston (Ja.), 7 t. 1 c.; Lyttleton, 4 c.; Madras, 1 c.; Mauritius, 15 c.; Melbourne, 14 c.; Montreal, 2 c.; Napier, 6 c.; Naples, 2 c.; New Plymouth, 1 c.; New York, 18 c.; Pt. Elizabeth, 5 c.; Philadelphia, 3 c.; Pt. Said, 16 c.; Puerto Barrios, 1 c.; Rangoon, 6 c.; Rotterdam, 3 c.; Sekondi, 1 t. 15 c.; Singapore, 12 c.; Sydney, 16 c.; Tocopilla, 2 c.; Toronto, 2 t. 10 c.; Trinidad, 6 t. 4 c.; Valparaiso, 5 c.; Warri, 10 c.; Wellington, 13 c.

STEARINE—
Cape Town, 3 t.

TALLOW—
Accra, 3 c.; Antwerp, 50 t.; Danzig, 17 t. 16 c.; Rotterdam, 9 t.; Sekondi, 5 c.

VEGETABLE WAX—
Valencia, 7 c.

WAX (*otherwise undescribed*)—
Auckland, 5 c.
Otago, 1 t.

WHITE LEAD—
Adelaide, £149.; Auckland, £243.; Bombay, £12.; Brisbane, £390.; Calcutta, £287.; Canary Islands, £12.; Christchurch, £94.; Colombo, £105.; Dunedin, £69.; Durban, £529.; East London, £70.; Hong Kong, £65.; Kingston, £114.; Lyttleton, £166.; Madras, £53.; Malta, £13.; Melbourne, £1,260.; Mossel Bay, £9.; Nelson, £13.; Oamaru, £93.; Pt. Elizabeth, £14.; Ponta Delgada, £20.; Rotterdam, £10.; Singapore, £184.; Sydney, £269. Wellington, £516.

ZINC ASHES—
Antwerp, 5 t.

MANCHESTER.

Week ending September 13.

ALUM—
Canada, 10 cks.
Malta, 4 brls.

AMMONIUM SALT (*otherwise undescribed*)—
Malta, 20 cs.

CHEMICALS (*otherwise undescribed*)
Danzig, 5 cks.
Melbourne, 5 cks., 1 kg.

COAL TAR PRODUCTS—
Creosote
Rotterdam, 5 cks.
Unspecified
Basle, 27 cks., 4 kgs.
Hamburg, 44 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Australia, 3 kgs.
Gothenburg, 2 pkgs.

DYESTUFFS (NATURAL)—
Unspecified
Danzig, 20 bxs.

FERRO MANGANESE—
Baltimore, 900 t.

GLUE AND SIZE—
Alexandria, 40 bgs.; Alexandretta, 20 bgs.; Canada, 300 bgs.; Gothenburg, 2 cks., 1 brl.; Montreal, 10 cs.

LEAD ACETATE—
Adelaide, 4 cks.
Montreal, 4 cks.

MANGANESE ORE—
Sydney, 4 cks.

SALT—
Gothenburg, 2,139 sks., 75 brls.; Malmo, 2,696 sks., 40 brls.; Quebec, 1,600 sks.

SOAP—
Bombay, 15 cs.; Bagdad, 6 cs.; Montreal, 10 cs.; The Hague, 15 cs., 5 bxs.

SODIUM CARBONATE—
Beyrout, 3 cs.

NEWCASTLE-ON-TYNE

Week ending September 15.

ALUMINA—
Christiania, 10 bgs.

AMMONIA—
Copenhagen, 5 brls.

ANTIMONY—
Antwerp, 80 kgs.
Montreal, 15 cks.

BARIUM SULPHATE (BLANC FIXE)—
New York, 100 cks.

BLEACHING POWDER—
Rotterdam, 66 cks., 85 pkgs.

CAUSTIC SODA—
Arendal, 5 drms.; Bergen, 86 drms.; Copenhagen, 52 drms.; Christiania, 59 drms.; Gothenburg, 54 drms.; Rotterdam, 10 drms.

CHEMICALS (*otherwise undescribed*)
Bergen, 6 cylds., 9 tubes.
Christiania, 2 drms.

COAL TAR PRODUCTS—
Benzol
Bremen, 64,336 galls.

LITHARGE—
Antwerp, 12 cks.; Copenhagen, 3 cks.; Christiania, 4 cks.; Rotterdam, 80 cks.

MAGNESIA—
Antwerp, 220 bgs., 3 cks.; Montreal, 42 cs.; New York, 85 cs.

RED LEAD—
Antwerp, 288 kgs.; Christiania, 41 cks.; Copenhagen, 35 cks.; Gothenburg, 14 cks.

SODIUM SULPHATE—
Gothenburg, 1 bl.

SODIUM SULPHITE—
Rotterdam, 34 cks.

TIN OXIDE—
Gothenburg, 10 cks.

WHITE LEAD—
Antwerp, 560 ktls., 14 tres., 40 cks.; Rotterdam, 10 cks.

PRICES CURRENT.

WEDNESDAY, SEPT. 19, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

	£	s.	d.
ACIDS.			
Acetic, 40% and 80% .. .. ..*cwt.	23/6 & 47/-		
Acetic, (Glacial, B.P.) in carboys ..*ton	68	0	0
Arsenic, S.G. 2.000 .. .. .. ton	85	0	0
Boric (crystals) .. ..†ton	48	0	0
Citric .. .. lb.	0	1	8¼
Formic, 80/85% .. ..*ton	51	0	0
Hydrofluoric, 59/60% .. .. ..*lb.	0	0	7½
Lactic, 80% .. .. ton	60	0	0
Muriatic (Tower Salts), 28° Tw. ..*carboy	0	4	0
Nitric, 80° Tw. .. ..*ton	21	10	0
Oxalic .. .. lb.	0	0	6
Phosphoric, 1,500° tech. .. .. ..*ton	33	0	0
Sulphuric (168°) .. ..*ton	7	10	0
Sulphuric (140°) .. ..*ton	3	15	0
Sulphuric (free from Arsenic, 144°) ..*ton	4	10	0
Tannic (commercial) .. .. .. lb.	0	1	6
Tartaric (crystals) .. .. lb.	0	1	2
COAL TAR PRODUCTS.			
Aniline Oil .. ..*lb.	0	0	9
Aniline Salt .. ..*lb.	0	0	9½
Anthracene, 40/45%, "A" .. .. unit	0	0	4
Benzol, 90% .. ..*gallon	0	1	4
Carbolic Acid (crude 60%) .. .. gallon	0	3	4
Carbolic Acid (crystals 40°) .. .. lb.	0	1	2
Creosote .. ..*gallon	0	0	9½
Cresylic Acid, 95% .. ..*gallon	0	2	6
Naphtha, crude, 30% .. .. ..*gallon	0	0	9
Naphtha, solvent (90/160) .. .. ..*gallon	0	1	4
Naphthalene, refined .. .. .. ton	18	10	0
Pitch (f.a.s. Liverpool) .. .. .. ton	6	12	6
Pyridin .. .. gallon	1	0	0
Tar, crude .. .. ton	4	2	6
Tar, refined .. .. barrel	2	2	6
Toluol .. ..*gallon	0	1	9
Xylol, (pure) .. ..*gallon	0	2	3
GENERAL CHEMICALS.			
Acetone .. ..*ton	127	0	0
Alum, loose lump (delivered) .. ..*ton	11	0	0
Aluminium Sulphate, 17/18% .. .. ton	10	10	0
Aluminium Sulphocyanide .. .. .. lb.	0	0	7
Aluminoferric (in slabs) 20° Tw. .. .. ton	7	0	0
Ammonia, anhydrous .. .. ..*lb.	0	1	4
Ammonia, .880 .. ..*ton	22	10	0
Ammonia, .920 .. ..*ton	14	10	0
Ammonium Carbonate (lump) .. .. lb.	0	0	4
Ammonium Muriate (grey) .. ..†ton	30	0	0
Ammonium Nitrate .. .. .. ton	35	0	0
Ammonium Phosphate .. .. .. ton	60	0	0
Ammonium Sulphate, 25¾% delivered ..†ton	14	10	0
Ammonium Sulphocyanide, 95% .. .. lb.	0	1	3
Antimony (Golden Sulphide) .. .. lb.	0	0	9
Arsenic (Cornish White) .. .. .. ton	65	0	0
Barium Carbonate (native), 92/94% .. ton	5	15	0
Barium Chlorate .. .. lb.	0	0	8
Barium Chloride (in casks) .. .. ton	14	10	0
Barium Sulphate .. .. ton	£5 to £7		
Barium Sulphocyanide, 95% .. .. lb.	0	0	9½
Bleaching Powder, 35% .. .. ..*†ton	11	5	0
Bleaching Liquor, 7% .. .. ..*ton	4	5	0
Calcium Chloride .. ..†ton	5	7	6
Carbon Bisulphide .. ..*ton	26	0	0
Casein (commercial) .. .. ton	80	0	0
China Clay (at Runcorn), in bulk .. ton	50/- to 90/-		
Chromium Acetate (crystals) .. .. lb.	0	0	8
Copper Sulphate .. .. ton	25	10	0
Formaldehyde, 40% .. .. .. ton	80	0	0
Glycerine (chemically pure, S.G. 1,260) ..*ton	85	0	0
Glycerine (crude), 80% .. .. ..*ton	60	0	0
Iodine .. ..*oz.	0	1	0
Iron Nitrate, 80° Tw. .. .. ..*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk*ton	2	0	0
Iron Sulphide (lumps) .. .. .. ton	6	0	0
Lead Acetate (white) .. .. .. ton	42	0	0
Lead Acetate (brown) .. .. .. ton	43	0	0
Lead Carbonate (White Lead) .. .. ton	44	0	0
Lead Nitrate .. .. ton	42	0	0
Lime Acetate (brown) .. .. ..*ton	11	10	0
Lime Acetate (grey), 80% .. .. ..*ton	21	10	0
Lime Bisulphite (S.G. 1,070) .. ..*ton	8	0	0
Lime Superphosphate, 30% .. .. ton	3	15	0
Litharge (British) .. .. ton	41	0	0
Magnesite, Calcined (delivered) .. .. ton	11	0	0
Magnesite, Raw .. .. ton	3	0	0
Magnesium Carbonate (light) .. .. cwt.	2	0	0
Magnesium Chloride (solid) .. .. ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.) ton	4	0	0
Magnesium Sulphate, B.P. .. .. .. ton	6	0	0
Manganese Borate, 85% .. .. .. ton	112	0	0
Manganese Sulphate, 90% .. .. .. ton	46	0	0
Methylated Alcohol, 64° (industrial) .. gallon	0	2	1
Naphtha (Wood), Solvent .. .. ..*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p. .. gallon	0	6	6
Potassium Bichromate .. .. .. lb.	0	0	5¾
Potassium Carbonate, 90% .. .. ton	28	0	0
Potassium Chlorate .. .. lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90% ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80% ton	26	0	0
Potassium Hydrate (liquid), 50° Bé. .. ton	16	0	0
Potassium Chloride 80% .. .. .. ton	8	10	0
Potassium Nitrate (refined) .. .. ton	25	0	0
Potassium Permanganate (commercial) .. lb.	0	0	9½
Potassium Prussiate (yellow) .. .. lb.	0	1	0¾
Potassium Prussiate (red) .. .. .. lb.	0	2	9
Potassium Sulphate, 90% (ex ship) .. ton	11	10	0
Potassium Sulphocyanide .. .. .. lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd cwt.	60/- & 57/-		
Sodium Acetate .. .. ton	24	10	0
Sodium Arsenate, 45% .. .. .. ton	50	0	0
Sodium Borate (Borax), Crystals .. ..†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags) ..†ton	10	10	0
Sodium Bichromate .. .. .. lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags ..†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd. †ton	5	5	0
Sodium Chlorate .. .. lb.	0	0	2¾
Sodium Cyanide (100% basis) for export lb.	8d. to 8½d		
Sodium Hydrate (76% C. Soda), f.o.r. ..†ton	19	7	6
Sodium Hydrate (70% C. Soda) .. ..†ton	17	17	6
Sodium Hydrate (60% C. Soda) .. ..†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.) ..†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%) †ton	22	0	0
Sodium Hyposulphite (commercial) ..†ton	9	10	0
Sodium Hyposulphite (photographic) .. ton	14	10	0
Sodium Manganate (basis 25%) .. .. ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool .. ton	13	5	0
Sodium Nitrite, 100% basis .. .. ton	26	10	0
Sodium Perborate .. .. lb.	0	0	11¼
Sodium Phosphate .. .. ton	15	0	0
Sodium Prussiate .. .. lb.	0	0	5¾
Sodium Silicate (glass), Alkaline .. ..†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.) .. ..†ton	9	0	0
Sodium Sulphate (Saltcake) .. ..†ton	4	10	0
Sodium Sulphate (Glauber's Salt) .. ton	4	0	0
Sodium Sulphide (conc.), 60/65% .. .. ton	14	0	0
Sodium Sulphide Crystals (casks) ..†ton	9	0	0
Sodium Sulphocyanide (liquid) .. .. lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian .. ton	8	10	0
Sulphur (Roll Brimstone) .. .. .. ton	8	10	0
Sulphur (Texas Gulf) .. .. .. ton	5	5	0
Tartar Emetic, 43/44% .. .. .. lb.	0	1	1
Tin Crystals .. .. lb.	0	1	4
Tin Perchloride fused .. .. .. lb.	0	1	10
Titanous Chloride .. .. lb.	0	1	0
Zinc Chloride (solution, 102° Tw.) .. ..*ton	20	0	0
Zinc Sulphate, Crystals .. .. .. ton	13	10	0
METALS.			
Aluminium (Ingot Metal 98/99%) .. ton	115	0	0
Antimony .. .. ton	30	0	0
Copper .. .. ton	62	2	6
Lead (Chemical Sheet), delivered .. .. cwt.	1	14	0
Lead (Foreign Pig) .. .. ton	25	7	6
Nickel .. .. ton	130	0	0
Silver .. .. oz.	0	2	7 13/16
Tin, English Ingots .. .. .. ton	198	0	0
Zinc (Spelter) .. .. ton	32	15	0
Zinc Dust, 90/92% .. .. .. ton	50	0	0
OILS.			
Cottonseed .. ..*ton	43	0	0
Linseed, Raw .. ..*ton	45	0	0
Stearine, 115-120° M.P. .. .. .. ton	48	0	0
Tallow .. .. ton	39	0	0
Turpentine .. .. cwt	3	14	9

* *Packages extra or returnable*: otherwise prices usually include packages.
† Makers' prices for home consumption only

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
The Work of the Government Laboratory	359
A New Compound Fertiliser	360
Private Oxygen Plants	360
The Nobel Industries Meeting	360
The Manufacture of Alumina	361
Quicklime for Causticising	362
Amino-naphthol Po ysulphonic Acids	362
Hydrogenated Phenols and Cresols	363
A Novel Belgian Nitrogen-fixation Process	364
Pumps for Industrial Purposes	365
Hydrofluosilicic Acid	366
National Gas Exhibition	366
The Work of the Government Laboratory	367
Hong Kong Market for Disinfectants	369
Our Bookshelf	369
Items of Interest	370
Coming Events	371
Reports of Companies	372
Legal Intelligence	372
Fertiliser News	373
Gazette News	373
Thirty-five Years Ago	373
Imports of Chemicals and Allied Products in August	374
Exports of Chemical and Allied Products in August	375
Cumberland Coking and By-product Industries	375
New Companies	375
The Patent List:—	
Applications for British Letters Patent	376
Complete Specifications Accepted	376
Complete Specifications Open to Public Inspection before Acceptance	376
Abstracts of Latest Complete Specifications	376
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	377
South Wales Notes	378
Publications Received	378
Market Reports:	
London "Open Market" Report	378
London Metal Market	380
Manchester Chemical Market	380
Swansea Market Report	380
Liverpool Chemical Market	380
West of Scotland Chemicals	381
Imports of Chemical Products	381
Exports of Chemical Products	384
Prices Current	388

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CURRENT TOPICS.

THE WORK OF THE GOVERNMENT LABORATORY.

THE enormous amount of chemical control work entailed in the service of the various Government departments and in the efficient administration of many Acts of Parliament is well illustrated in the recently published annual report of the Government Laboratory. The total number of samples examined during the period April, 1922, to April, 1923, was 343,453, and this number is increasing at the rate of about 30,000 each successive year. The total increase has been reflected in every department of the Laboratory's activities with the exception of tea, the number of samples of which examined has shown a decrease of 5,500 from the previous year. The Safeguarding of Industries Act, the Dyestuffs (Import Regulation) Act, and the Dangerous Drugs Act have continued to impose considerable extra work on the Department. With regard to the first-mentioned Act, nearly 8,000 samples were examined during the course of the year, and many of these samples necessitated analyses of an exceedingly intricate nature. On the whole, the figures furnished in the report show that the number of rejections of inferior-quality materials, or of materials not up to the standard demanded by law, were surprisingly few, particularly in the case of foodstuffs. Only 22 samples of fertilisers found by the local authorities not to comply with the Fertilisers and Feeding Stuffs Act were examined, and in most of these cases the amounts of nitrogen, phosphates, or potash were found to be less than the guarantee stated. An interesting point arose under the Merchandise Marks Act, where 71 samples of blue vitriol, supplied for horticultural or wheat-dressing purposes, were investigated. In one case the material consisted of a mixture of copper sulphate and ferrous sulphate in approximately equal proportions, and the seller contended that such a mixture was properly described by the trade description, "Commercial blue vitriol." Legal proceedings ensued, however, and the findings negatived the contention of the seller. The point arose under the Merchandise Marks Act, when 71 attitude of the customs authorities in claiming the full rate of duty on ethyl alcohol contained in commercial formaldehyde is recalled by the practice of these same authorities in the case of fusel oil. This, whether home-produced or imported, generally contains ethyl alcohol as an unavoidable impurity, and duty is not charged unless upwards of 15 per cent. of proof spirit is present.

Where alcohol is found in greater proportion than 15 per cent. of proof spirit, the importer is allowed to reduce the alcohol content to the amount allowed. It is very difficult to understand why a similar line of action should not be adopted in the case of formaldehyde, since on the grounds of both potability and facility of recovery of the ethyl alcohol, formaldehyde presents a greater obstacle than fusel oil.

A NEW COMPOUND FERTILISER.

Details are available from France of a new compound fertiliser which, if all the claims made on its behalf are substantiated should prove a proposition worthy of investigation. The feeling is growing, and was given expression to quite recently by Mr. R. C. Taylor in a paper he read to the North of England Gas Managers' Association at Bridlington, that the future of ammonium sulphate is, in face of the growing competition of more highly concentrated nitrogenous fertilisers, by no means assured, and that more attention should be given to the conversion of gasworks' ammonia into more concentrated products. The new fertiliser, which is manufactured by the Compagnie de Saint-Gobain under the name of "Superam," is based upon the idea of neutralising the residual acidity of ordinary superphosphate with ammonia gas. The general process is by no means new, but all the methods that have been proposed hitherto have suffered from the disadvantage that in the presence of the ammonium sulphate formed, and of the calcium sulphate invariably present in commercial superphosphate, retrogradation of the phosphoric acid to the soil-insoluble condition has occurred, and thus the benefit accruing from the presence of the ammonium sulphate has been more than neutralised. The Saint-Gobain Company has found, however, that by utilising the ammonia gas in low concentration—say, 3 to 5 per cent. —and controlling carefully the temperature of the reaction, not only can the danger of retrogradation of the phosphoric acid be positively averted, but the resultant compound fertiliser is obtained in a perfectly dry and friable condition, and of a homogenity much greater than that of simple mixtures. From the economy standpoint the main advantage of the process would appear to be the great saving in the amount of acid used as compared with the direct manufacture of ammonium sulphate, an average saving of 48 per cent. of sulphuric acid is being claimed. This process is, of course, applicable only to special cases, the cost of carriage and handling of the superphosphate precluding its serious consideration in many plants.

PRIVATE OXYGEN PLANTS.

A few years ago the answer to the question of whether an individual consumer of oxygen to the extent of from 30,000 to 50,000 cubic feet per week, could instal his own plant and run it with substantial economy would have been a decided negative. Within the last two or three years, however, the improvements in the air liquefaction and fractionation process of oxygen production have been so marked that such a categorical denial can now no longer safely be given. In a recent issue of the *Gas Journal*, for example, Mr. O. Simonis, the managing director of Liquid Air, Ltd., points out that his firm alone has during the last few years put up in this country small private oxygen plants which produce well over 1,500,000 cubic feet of oxygen per week, and which save their owners, on the average, about 50 per cent., and in some few instances as much as 75 per cent. of their former oxygen bills. It is claimed also that such small private plants prove commercially efficient for so low a make of oxygen as 25,000 cubic feet per week, provided that the plant be run continuously and not intermittently during any one week. The greatest measure of economy is obtained, naturally, in those plants which are at a considerable distance from the nearest oxygen factory, and which are able to utilise the gas as formed, since the heavy charges for compression, cylinders, and carriage are all avoided. The essential features of the small-output plants made by the firm in question are the preliminary absorption of carbon dioxide from the ingoing air by means of caustic-soda solution at ordinary pressures, the use of either horizontal or vertical four-stage air compressors, and the erection of the rectifying column on the top of the liquefier. The price of commercial oxygen from the large works has fallen very considerably during the last twelve months, and there is every indication that rock-bottom prices have not yet been reached, but if the remarkable economy figures instanced by Mr. Simonis are borne out by further experience, it would certainly seem that the small plant is in many cases in no immediate danger of ceasing to become a profitable proposition.

THE NOBEL INDUSTRIES MEETING.

The satisfactory financial position of Nobel Industries, Ltd., was commented upon in detail by the chairman, Sir Harry McGowan, K.B.E., at the annual meeting on Friday last. The greater freedom of the country from industrial disputes during 1922, and the gradual improvement in trade during the year, were given as the main reasons for the ready sale of the products of the associated companies. The maintenance, and in many cases the improvement, of the qualities of these products were also contributory factors of no mean importance. The Chairman admitted that the opinion was prevalent amongst a number of consumers that prices, especially of explosives, detonators, and fuses, were rather high, and foreshadowed that the economies in production resultant upon the policy of concentration adopted by his enterprise would undoubtedly be reflected in lower-selling prices in the near future. It is encouraging to learn that the export trade of at least one large chemical manufacturing concern has shown considerable improvement during 1922. Sir Harry McGowan, in common with all the leaders of big industrial undertakings, realises that until a permanent settlement of the European reparations problem is effected, expectations of real trade stability is quite futile, and last months' Board of Trade Returns unfortunately show too clearly the present depressed state of our overseas trade.

THE MANUFACTURE OF ALUMINA.

PRODUCTION OF THE HYDROXIDE AND OXIDE.

By F. R. Lowe.

ALTHOUGH the metal aluminium is now in universal use it is remarkable that the literature dealing with its manufacture does not give much information regarding the first part of the process of winning the metal from its ores. It is proposed in this article to try and fill the omission.

Varieties of Bauxite Suitable.

Bauxite is the raw material now universally used for the manufacture of alumina $Al_2(OH)_6$ and its anhydrous form Al_2O_3. This material is found in all parts of the Globe, but all is not suitable for the extraction of alumina. Other materials, such as alunite, feldspar, etc., have been proposed, and in America alunite has been used, but generally the alumina is a by-product in these cases. Alumina made from china-clay by means of sulphuric acid and calcining is produced in the anhydrous form, and is not sufficiently pure for many purposes.

The composition and physical properties of bauxite vary considerably, the greatest variations being connected with the amount of iron and silica. The colour ranges from a light biscuit colour to a deep brown red, and the texture and hardness from a soft earthy structure to a massive rock-like structure. Irish bauxite is usually the poorest in alumina, and the French highest, although that from British Guiana and Georgia run it very close. The latter as usually mined contains 60-70 per cent. Al_2O_3 and from 3-25 per cent. Fe_2O_3, silica 3 to 9 per cent., and small amounts of vanadium, phosphorus, and titanium.

Indian bauxite is of quite a different structure, such as the laterites, its derivation being like that of British Guiana, due to tropical heat and humidity of the atmosphere. There is as a rule rather more organic matter present in the tropical ores than in those from colder climates.

Importance of the Free-Silica Content.

The physical condition affects the process working, and those ores which are moderately hard are much to be preferred. In fact, some of the softer earthy varieties cannot be economically worked, although their composition is all that can be desired. Chemically the worst constituent of the ore is silica in the free state. At one time titanium was thought to be deleterious, but this only applies to the Deville-Pickering process and not to the Baeyer process—really the wet process.

Two processes have been in use, the dry and wet or Baeyer process. Other processes have been proposed, such as electric fusion with coal, and the Peniakoff process, using sulphate of soda, but none is commercially employed. The object of both processes is to obtain the alumina in the soluble form as aluminate of soda.

Ore is first ground to a mesh of at least 80 and then mixed with the molecular equivalent of Na_2O, allowing for the amount of Na_2O which will combine with the free SiO_2, forming a sodium silicate, which in turn forms a complex sodium aluminium silicate partially soluble in the liquors and partly insoluble.

Bauxite is never used if it contains more than 3 per cent. of free SiO_2, since from 12 to 20 per cent. of the alumina content is thereby rendered unavailable and is lost, remaining in the residue for the dump. One part of SiO_2 fixes 0.61 part of Al_2O_3, and from this it will be seen that SiO_2 is deadly to economical extraction, consuming both alumina and the expensive soda.

In the dry process a proportion of the titanium is allowed for, but if it is in combination with iron nothing is to be feared. The small amounts of vanadium and phosphorus present in the ore consume soda, but are not taken into account as such. A figure based on actual practice is used as a factor.

Production and Decomposition of the Sodium Aluminate.

After the dry ore is mixed with (1) sodium carbonate, (2) caustic soda, in the correct proportions, it is conveyed to (1) furnaces or (2) autoclaves.

In the (1) fusion process the mixture is heated to about 1,000° C., and the CO_2 of the sodium carbonate is driven off and sodium aluminate formed. In the wet process the liquid mixture is heated with steam at 90-100lb. gauge pressure for about 8 hours, the temperature being raised as rapidly as possible to 150-160° C. In both processes the quicker the reaction temperature is reached the better the extraction as a whole.

Dealing with the dry process, the roasted product is lixiviated with water (usually condensed so as to prevent the further formation of insoluble aluminates), and care taken to prevent the undue access of CO_2. The liquors after clarification and containing the alumina as sodium aluminate are now ready for the precipitation of the aluminium hydroxide, either by the Baeyer method or by means of CO_2.

Turning back now to the wet process after the boiling of the mixed bauxite and caustic soda, the liquors are blown, under their own pressure, into diluting tanks, and there diluted to a gravity of 1.19 to 1.24, depending on the process conditions. The water used in the dilution is treated to precipitate the calcium and magnesium compounds, as the loss of alumina in the form of insoluble calcium and magnesium aluminates may amount to a large figure in the course of the year.

The two processes may now be treated as one up to the precipitation of the alumina, if the Baeyer process is used; but if the precipitation is by means of CO_2, separate treatment is necessary. The Baeyer process depends on an inherent property of sodium aluminate in solution to decompose spontaneously into aluminium hydroxide and caustic soda. The action is not reversible, nor is it complete, ceasing when the ratio of Na_2O to Al_2O_3 is as 6 : 1, the original being 2 : 1.

The liquors from the lixiviating or diluting tanks are now clarified, and the clear liquor, carefully kept free of suspended matter, is now run into decomposing tanks, where the above reaction takes place. The residue of red mud is taken to the dump. These tanks are large vertical cylinders fitted with stirring gear. The speed of the reaction and the physical condition of the hydroxide depend on a number of factors, such as temperature, concentration, speed of stirring, and volume of hydroxide initially present. The volume of hydroxide is usually found to be about 30/33 per cent. of the volume of liquor, and if the temperature is right and corresponds to the gravity, the precipitation of hydroxide is rapid and of a physical texture easy to filter.

Should these conditions not be present, then the rate of precipitation will be slow and the hydroxide of a slimy nature difficult to filter and settle. This upsets the process routine, besides causing other mechanical difficulties in the future handling of the residual liquors.

If the precipitation is by means of CO_2, extra plant in the way of CO_2 generators, coke or limestone, is required. An objection to the latter is the amount of residue that is left to handle, although if in a district where caustic is required the quicklime becomes a source of revenue. In this method precautions are taken to prevent, by correct strength of liquors and temperatures, the formation of a curious loose compound of sodium carbonate and hydroxide of alumina, and the formation of a slimy precipitate very difficult to filter. The precipitation of alumina in this process is of course complete, and therefore the liquors are concentrated direct and used over again as sodium carbonate.

In the above process it is obvious that once in the precipitating tanks no objection is taken to access of air. On the other hand, care is taken in the Baeyer process to prevent the undue access of air, to preclude as far as possible the carbonation of the liquors.

After the precipitation is completed the whole of the liquors in the dry process are filtered off, whilst in the Baeyer only so much as accompanies the amount of new hydroxide made is filtered. The remainder is settled, which under normal conditions is rapid and complete. The Baeyer hydroxide if properly made filters readily and contains 61/62 per cent. Al_2O_3. If badly made it contains, more water, soda and sodium aluminate. This hydroxide whilst moist usually has a salmon-pink colour due to the property which it possesses of absorbing colouring matter. The colour is derived from the ore by the action of the hot caustic on the organic matter present, the liquors usually resembling beer in colour.

Calcination of the Hydroxide.

Should the object be to make anhydrous alumina for aluminium manufacture, the hydroxide is now calcined in gas-fired furnaces. The temperature required to make a product suitable for the reduction furnaces is not less than 1,100° C., when an article having a density of at least 3.84 is obtained.

The calcination is not a simple matter. The type of furnaces in use is the result of careful observation and experiment. The thickness of the layer of hydroxide appears to influence in some undetermined manner the quality of the product, temperatures being equal. At densities of 3.4

to 3.75 the structure of the alumina is such that it runs like dry sand and is very dusty. At a density of 3.8 the change is very striking, the alumina lying heavy and practically dustless when moved about.

A small amount of calcium fluoride is added to the hydroxide before charging into the furnace (less than 1 per cent.), and this has the effect of considerably reducing the temperature at which the above change takes place, and so economises fuel. During the calcination a large amount of steam is evolved, and carries with it correspondingly large amounts of hydroxide and imperfectly-calcined alumina, which has to be collected in large dust chambers or mechanical dust collectors.

The question of alumina dust is a very important one, and continuous research into methods of alleviating the loss is carried out.

Recovery and Working-up of the Waste Liquors.

The working-up again of the liquors from the decomposers and hydroxide filter presses is obviously very important. Due to wash liquor and carbonation from the atmosphere the main body of the liquor suffers a reduction of gravity, and as the process is cyclic, this is a very important point with regard to concentration and proper circulation of liquors.

The concentration is usually carried out in vacuum evaporators, the final liquors having a gravity of 1.34 to 1.38. The act of concentrating also produces a partial purification of the liquors, sodium carbonate "salting-out" in the third pan with a further quantity in the storage tanks on cooling. This carbonate is causticised and added to the liquor going to the evaporators. The first effect acts also as a purifier, the tubes, tube plates and calandria body becoming covered with a very hard scale of sodium aluminium silicate, which is troublesome to get off, but which has to be removed.

Utilisation of the "Red-mud" Residues.

With regard to the residues of red mud, these are very troublesome to dispose of, and no use has yet been found for them. The high percentage of Fe_2O_3 which they contain (55-62) points the way to the blast furnaces for iron-making, but the ironmasters are afraid of the 5/6 per cent. of TiO_2, although in other parts of the world titaniferous ores are not looked upon with so much suspicion. They have also been proposed for use in gasworks, but the residue appears to act very inconsistently, and some method of making it more reliable for the absorption of H_2S must be found before gas engineers will take it. Needless to say, many experiments have been tried in co-operation with gasworks, but up to now success has not rewarded these efforts, although the experiments have not been concluded.

QUICKLIME FOR CAUSTICISING.

PROPOSED U.S. SPECIFICATION.

THE American Bureau of Standards (Circular No. 143), state:—The manufacture of caustic alkali consumes a large tonnage of quicklime annually. For this purpose a very pure grade of lime is required. Purity is determined not by the total content of calcium oxide, but rather by the content of calcium oxide which is available in the process for which the lime is used. A careful study of the requirements of the users of the quality of lime which is actually being used and of the possibilities of production have led to the establishment of 85 per cent. as a fair standard for available lime. Unlike most materials which are bought on specification, chemical lime is more valuable if it has a higher degree of purity than that required by the standard and less valuable if it has a lower degree. For this reason we have recommended that a bonus and penalty clause be inserted in the contract in order to take care of variations from the 85 per cent.

While the material is less valuable, but can still be used if the purity falls below the standard, there is a point reached eventually when the value of the material becomes such that it is poor economy to use the lime for this purpose. A careful survey of the situation has led us to set this figure at 70 per cent. In working up the details of this specification the Bureau has been assisted by an Interdepartmental Conference on Chemical Lime, composed of representatives of various Government agencies. The specifications have been partially approved by the National Lime Association, representing the producers, and by the Technical Association of the Pulp and Paper Industry, representing the largest group of consumers of this kind of lime.

THE AMINO-NAPHTHOL POLYSULPHONIC ACIDS.

By JOHN MISSENDEN.

FOR some considerable time these very complex acids have resisted attempts to determine their constitution, and, in some cases, their reactions, syntheses, and colour yields. From the disulphonic compounds given below a range of monazo- and disazo-dyestuffs have been produced:—

1 : 8 : 3 : 5 (B acid). 1 : 8 : (5) : ? (H acid).
1 : 8 : (2) : ? (L acid). 1 : 8 : 4 : 6 (K acid).
1 : 8 : 2 : 4 (S acid). 1 : 8 : 3 : 6 (B acid).

2 : 8 : 3 : 6 : (2R acid).

It is not proposed to discuss here more than the L acid, the 1 : 7 : (4) : ? position, and the 2 : 3 : 6 : 8 position of the disulphonic acids, and a few of the better known among the trisulphonic acids. So far as can be ascertained, none of these compounds appear even to a highly impure degree in the fractional distillation of coal tar; in consequence, their preparation is purely synthetic.

J. J. Müller and Co., of Basle, and later M. R. Knosp, of Stuttgart, believed that they separated some H-monosulphonic acid from a fraction heavy with naphthalene "salts," but found that the suspected compound was really a mixture caused by too low a temperature in the worm-tank and a tendency to "crust" in the lower end of the condenser-worm itself. On this occasion, a considerable quantity of the sulphuretted hydrogen passed through the worm instead of through the foul gas mains, and much of the fraction was rendered useless.

The Two Groups of Disulphonic Acids.

The information published in patent specifications upon the aminonaphthol sulphonic acids and their derivatives is exceedingly scanty. Descriptions of the reactions seem almost confined to their behaviour towards diazotised bases and nitrous acid. In the case of the 8 : 1 amino-naphthol described in a previous paper*, this substance is most suitable for the syntheses of many of the disulphonic acids, and those so formed divide into two groups—viz.:—

(1) Those giving para-azo-dyestuffs (they are purely the result of intensive research, and are not industrially useful);

(2) Those which give ortho-azo-dyestuffs in interaction with diazotised bases, as is evidenced in the cases of the B, H, and K acids.

Amino-Naphthol Disulphonic Acid L.

L Acid.—Two separate acids, the 1 : 8 : (2) : (5) — position, and the 1 : 8 : (2) : ? — position have been named "L acid." The first position is the one generally accepted as L acid, but many firms still use the term for the second. Dr. H. Brunck, of Ludwigshafen, declared in 1912 that the two compounds were identical, but an examination into their respective industrial uses shows this not to be so. In the first place, when acted upon by ferric chloride the acids show brown and green colourations respectively. Although the brown colour is fast to sunlight and to the action of most common washing soaps, it fades slightly under dry-cleaning processes, and is thus not a commercial dyestuff. The green is not so bad, indeed it might form a fairly useful bright lake with sodium acetate combinations. Care should be taken, however, accurately to regulate the acid and alkali, in order that neutrality may be obtained precisely at the moment when formation is in progress; otherwise, an excess of alkali will produce a dirty shade. The quantities of the raw materials used in the preparation in parts by weight were: Aluminium sulphate, 10; ferric chloride, 3.5; soda ash, 5; L acid, 3.5; sodium acetate, 3; caustic lye, 2; and hydrochloric acid, 4.

Both of the isomerides give yellow diazo compounds, and also couple with diazotised bases in acid solutions. (*References*: *Ger. Pats.*, Casella, 73,048 and 84,952; *Brit. Pat.*, Fischesser, 13,203/1894).

Other Disulphonic Acids.

The 1 : 7 : (4) : ? — acid (also known as 8 : 2 : (5) : ?) may be best produced by heating a reduced solution

* See article, "The Amino-Naphthols," by J. Missenden and F. E. Liechti, in *The Chemical Trade Journal and Chemical Engineer*, July 13, 1923, page 35.

of 8-nitro-2-naphthol, hydrochloric acid, and stannous chloride to 100° C. with concentrated sulphuric acid. The only information published by the patentee is that the acid is readily soluble. There are several colour reactions, however, the most noteworthy being the formation of a "viridine" green in interaction with ferric chloride, and subsequent treatment with alkali. The colour is peculiarly fast to light, and a wide range of shades may be obtained by mixing with quinoline yellow. The azo-dyestuffs resemble greatly those from K acid, but there is only one series. Little descriptive data concerning this series are to hand, but they are sufficient to warrant the belief that the dyestuffs are not commercially profitable. (*References*: *Ger. Pats.*, Casella, 69,458 and 75,066).

Unprecedented difficulties have been presented in the fixation of the final position, owing to a very complex constitution. The true constitution, however, believed to have been obtained during fission with cold fuming nitric acid, is probably 1 : 7 : (4) : (6).

The 2 : 3 : 6 : 8 — acid (also 3 : 2 : 5 : 7) has not had any description published by the patentee beyond the fact that it is produced by the sulphonation of 2-amino-3-naphthol-6-sulphonic acid. Investigation shows that the acid is fairly soluble, the acid sodium salt is obtained in needles, and is moderately soluble, the acid barium salt sparingly soluble, the calcium salt sparingly soluble, and it is possible to produce an acyl derivative which, upon coupling with diazotised bases, forms unstable azo dyestuffs pale yellow in colour. With ferric chloride a pale bluish green has been formed which is hardly suited to commercial requirements.

The Imperfectly Investigated Trisulphonic Acids.

There are only three of these acids that have been investigated with any degree of accuracy; they are the 1 : 2 : 3 : 6 : 8 —, the 2 : 1 : 3 : 6 : 8 —, and the 1 : 8 : 2 : 4 : 6 — positions. The first is obtained by reducing the azo-derivatives of the corresponding 2-naphthol-3 : 6 : 8 — trisulphonic acid; the second, by the same procedure, using the *a*-naphthol; and the third, by fusing naphthasultam — 2 : 4 : 6 — trisulphonic acid with 85 per cent. of caustic potash at 150° C. The first two do not give any salts worthy of mention.

The third compound forms salts sparingly soluble, such as the calcium, sodium, and potassium derivatives. Treatment with ferric chloride gives a green which can be made very bright, providing absence of alkalis is ensured. A very beautiful orange may be produced, which is highly soluble. Care should be taken in this case that every trace of free mineral acid is removed from the solutions, otherwise diazotisation will not take place; instead, there will be a rapid oxidation to the corresponding—naphthaquinone—trisulphonic acid. Oxalic acid is said to be best suited for the purpose of acting on the nitrite for diazotisation. The presence of cupric, ferric, mercuric, manganese, or nickel salts impair the brightness of the orange, but salts of the alkaline earth metals tend to intensify it. A most rich colouration can be obtained by the use of a calcined soda and barium chloride mixture in the ratio of 3 : 2, additional substances being Turkey-red oil and para nitraniline dissolved in very weak hydrochloric acid. Diazotisation should take place with sodium nitrite, and a splendid precipitated lake may be obtained. *References*: *Ger. Pats.*, Geigy, 171,024; Bayer, 84,597. *Brit. Pat.*, Geigy, 10,235/1904.

The Manufacture of Ether. — According to a *J.S.C.I.* abstract of a paper by J. B. Senderens (*Comptes rend.*, 1923, 177, 15), in preparing ether by running alcohol into sulphuric acid kept at 130° C., use is being made of a poor dehydrating agent—viz., the hydrate, $H_2SO_4,4H_2O$. At 140°, ethylene formation begins, but at 136°—138° etherification is more rapid than at 130°, since the highest hydrate capable of existence is then $H_2SO_4,3H_2O$. In practice it is more advantageous to supply an ether still with 95 per cent. alcohol containing 10 per cent. of concentrated sulphuric acid than to supply it with alcohol alone. Methyl ether is best prepared by heating methyl alcohol at 160°—165° with an acid corresponding to $H_2SO_4,2H_2O$. If sulphuric acid is used more dilute than corresponds to $H_2SO_4,4H_2O$, no conversion of methyl alcohol to ether occurs.

HYDROGENATED PHENOLS AND CRESOLS.*

THEIR USE IN SOAPS AND FOR GENERAL TEXTILE PURPOSES.

(*Continued from page 305.*)

IT is possible, however, that the hexalin and methyl-hexalin soaps will find a great field of application not only in textile manufacturing, but in laundry and general household work. Schrauth (*loc. cit.*) gives an account of experiments that have been carried out at the German Textile Technical College at Aachen. Materials made both of pure white wool and of dyed wool were rubbed well over with fat containing a good proportion of mineral oil. After washing with the hexalin soap the materials were obtained quite clear and oil-free.

Odour Not Found Objectionable.

In the use of hexalin and methyl-hexalin soaps in the fulling mill or in the washing machine, provided the temperature is not too high and the percentage of hydrogenation product in the soap is not too great, no deleterious effects on the health of the workpeople have been noted, and no objections have been raised against the odour of the soaps. For the preparation of solid household soaps, Bergo (*Seifensied. Ztng.*, 1922; No. 23) recommends mixing a considerable proportion of dekalin (decahydronaphthalene), which, in addition to its excellent fat solvent action, partially hides the odour of the hexalin or methyl hexalin. It is doubtful, however, whether the advantages claimed for the addition of dekalin are not more than outweighed by the increased possibility of fire accompanying its use.

Liquid hexalin and methyl-hexalin soaps now appear on the market under various trade names, such as Savonade, Texapon, Texalin, Hydralin, etc., and may contain in addition to hexalin, turpentine, tetralin (tetra-hydronaphthalene), benzine, benzol, carbon tetrachloride, and other chlorhydrocarbons. On dilution with water they give either clear solutions or permanent emulsions, both of which types possess excellent de-fatting and detergent properties.

Use in Special Oil Products.

A further use for hexalin and methyl hexalin is in the preparation of special oil products for the textile industry. These have been described in detail by Welwart (*Seifensied. Ztng.*, 1922; No. 36). For a good many years now, a series of water-soluble defatting materials, such as Tetrapol, Tetraisol, Lanapol, Verapol, etc., have been used in the textile industry. In general these materials are prepared by neutralising with alkali a mixture of the sulphonation products of castor oil or its fatty acids in the presence of water, hydrocarbons, chlorhydrocarbons, and sometimes in the additional presence of olein. Whilst the alkali salts of the ordinary fatty acids possess only a very slight solvent power for hydrocarbons and chlorhydrocarbons, the products described above possess, owing doubtlessly to the sulphonic group in the ricinoleic chain, a very considerable solvent power, which, in the presence of soaps is increased even more.

The solvent and emulsifying powers of the neutralised castor-oil sulphonation products are increased still further by a certain amount of polymerisation such as takes place in the preparation of monopol soaps, monopol oils, turkey-red oils, and iso soaps. Neutralised mixtures of monopol soap and olein can dissolve 20 to 25 per cent. of mineral oils, and the resultant mixture is perfectly soluble in water. Similar oil preparations which find application as wool fats, or as brightening materials in cotton and wool dyeing, can also be prepared simply by the use of hexalin or methyl hexalin. Emulsions of hexalin soaps and mineral oils, containing 60 per cent. or over of the latter constituent, when used with lukewarm water will completely cleanse woollen material that has been impregnated with fatty matter and mineral oil, even though such material has been allowed to remain in this state for many weeks. The use of small amounts of hexalin soaps will remove traces of mineral oils from a woollen fabric in a few minutes at the ordinary temperature.

Use in Silk Degumming and Dry Cleaning.

Welwart (*Seifensied. Ztng.*, 1922; No. 29) recommends the use of hexalin soaps as an addition to the soap bath in the degumming of silk, since they suppress the hydrolysis of the

* A Report by Ing. Chem. Welwark, of Vienna. Translated and rearranged from the *Chemiker Zeitung*, Sept. 3, 1923.

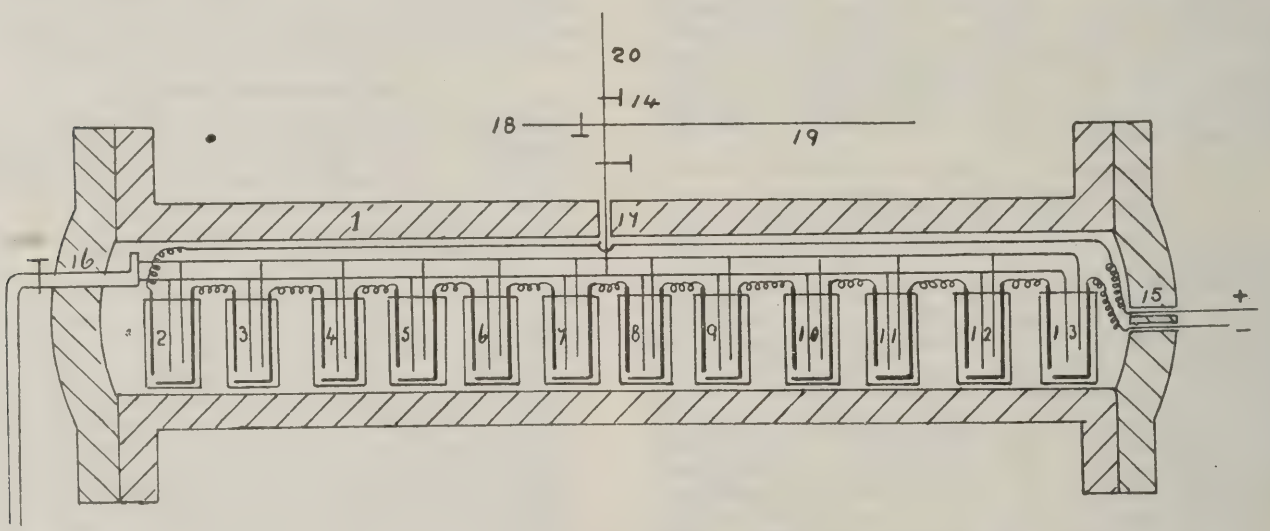
ordinary soaps, and thus minimise the formation of insoluble alkaline earth soaps. Liquid hexalin soaps can also be employed advantageously as additives to the bucking lyes and as mordanting oils. In chemical dry cleaning, as substitutes for benzine soaps, and as efficient stain removers for all classes of textiles, the hexalin and methyl-hexalin soaps may usefully be used.

These new soaps must not be valued merely on their fatty-acid content, since the presence of the hydrogenated phenols increases their detergent powers to a degree many times that possessed by ordinary soaps with a similar fatty-acid content.

A NOVEL BELGIAN NITROGEN-FIXATION PROCESS.

FORMATION OF AMMONIA IN AQUEOUS SOLUTION.

IN our issue of August 31, we printed a letter from J. J. Van der Bossche, chemical engineer of Courtrai, Belgium, in which the writer pointed out the similarity between the process of nitrogen fixation invented by himself and the hydrolytic nitrogen decomposition method investigated by the American workers Falk and McKee, and dealt with in our issue of August 17. In our comment on M. Van der Bossche's letter we stated that although the two methods were not strictly comparable, yet the Belgian process presented so many points of novelty and interest that a more detailed description of it would be given in a subsequent issue. The following account is from M. Van der Bossche's Belgian patent specification. We have since received from the inventor a description and sketch of a plant suitable for making ammonium sulphate and ammonium nitrate according to this process.



Electrolytic Hydrogen Evolved in a Pressure Vessel.

The aim of the inventor is to accomplish the synthesis of ammonia in the cheapest and most efficient manner. The method starts from the fact that by the electrolysis of any aqueous solution of an electrolyte, hydrogen is produced at the cathode at a pressure which, at the moment of liberation of the gas, is sufficiently great to enable the hydrogen to combine with nitrogen dissolved under pressure in the electrolyte. One kilogramme molecule of hydrogen at the moment of its liberation by electrolysis occupies a volume of 18 cubic metres, and if it is desired to keep this volume at 18 cubic metres a pressure must be applied above the electrolyte of about 1,222 kilogrammes per cubic metre. It is thus seen that at the instant of liberation of the hydrogen, there is a hyperpressure of more than 1,200 atmospheres. The higher the temperature of the electrolyte, the greater will be this pressure.

Influence of Catalysts.

If these hydrogen ions liberated at these hyperpressures come into immediate contact near the cathode with ions of nitrogen dissolved in the electrolytic liquid, combination to form ammonia can take place in the presence of a catalyst. It has been found that the catalytic action exerted by manganese dioxide placed at the bottom of the electrolytic cell is sufficient to cause ammonia formation, even in the presence of catalyst poisons such as sulphur, cyanogen, etc. By using cathodes and anodes of ferro-manganese (80 per cent.) the optimum conditions for the synthesis are realised since electrodes of this material destroy the catalyst poisons. If, in addition, the electrolyte also contains in solution a reducing salt such as manganese sulphite, or ammonium sulphite or sulphurous acid itself, this salt will be oxidised to manganese sulphate, ammonium sulphate or sulphuric acid respectively, particularly in the neighbourhood of the anode.

It results therefore that the electrolysis of a solution of this type containing nitrogen dissolved under pressure can be accomplished without the evolution of any gas whatsoever. The ammonia synthesised will combine with the sulphuric acid formed by the oxidation of the sulphurous acid or will precipitate the manganese hydroxide from the manganese sulphate, etc.

Description of Plant.

To put the invention into execution, the operation can be carried out in the manner indicated schematically in the accompanying illustration. In the pressure vessel 1, are placed a series of electrolytic cells, 2 to 13, arranged either in electrical series or in parallel. At the bottom of each cell is placed a quantity of small-lumped pyrolusite with a normal content of silica. It has been found that the presence of this silica facilitates the process in some unexplained manner. The anodes and cathodes are made of ferro-manganese and the electrolyte is composed of ammonium sulphate, manganese sulphate, ammonium sulphite, manganese sulphite, ammonium hydrosulphite or carbonate, sulphurous acid, hydrogen sulphide, cyanides and sulphuric acid, all in solution in water and proceeding partially from the actions which take place in the cell under the action of the electric current. The electrolyte also contains a small amount of ammonium silicate.

The nitrogen under pressure is introduced into the pressure vessel, through a pipe ending at 16 and constructed in such a manner as to resist a variable pressure. A series of pipes branching out from the main nitrogen pipe deliver the gas to the bottom of the electrolytic cells where the nitrogen owing to the general pressure in the system dissolves in the liquor, any excess of the gas being trapped and stored in the free space above and around the sides of the cells.

A second system of piping entering the main vessel at 17, after having passed through the four-way valve 14, introduces intermittently the liquor prepared for the electrolysis. Such a liquor is prepared in any suitable installation and reaches the four-way valve through the pipe 19. The spent electrolyte is forced out of the pressure vessel by means of the nitrogen through the pipe 18. Pipe 20 is a cleansing pipe for forcing out slime and gas. The liquors leaving by pipe 18 are submitted to any appropriate treatment, such as distillation, concentration, evaporation, or crystallisation,

and the resultant mother liquors are utilised for the preparation of fresh electrolytic liquor to be introduced through pipe 19. The anode may be constructed of a ferro-manganese plate of large surface on which the pyrolusite rests, and the cathode is preferably a ferro-manganese rod of comparatively small superficial area. The electrical pressure at the terminals may vary from 4 to 8 volts, according to the degree of concentration of the liquors, the pressure of the nitrogen, and the temperature of the cells.

PUMPS FOR INDUSTRIAL PURPOSES.*

FACTORS INFLUENCING CHOICE.

THE pump is a vital part of many industrial processes, and yet there is probably no piece of equipment which is purchased with so little consideration as to its application. There are an almost infinite number of combinations of mechanical elements which can be assembled into a pump design. It therefore becomes possible, by marshalling such elements properly, to build a pump which will meet an industrial problem more satisfactorily than "just a pump."

Of the many types of pumps available, such as are of industrial interest can, in a general way, be placed in four groups—namely, piston, plunger, centrifugal, and rotary. There are, however, many variations in design and construction in each group.

If a fluid has the consistency of water or is no more viscous than light motor oil, then a centrifugal pump can be applied with success. Whether the centrifugal pump should be of the single- or double-suction type, or equipped with open or enclosed impellers, depends upon circumstances surrounding the installation, such as volume in gallons per minute, head in feet, and the method available for driving the pump. In general, it can be stated that for large volumes at low head, a single-suction open impeller type pump is usually satisfactory; while for high heads, the double-suction, enclosed, impeller type centrifugal pump is more efficient.

A small volume, say 50gals. per min., and a high head, 50lb. to 75lb. per sq. in., is a combination of conditions which can be better met with a piston or plunger type pump than a centrifugal, unless there is some very special reason why a centrifugal pump should be considered. Such a reason might be found in passing certain kinds of fluids through filter presses, because the centrifugal pump has the advantage of delivering a steady flow without any pulsations or shocks through the filter medium. It also has the advantage that, as the filter becomes clogged, the rate of flow will automatically adjust itself to the increased filter resistance, and no undue pressure will accumulate on the filter, with the possibility of rupturing the cells or the filter itself.

A plunger pump will deliver a relatively small volume of fluid against a high head more economically than either a centrifugal or a rotary pump. A rotary or plunger type pump will handle viscous materials which would be impossible with a centrifugal. A rotary pump designed for the purpose will handle materials which are too viscous for either a plunger or piston type pump (materials like white-lead paste, etc.). It must, however, be borne in mind that such materials cannot be handled by an ordinary rotary pump. It must be designed for the purpose in order to assure success.

The fact must not be lost sight of that there is no universal rotary pump. In fact, there is no universal pump of any type. It follows that each type or design of pump is limited to certain uses. These limitations are governed by a variety of conditions, but, fundamentally, the viscosity, temperature, volume, head, and chemical properties of the fluid are most important.

Effect of Viscosity of Fluid.

When using the term "fluid," every substance is included which is plastic enough to permit it to flow through a pipe—for example, commercial white lead and oil, cereal mash, chilled lard, tooth paste, paper pulp, pitch, tar and asphalt, chocolate paste, glucose, molasses, etc.

Good practice would dictate that viscous materials must either gravitate or be fed to the pump inlet. Such materials do not respond readily to suction lifts, as they have a high coefficient of friction; therefore, one must avoid trying to impart an excessive velocity of flow to them through any part of the pumping system. A pumping system here refers to the whole equipment from the source of supply to the point of discharge, including the vessel, agitator, or equivalent in which the source of supply originates, and the container into which it is to be delivered. If a paste or viscous material can attain a normal (efficient) velocity of 0.5ft. per sec., the pumping system should be so arranged that in no part of it a greater velocity is attempted than the ideal condition would include, not even through the pump, its ports or valves. Thus, a 3in. pump might efficiently handle 300gals. per min. of a fluid of low viscosity, and yet not more than 10gals. per min. could be successfully handled when the material is highly viscous.

A pump speed or capacity must be synchronised with the fluid's economical flowing capacity; and all pipes and fittings used in the pumping system must also be of such sizes to accommodate the economical flowing capacity of the material pumped. If a pump has a capacity too large for the normal rate at which a viscous fluid will flow, there will be a tendency to "wire-draw" the fluid in the suction pipe and set up a high vacuum in the same. This will result in having the pump's displacement only partly filled and under vacuum, causing shocks and setting up serious vibration and noise in piston, plunger, or rotary type pumps.

A Perfect Vacuum Unnecessary.

Too few people realise that even if a pump were able to produce a perfect vacuum on the suction side, the head pressure forcing the fluid to the pump would only be equal to that of the atmosphere, provided the source of supply was on the same level as the inlet to the pump. It would be considerably less, however, with a vertical suction lift, and as much less as the static head resulting from a lift below the level of the pump inlet.

A practical example might be suggested by assuming 100ft. of straight 1in. pipe connected to the discharge of a pump. This line of pipe would require a head equal to approximately 12lb. per sq. in. to force water at the rate of 20gals. per min. through it, because the velocity set up in the pipe requires this pressure to overcome the frictional resistance.

Should it be required of a pump to draw water to the inlet, a vacuum of approximately 25in. would have to be created by the pump to cause a flow of 20gals. per min. through a 1in. straight pipe 100ft. long. If the water were warm or saturated with air, it is obvious that such a vacuum could not be maintained, and thus the capacity would be less. If the suction pipe-line were longer, the rate of flow could not be established, because of the increased friction resulting. It follows that the pump cylinder would then only be partly filled with water, while the balance of the space would be under vacuum. Such a condition would cause shock within the pump as well as the pipe-line, resulting in noise and vibration which might cause serious difficulty.

Where Mechanical Efficiency Must be Sacrificed.

Efficiency is always an important item to be considered in the selection of pumps or any other equipment, but the meaning of efficiency must be applied in its broadest sense—that is, the ultimate efficiency as related to other equipment in the process or plant—namely, freedom of interruptions, etc. A pump may have a very high mechanical efficiency in itself and yet be the cause of great inefficiency in the plant or process as a whole; while a pump of low mechanical efficiency may bring up the plant efficiency to an exceedingly high level. Some concrete experiences will illustrate this statement.

In a plant handling liquid foodstuffs an excellently made and efficient pump was used, and would have been correctly applied if the fluid had been of a kind where the element of cleanliness was not important. But the pump was of such construction that accessibility to the interior, ports, etc., was impossible, thus permitting the breeding of bacteria, which seriously impaired the flavour and quality of the product. The difficulty was overcome by building a special type of open impeller centrifugal pump, in which the features making for higher efficiency had to be sacrificed in favour of obtaining the essential sanitary features. Thus, a higher efficiency was established within the plant by the application of a pump of lower efficiency, but sanitary in construction.

In a certain chemical industry in which a great many pumps were installed, continual interruptions were experienced because a standard open impeller type pump had to be used; and since the service was continuous, some of these pumps would wear out within from four days to a week. The material to be handled was not only of an acid nature,

* Abstract of paper by W. F. Traudt, of the Taber Pump Co., Buffalo, N.Y., in *Industrial and Engineering Chemistry*, Sept., 1923.

but held in suspension materials which were highly abrasive. The pumps were operated at the most efficient speeds considered strictly from a hydraulic standpoint. The pressure heads were relatively high, and required high speeds to obtain good mechanical efficiency. The writer was consulted on the matter, and advised that improvement could only be obtained by using larger pumps and operating them at slower speeds, which in some instances reduced the mechanical efficiency of the pump unit to half, with the result that shutdowns and interruptions were reduced. Thus the total plant efficiency was improved.

In one case, with a pump which had to be replaced every week, the time was extended to a month's operation before repairs or replacements had to be made; and in another instance, by changing the alloy from which the pump was made, the service was extended from five weeks to eleven months.

If the subject of pumping fluids is given a little earnest thought, it is amazing to find how dependent upon some form of pumping operation the world is. A syphon is a pump. Capillarity is a form of pumping, and is frequently the only means by which line shafts are lubricated. Vegetation itself depends upon the pumping operation such as is accomplished through the rootlets of trees conveying moisture to the smallest twig and leaf. In short, any process which will cause a fluid to be raised from one point to another at the same or higher level can be considered a pumping system. It follows, therefore, that if one will consider industrial pumping problems with more care, and examine into all phases of the proposed pumping system, never losing sight of the physical and chemical properties of the fluid to be handled, there will result incalculable savings not only in fuel or power, but through fewer interruptions in manufacturing processes. Too often, when laying out an industrial process, one thinks of the pump at the "eleventh hour," and then only in terms of "just a pump."

HYDROFLUOSILICIC ACID.

NEW USES AND PROPERTIES.

ACCORDING to C. A. Jacobson (*Bull., Internl. de l'Académie Polonaise des Sciences*, 1922, p. 9) the uses of hydrofluosilicic acid are rapidly increasing. A solution of 28-30 per cent. strength is sold in America as a disinfectant and for the destruction of fungi. The acid will convert starch into soluble starch at temperatures below 100° C. Its use has been proposed in the paper industry for the hardening of paper. Calcium fluosilicate is stated to give good results when applied as a fertiliser for cereals. Fluosilicates are also used in the cement and linoleum industries. The acid itself may be used for the precipitation of potash in molasses.

Systematic examination of the nature of hydrofluosilicic acid has given the following results:—Slow distillation *in vacuo* at ordinary temperatures of the aqueous acid has allowed the concentration to be pushed up to 60 per cent., and this figure appears to be maximum attainable at normal temperatures. It is very probable that hydrofluosilicic acid does not exist in the gaseous state and cannot be distilled as such. The density of a 60.79 per cent. H_2SiF_6 has been found to be 1.4634 at 25° C., and the index of refraction at the same temperature is 1.3465. In concentrated solutions the acid possesses a biting taste, but in dilute solution its taste resembles that of alum.

For the estimation of hydrofluosilicic acid, the author recommends the following process:—Sodium or potassium chloride is added to a determined volume of the acid and the titration effected in two steps, firstly at a low temperature with normal caustic soda or caustic potash and in the presence of methyl orange, and secondly in more dilute solution in the neighbourhood of the boiling point and in the presence of phenol phthalein. The hydrofluosilicic acid investigated was prepared by the author by decomposing a mixture of fluorspar and precipitated silica with sulphuric acid and absorbing the silicon tetrafluoride evolved, in water. Ortho-silicic acid is formed at the same time as the hydrofluosilicic acid and the reaction only takes place in aqueous solution.—*La Revue des Produits Chimiques.*

German Patent Regulations.—Germany has increased the fees for registration of trade-marks and patents and has extended the terms of patents from fifteen to eighteen years.

NATIONAL GAS EXHIBITION.

SCIENTIFIC PAPERS READ AT BIRMINGHAM.

A JOINT meeting of the Society of Chemical Industry (Birmingham and Midland Section) and the Midland Junior Gas Association was held at the National Gas Exhibition, Birmingham, on Tuesday last. The papers read were "Specific Heat of Coal and Relation to Its Composition," by Mr. G. Coles (Mining Research Laboratory, University of Birmingham); "A New Gas-fired Combustion Furnace," by Mr. T. J. Hedley (Department of Chemistry, University of Birmingham); and "Improvements in Nett Value Calorimetry," with a description of an automatic device for temperature and pressure correction by Mr. C. H. Beasley.

A New Gas-combustion Furnace.

In this paper Mr. Hedley pointed out that gas-combustion furnaces are used in chemistry for the ultimate analysis of organic substances. Existing types of furnaces represent little or no advance in design or efficiency over those in use over half a century ago and are usually expensive, heavy and cumbrous, easily get out of order and are very wasteful of gas, time, and human energy. The new furnace is readily portable by one person, costs considerably less than any other furnace, is economical of gas and can be operated with precision and comfort. The essential features are a multiple flame burner with separate control of each flame, gas being admitted at each end of the burner (which is partitioned at the centre) by a series of jet holes, the number in use being controlled by a screw plunger. The burner is self-regulating as regards air-gas mixture, the air intake by induced draught being governed by the number of jets in use. By this means any type of flame can be obtained for any number of flames, the number of flame orifices open being varied from the front underneath the burner by simple heat screened thumb-screw valves. Adequate provision is made for the protection of the operator, the bench and the bungs of the combustion tube, by suitable hinged and fixed refractory screens.

These furnaces are in daily use in Universities and colleges at Birmingham, Edinburgh, Leeds, Liverpool, etc., and are made and supplied by Messrs. W. and J. George, Ltd., Birmingham.

An Improved Automatic Gas Calorimeter.

The subject of calorimetry, stated Mr. Beasley, is now engaging a good deal of attention both from gas manufacturers and consumers, and it is interesting to note the improvements in calorimetric apparatus. The Beasley Recorder has had some very important improvements effected in its design, chiefly relating to the gas measuring part of the apparatus. The meter water line is now kept to a constant level by a small storage tank holding enough water to keep the meter correctly lined for several days without attention. With regard to correcting the volume of gas to standard conditions, by a very simple device the pendulum rate of oscillation can be automatically varied in direct proportion to the alteration of volume of the gas passing through the meter, owing to temperature and pressure conditions. The main novelty about the device is what one may call a brake in the form of a flat steel spring that is used to oppose the motion of the pendulum on the constant flow meter.

The movements obtained by changes of pressure are closely proportional to the magnitude of these changes, so that the brake spring moves distances proportional to the pressure changes. It was found by experiment that if a brake in the form of a flat steel spring could be applied to oppose the motion of the pendulum in such a way that the opposition force itself is a constant amount, then by applying this brake at different points from the fulcrum or suspension point, the rate of the pendulum varied in direct proportion to these distances. These conditions are complied with in the apparatus now in use. A feature about the corrector is that its movements are practically free from friction, the arm turning on pointed pivots and the stud at the end of the spring only coming in contact with the slot at the end of pendulum beat.

The meter without the corrector delivers a constant volume of gas irrespective of pressure, temperature and density, but with the corrector it delivers a constant amount, that is if the volume passed at any temperature and pressure is corrected to standard conditions, at which gas rate the instrument is calibrated.

THE WORK OF THE GOVERNMENT LABORATORY.

REPORT OF CHIEF CHEMIST FOR 1922-1923.

THE report of the Government Chemist upon the work of the Government Laboratory for the year ending March 31, 1923, has just been published by H.M. Stationery Office (price, 1s. 3d. net). The following extracts are taken from this report.

The chemical work of the following departments is performed wholly or in part in the Government Laboratories —Admiralty, Ministry of Agriculture and Fisheries, Air Ministry, Colonial Office and Crown Agents for Colonies, Board of Customs and Excise, Geological Survey, Ministry of Health, Board of Inland Revenue, Ministry of Pensions, Post Office, Department of Scientific and Industrial Research, Home Office, Board of Trade, War Office, Office of Woods and Forests, and Office of Works.

The total number of samples examined in the course of the year is 343,453, as compared with 302,562 in the preceding year, an increase of 40,891. The samples of wine have increased from 61,683 to 85,776, of sugar from 42,715 to 49,172, and of tobacco offal and waste from 31,851 to 35,545, while there are notable increases in the numbers of samples of wort and exported and imported spirituous preparations. The number of samples of beer for the detection of dilution is again high, the number being 5,079, as compared with 4,650 in the previous year and 854 two years ago. There has been a decrease of 5,500 in the number of samples of tea. In connection with the Safeguarding of Industries Act the number of samples in the present year is nearly 8,000. The Dangerous Drugs Act, and the Dyestuffs (Import Regulation) Act, continue to impose considerable work on the Department.

Investigation of Sheep Dips.

The regulations of the Ministry of Agriculture require the periodical dipping of sheep in a bath prepared from a dip which has received the approval of the Ministry. In applying for the approval of a dip, the manufacturer submits a sample, together with a formula according to which the dip has been prepared, and both formula and dip are forwarded to the Government Laboratory. In some cases the formula shows that the dip made as prescribed, or the bath prepared at the dilution proposed, would not contain a sufficient quantity of active ingredients (arsenic, tar acids, nicotine, sulphur) to be considered effective for the cure of sheep scab. In such cases the formula is returned to the makers for amendment. Where the formula is satisfactory the dip is analysed to ascertain whether it has been made according to the formula. Samples of the dips as sold for use, as well as samples of the bath in use during a dipping operation, are also occasionally examined to ensure that dip and bath are of the approved strength. 189 samples were submitted during the year, and 27 were reported as defective.

Pollution of Rivers by Tar Drainage.

Ninety-eight samples of river water and effluents were investigated. In order to ascertain whether bituminous road dressings would give drainage harmful to fish life, a committee of the Ministry of Agriculture and Fisheries was set up to deal with the matter, and a representative of the Government Laboratory served on that body. Experiments carried out showed that pure bitumens were free from tar acids and bases and did not contain toxic ingredients likely to be dissolved in road drainage. From this point of view bituminous road dressings would appear to be reasonably free from risk to fishing streams. The matter was investigated at a site at Alresford on the road previously used for testing tarred surfaces. A report (No. 40 of Standing Committee on Rivers Pollution, Ministry of Agriculture and Fisheries) dealing with these experiments has now been issued, and it is shown that in the conditions stated no toxic effects resulted from the bituminous road dressing.

Fertilisers and Feeding Stuffs.

The Fertilisers and Feeding Stuffs Act is administered by local authorities, but before any of these bodies can take proceedings against a seller for contravention of the Act, the consent of the Ministry of Agriculture must be obtained. Such consent can be given only after the portion of the original sample taken and reserved for the purpose has been analysed at this laboratory and reported upon to the Ministry. During the year, 22 fertilisers, including one from Scotland, and 22 feeding stuffs have been reported upon. In most cases the amount of nitrogen, phosphates or potash was less than the guarantee stated. Seven samples of basic slag and basic phosphate were deficient in citric-soluble phosphates to an extent exceeding the limits of error prescribed in the Ministry's regulations, and in five cases the basic slags were deficient in total phosphates, two of the samples containing only 71 per cent. of the guaranteed quantity. Two samples of basic slag were found to contain mineral phosphate mixed with the slag. A sample of sulphate of ammonia was found to be deficient in nitrogen and to contain 0.33 per cent. of free sulphuric acid and 5.0 per cent. of water, the deficiency in nitrogen probably being due to the absorption of water by the free acid in the sulphate.

The feeding stuffs included ground oats, clover meals, fish meals, coconut cake and pea meal, alleged to contain foreign materials, and various meals and cakes deficient in oil and albuminoids when compared with the guarantee on the invoice. The ground oats, in some cases described as "Sussex Ground Oats," were adulterated to an extent varying from 20 per cent. of barley meal to 90 per cent. of barley, maize, weed seeds and oat-shudes. The clover meals contained 50 per cent. of material not derived from clover. A sample of coconut cake contained 17 per cent. of castor oil cake; fish meal 30 per cent. of vegetable matter and sand; and a sample of pea meal, 45 per cent. of wheat and maize. Among the samples deficient in oil and albuminoids were a meat-and-bone meal containing only two-thirds, and a meat meal with less than one-half of the guaranteed quantities of albuminoids.

The Meaning of "Commercial Blue Vitriol."

Inquiries instituted in connection with proceedings under the Merchandise Marks Act, led to the examination of a considerable number of samples in order that information might be obtained as to the composition of the agricultural materials concerned as placed on the market. One inquiry, in the course of which 71 samples were received, related to the quality of the blue vitriol supplied for horticultural or wheat-dressing purposes throughout the country. Sixty-five of the samples were sold under the descriptions "Blue vitriol," "Blue stone," or "Copper sulphate," and of these 53 contained more than 98 per cent. of crystallised copper sulphate, while 12 were almost up to this standard. Two other samples, consisting of mixtures of copper sulphate and ferrous sulphate in approximately equal proportions, and sold under the description "Commercial blue vitriol," were the subject of legal proceedings, at which it was contended that it was a trade practice to apply the term to copper sulphate containing large quantities of ferrous sulphate. This contention was negatived by the result, the seller being fined.

Work for the Customs and Excise Departments.

In order to avoid delay in the examination of samples for the Customs and Excise Department, chemical stations have been established at the more important seaports and one inland town, where samples are tested by Customs and Excise Officers who have been specially trained at the Government Laboratory for this purpose. The chemical station at Liverpool is in charge of one of the chemists on the staff of this Department.

The number of samples tested for arsenic, including beer, wort, malt, sugar, and other materials used in brewing, was 462. Of these 66 were found to contain arsenic in excess of the limit laid down by the Royal Commission on Arsenical Poisoning—namely, the equivalent of one-hundredth of a grain of arsenious oxide per pound in the case of solids, or per gallon in the case of liquids. Of the 208 samples of malt and sugar tested, only three contained arsenic in excess of the limit, but the limit was exceeded in three instances out of 61 samples of beer and wort.

During the year the question of the presence in chocolate of fat other than cocoa butter has continued to receive attention. Fat expressed from the cocoa nib during the manufacture of cocoa powder was formerly available in large quantities for incorporation in chocolate in which a varying proportion of extra fat is desirable. For various reasons manufacturers have been constrained to use a substitute which, whilst not derived from the cocoa bean, closely resembles cocoa butter in its physical and chemical properties. The estimation and even the detection of this fat when incorporated in chocolate presents great difficulties, but the method devised in this Laboratory has been applied with satisfactory results.

Under the provisions of the Dangerous Drugs Act, the importation or exportation of prepared opium is prohibited. The Act, further, makes it an offence, *inter alia*, to import or export without licence, certain drugs [morphine, diamorphine (heroin), cocaine and ecgonine], or preparations containing more than a certain percentage of these drugs. In suspected cases the Officers of Customs and Excise sample the goods and the samples are examined at the Government Laboratory; 105 such samples were received, and of these three were found to contravene the provisions of the Act. One sample bearing the seal of a foreign company and marked "Cocainum hydrochloricum," was seized by officers, but it consisted of quinine hydrochloride, and two samples with indistinct markings, but bearing labels of a foreign cocaine company were found to consist of benzoic acid.

Dyestuffs (Import Regulation) Act, 1920.

Six hundred and thirty-three samples of imported colours, lakes, and other goods were examined to ascertain whether they contained synthetic organic dyes or intermediate products, the importation of which is prohibited except under licence.

One hundred and seven samples of matches were submitted under the White Phosphorus Matches Prohibition Act, 1908. None of the samples showed any evidence of the presence of white phosphorus.

Safeguarding of Industries Act.

This Act came into force on October 1, 1921, and nearly 8,000 samples were examined during the year. The object of the examination in most cases was as to (*a*) whether the chemical substance was such as to come within the class of those liable to tax; or (*b*) whether, in the case of substances bearing trade names without indication as to their ingredients, such as medicinal preparations, toilet articles and perfumes, the imported article contained any substances liable to tax, and if so in what proportion. The analysis of many of the samples such as medicines, perfumes and proprietary articles, is of an intricate nature, especially as in some cases no information is available as to the composition of the goods.

Industrial Alcohol and Fusel Oil.

882 samples of wood naphtha and mineral naphtha intended for use in the preparation of methylated spirit were examined. The naphtha represented by 877 of these samples was approved as fit for methylating purposes. One thousand eight hundred and one papers were dealt with relating to applications to the Commissioners of Customs and Excise, either (1) in respect of claims for rebate on alcohol used in making medicinal preparations or for scientific purposes, or (2) in connection with permission to receive methylated spirit and other forms of duty free alcohol for use in manufactures, tuition and research. A further amount of work has been done in connection with the inquiry into the characteristics of denaturants and colouring substances for alcohol for industrial purposes.

Fusel oil, which consists largely of butyl and amyl alcohols, is a by-product in the manufacture of ethyl alcohol, and is of considerable commercial importance as a constituent of lacquers, varnishes, etc. Fusel oil, whether imported or home produced, generally contains ethyl alcohol as an unavoidable impurity, but duty is not charged unless upwards of 15 per cent. of proof spirit is present. This was the case in 15 of the 108 samples of imported fusel oil submitted for examination, and as an alternative to payment of duty, the importers were allowed to reduce the proportion of proof spirit to the limit of 15 per cent. Thirty samples of fusel oil from British distilleries were examined. Of these 9 were found to contain more than 15 per cent. of proof spirit and delivery out of revenue control was refused until the proportion of spirit had been reduced. Ethyl acetate, which is a tariff article, is found in commercial amyl acetate prepared from fusel oil containing ethyl alcohol. In view of this a proportion of ethyl acetate equivalent to the alcohol allowed free in fusel oil is admitted free of duty in commercial amyl acetate.

Denatured spirits, if imported, are chargeable with duty, but wood spirit (methyl alcohol) is not dutiable unless purified so as to be potable and consequently liable to be used as a substitute for ordinary spirit. Of 82 samples of methyl alcohol 46 were found liable to duty on the ground of purity.

Glucose and Saccharin.

In connection with the assessment of duty on glucose, 136 samples of glucose solution taken from charging vessels during the course of manufacture were examined in order to check the manufacturers' declarations; 419 samples were taken for assessment of drawback on exportation; and 576 samples of imported glucose and of glucose used in syrups made at sugar refineries were examined. Owing to the heavy duty on saccharin, which has approximately 500 times the sweetening power of sugar, the inducement to smuggle this article into the country is very great. Saccharin has, therefore, to be searched for in all preparations in which there is any probability of its occurrence, and 179 samples of substances imported were specially examined with this object. 154 samples of saccharin and articles containing saccharin were examined for the purpose of assessing the amount of drawback payable on exportation; and 49 samples of saccharin and of the materials used in its production were examined in connection with the assessment of duty on saccharin manufactured in this country.

Tobacco.

The work of the Government Laboratory in connection with tobacco consists chiefly in the examination of unmanufactured and manufactured imported tobacco, tobacco manufactured in the United Kingdom for home consumption, tobacco and commercial snuff for drawback on exportation, and offal tobacco for drawback either on exportation or on abandonment or for denaturing. In the ordinary process of manufacturing tobacco or preparing dry leaf for smoking, nothing as a rule may be added to the leaf except water. When, however, raw tobacco is made into "roll tobacco," either by spinning or twisting the leaf into coils, olive oil is allowed to be used to prevent the coils adhering to each other during stoving, a process which involves the subjection of the rolls to heat and pressure. The proportion of water which may be present in manufactured tobacco is limited by statute to 32 per cent., and the quantity of oil in roll tobacco must not exceed 4 per cent. The percentage of moisture was determined in 10,570 samples, and the percentage of oil in 1,960 samples taken by the Customs and Excise officers from the stocks of manufacturers and retailers of tobacco.

Various substances, such as sulphur, asafœtida, sago flour, tar oil, carbolic and cresylic acids, moss litter, soda ash, borax, hellebore, cayenne, lampblack, saltpetre, and anthracene oil are used in denaturing tobacco, and 179 samples of these materials were approved for this purpose. One hundred and fourteen samples of nicotine preparations, of which 53 were from imported goods, were examined, and 112 of these were approved for delivery free of duty. One hundred and thirty-one samples of essential oils submitted for approval for use in flavouring tobacco were examined, and 39 of these were found to contain prohibited ingredients. Six samples of solutions for preserving or improving the condition of tobacco were found to contain either fluorides, calcium chloride, sugar or honey, and their use could not be approved. One sample of a solution used for denaturing leaves in the course of manufacture contained saltpetre, added for the purpose of remedying the poor burning qualities of the leaf.

A number of metals was examined for the Disposal Board in order to facilitate grading. Sufficient quantity of waste material from gun sights and luminous dials is now in hand to render a further recovery of radium profitable. The recovered radium is held in reserve for Government use.

As in previous years, the examination was continued for the Home Office of lead glazes, dust, rubber mixings, enamels, and other materials in connection with special inquiries affecting the health of workers in factories.

In connection with a fire and explosion at a works where a synthetic dye was being ground and mixed, an investigation into the properties of the dye was carried out. It was found that under certain conditions the dye would take fire and explode, but that the danger was easily obviated by altering the nature of the plant.

The paper, pigments, and gum used in the manufacture of postal, fiscal, national health, and unemployment insurance stamps were systematically examined for quality and freedom from deleterious substances. The samples examined included postal obliterating fluids, creosote oils, and copper sulphate for the telegraph and telephone services, and miscellaneous stores, such as white and red lead, soap, carbide, sealing wax, oils, waterproofed clothing and fabrics, rubber tyres, and lubricating oils. A sample purporting to be effective for stopping leaks in motor-car radiators consisted of borax and shellac.

Proprietary Materials Offered to the Office of Works.

The samples examined for the Office of Works, London, consisted largely of materials purchased for the public

service. They included lubricating and other oils, motor spirit, soap and soap powder, disinfectants, fire-extinguishing fluids, paints and varnishes, coal, dust allayers, lime and sand. Some "preservatives" for stone and wood were examined, but it did not appear that anything new or more promising than the older preparations was in sight despite the claims of the makers. The question of the decay and disintegration of stone in town atmospheres is still urgent. Treatment of decaying structures with liquids can afford very limited protection and must be renewed periodically. The matter is becoming very serious with some buildings where impregnation with liquid is almost impossible, if not futile. In such cases the stone must be replaced. If this is effected by the same kind of natural stone as that originally used, disintegration arising from acids and soot must recur, so that the problem is much more involved than would appear at first sight.

Specimens of defective plaster from various buildings were examined showing that in one case at least the trouble was due to the short hair used as matting. In other cases nothing was disclosed to account for the rapid deterioration, except possibly the effect of damp. Samples of coke breeze and clinkers for making concrete were examined for sulphur and other constituents likely to cause trouble.

As usual, mainly articles were offered for use for which exceptional qualities were claimed for the purpose in view. Special paint-cleaners and renovators were found to consist of oil and silicates, and coloured mineral oil respectively. Another consisted of caustic soda solution. They offered no advantages over the ordinary method of cleaning paint surfaces. A marble "cleaner" consisted of a mixture of silica (silex) and chalk and was rather gritty. Its use for fine marble work was not considered desirable, and it did not differ appreciably, except in grittiness, from the solid matter usually found in polishing creams and polishing pastes. It is of interest to note that excellent results have been obtained by the treatment of the magnificent old tiles in the Chapter House at Westminster with aqueous 3 per cent. casein, containing a little formaldehyde, followed by a thin coat of matt varnish.

HONG KONG MARKET FOR DISINFECTANTS.

At present there is a fair demand for disinfectants in Hong Kong, states an American Consular Report, but the market fluctuates considerably, according to sanitary and health conditions both in Hong Kong and in South China. Sanitary conditions in Hong Kong are improving every year, owing to the construction of new sewers and sewage-disposal plants, and the development of new drainage schemes, with the result that the local demand for disinfectants is decreasing. However, in view of the poor sanitary conditions in the interior of South China, there is still a great need in that section for purifiers of all kinds. Imports of disinfectants into Hong Kong for the years 1921 and 1922 were reported as follows:—From United Kingdom, £8,536, in 1921 and £5,790, in 1922; United States, £4,849, in 1921 and £752, in 1922; Japan, £2,776 in 1921 and £3,910, in 1922; all other countries, £1,429, in 1921 and £1,791, in 1922; total, £17,590, in 1921 and £12,243, in 1922. The kind in most demand is a cresol disinfectant, ranging in strength from 5 to 15 per cent., which can be sold to the Chinese dealers at approximately 4s. per gallon. At present there is one large Hong Kong firm purchasing this disinfectant in Shanghai for about 3s. 4d. per gallon. After paying freight and shipping charges, the Chinese dealers place the product on the market under their own brands, or "chop," at about 4s. 3d. per gallon.

Indian Sesamum Crop.—The first forecast for the 1923-24 sesamum crop is based on reports received by the Indian Department of Statistics from provinces which contain, on an average, 99.6 per cent. of the entire area under sesamum in British India. The returns dealt with in this forecast, however, exclude estimates of area in the United Provinces and those of the late crops in Bengal and Burma, which are not available at present. The total area, so far reported, is 2,100,900 acres as compared with 2,367,000 acres (revised) at this time last year. Sowings still continue in many places. Seasonal conditions at sowing time were favourable except in Bengal and Madras, where early rains failed. The present condition of the crop is, on the whole, fair.

OUR BOOKSHELF.

The Absorption of Nitrous Gases. By H. W. Webb, M.Sc. (B'ham), F.I.C. (Head of the Department of Chemistry and Industrial Chemistry, Technical College, Cardiff). 1923: London: Edward Arnold and Co.; demy 8vo., 25s. net.

The absorption of nitrous gases in water is a very important practical problem at the present day, particularly in the fixation-of-nitrogen processes, and Mr. Webb has rendered valuable service to chemical industry by devoting a special volume to the theoretical and practical treatment of the subject. The chemical principles underlying the process have not been studied to a very great extent, in spite of the contrary opinion that the huge number of patent specifications on the matter would suggest, and it is very often the case that the absorption process is conducted with rule-of-thumb methods with an efficiency much below the maximum attainable with thorough scientific control. The volume commences with a discussion of the more important properties of the oxides and oxy-acids of nitrogen having a direct bearing on absorption practice. The theoretical problems of absorption are then dealt with in great detail, and are followed by a highly valuable practical chapter on the construction of absorption towers, giving some broad figures of comparative costs. The important question of filling materials receives a whole chapter to itself. Subsequent sections deal with gas circulation and measurement, the handling of nitric acid in the absorption system, the production of concentrated nitric acid, and the production of synthetic nitrates and nitrites. The final chapter is an excellent one, dealing with analytical control. The book is well produced and excellently illustrated. Sulphuric-acid manufacturers who search its pages in the hope of finding information on their own problems of nitrogen-oxide absorption will be disappointed. Possibly in a later edition Mr. Webb may consider it advisable to include absorption of nitrous gases in vitriol within the scope of his work.

Water Treatment. Brochure issued by Messrs. Brunner, Mond and Co., Ltd., Northwich, Cheshire. Copies may be obtained by readers of the *Chemical Trade Journal and Chemical Engineer* upon application direct to the company.

This is a publication (W.T. 231) of the research staff of Messrs. Brunner, Mond and Co., Ltd., giving a particularly readable and explicit account of the scientific principles underlying the hardness of water and the methods to be adopted for the prevention of scale and corrosion. The book is divided into 14 sections, and includes a detailed explanation of the causes of hardness in water, methods of analysis, and the principles of the elimination of the calcium and magnesium salts by means of the soda ash and lime treatment. A valuable section is that dealing with the choice of softening plant, and particular stress is laid on the necessity of installing a plant of sufficient capacity, so as to allow ample settling. Many engineers and chemists do not realise the importance of this point, which has caused much trouble in the working of water-softening installations. The chemist will be particularly interested in the more difficult problems of water-softening, discussed in detail in the book, such as the removal of the last traces of magnesium and the elimination of oil and grease. The booklet should do good work in spreading much-needed light on the whole question of feed-water treatment.

Dairy Farming. Renwick Hutson Leitch. Edinburgh: W. Green and Son., Ltd.; 6s. net.

Dairy farming is a subject which the average person is inclined to regard as a very simple and commonplace "cows to the meadow and home to the barn" sort of business, yielding copious and regular supplies of milk and easily obtained by-products. This book treats the subject with all the intelligent and scientific precision which modern industry requires. It is one of the Scottish Series of Junior Agricultural Textbooks (general editor, Professor James Hendrick, B.Sc., F.I.C.), and these Scottish books are very thorough. Every aspect met with in the selection and management of a dairy farm are dealt with in a volume the text of which is interspersed with excellent illustrations.

ITEMS OF INTEREST.

Personal.—Mr. Frank B Gorin has been appointed chief of the heavy chemicals section of the Chemical Division, U.S. Bureau of Foreign and Domestic Commerce.

University News.—Swansea Town Council has decided to apply for a provisional order to enable them to advance £50,000, to the University College of Swansea.

Fatal Laboratory Oil Test.—One person was killed and nine injured during a test of internal combustion oil at the Bureau of Standards last week. The oil exploded, and the small building where the test was made was wrecked.

Iron Ore Pits Closed.—Pennington iron ore pits in Furness were closed indefinitely on Saturday last. Operations also ceased on Saturday at the Yarlside pits of the Barrow Hematite Steel Company. Two hundred and twenty men are affected.

Medical Research Council. — Sir Archibald Garrod, Regius Professor of Medicine, University of Oxford, has been appointed a member of the Medical Research Council, from September 30 next, to fill the vacancy caused by the retirement of Professor F. Gowland Hopkins.

Bromine in the U.S.—The total quantity of bromine (including the bromine content of bromides) consumed in the United States in 1922 amounted to 1,005,174lb., worth 150,668 dollars, against 711,953lb., worth 172,759 dollars, in 1921. Imports amounted to 1,094lb., against 300lb. in 1921.

Obituary.—The death, on September 3, is announced from Germany of the well-known agricultural chemist, Professor Dr. A. Stutzer, of Königsberg University. The late Professor Stutzer carried out numerous and important researches on Chile nitrate, nitrification and denitrification, soil micro-organisms, composition and action of fertilisers, etc.

Synthetic Vanillin in Germany.—The firm Aktiengesellschaft Josef Hösl, Vanillin Fabrik, Hanover, has just been established at Hanover. Its specialities will be the manufacture of synthetic vanillin, and of two catalytic materials, both known as Je me L, one for oxidation reactions and the other for acetylation reactions.

Japan Suspends Import Duties.—The British Consul General at Kobe reports by telegraph the issue of Japanese Imperial Ordinances providing for the suspension, until the end of March next, of the import duties on a large number of commodities, including certain acids and chemicals, oils, cement, plate and sheet glass. Other import duties will be suspended as necessary.

Reduced Petrol Prices.—It is officially stated that from September 25 the prices for the leading brands of petrol are reduced throughout the United Kingdom and Ireland. The new retail prices for England and Wales are:—No. 1, 1s. 6½d.; No. 3, 1s. 4½d.; Scotland: No. 1, 1s. 7½d.; No. 3, 1s. 5½d.; Northern Ireland and Irish Free State: No. 1, 1s. 8½d.; No. 3, 1s. 6½d.

Metric System in America. — Following the lead of the Medical Department of the Army, the U.S. Public Health Service has dropped the metric system from its specifications covering the purchase of drugs and medical supplies. The General Supply Committee of the Treasury Department has also adopted this procedure. The question of eliminating the metric system from specifications of other purchasing departments of the Government is understood to be pending.

Publication of Scientific Works Suspended in Germany. —It is stated that the leading German publishers decided at a meeting held on August 21 to suspend entirely the publication of scientific works. It has been shown that those issued during the past few weeks have been a drug on the market, as the people who constitute the reading public for such books have no money to purchase them. Even the public and university libraries can no longer afford to do so. —*Pharm. Journal.*

British Industries Fair. — The future control and organisation of the Birmingham Section of the British Industries Fair, has been modified as a result of a meeting of the incorporated body governing it. The entire control of the fair thereby reverts to the Birmingham Chamber of Commerce, who were the original sponsors of the undertaking. The Chamber, through its Fair Management Committee, is already making arrangements for the fair to be held at Castle Bromwich from May 12 to 23 next.

Business Notice.—In the reorganisation of the business of Armstrongs and Main, Ltd., the title of the company has been altered to A. and J. Main and Co., Ltd.

Australian Chemical Imports.—The value of chemicals, drugs and fertilisers imported into Australia during the year ending June 30, 1923, amounted to £3,894,435, compared with £3,553,377, for the previous twelve months.

New Radium Deposit Discovered. — A large deposit of radium is reported to have been found in Turkestan, according to an announcement from Petrograd, the discovery having been made by members of the Russian Radium Institute.

Canadian Imports of Chemicals.—Chemicals and allied products to the value of 25,690,382 dollars were imported into Canada during 1922, of which the United Kingdom provided 3,765,429 dollars worth and the United States 18,162,209 dollars worth.

Tariff Notes.—The duty on petrol, benzine, and similar volatile oils imported into British North Borneo has been fixed at the rate of 25 cents per gallon.—The Mexican duty on imported common soap has been increased to 0.15 pesos per kilog.

Institution of Chemical Engineers. — Owing to great public demand, a limited number of copies of the paper on "Industrial Oxygen" read by Mr. T. Campbell Finlayson (Associate-Member), B.Sc., before the Institution of Chemical Engineers in June last have been published and are issued to the public at the price of 10s. 6d. each.

New Research Association.—A licence has been issued by the Board of Trade to the Research Association of British Flour Millers, which has been approved by the Department of Scientific and Industrial Research as complying with the conditions laid down in the Government scheme for the encouragement of industrial research.

Trade with Serbia.—Captain E. Murray Harvey, Commercial Secretary at Belgrade, will be in attendance at the Department of Overseas Trade on October 1, 2, and 3, for the purpose of interviewing manufacturers and merchants interested in trade with the Serb-Croat-Slovene Kingdom. Applications for interviews should quote the reference 4937/T.G.

Industrial Oxygen on the Tees-side. — Situated on the north bank of the Tees, between Stockton and Billingham, the new branch of the British Oxygen Company, Limited, was formally opened on Wednesday of last week. The branch has been erected to supply the demands of the whole of the Tees-side area, and save the present cost of carriage from the previous nearest branch at Newcastle.

Iron-ore Discovery in Wales.—Considerable deposits of limonite are reported to have been found on the Breconshire border at Ystradfellte and Penderyn. Tests have disclosed a seam 20 inches thick 20 feet from the surface. A second seam was found a little lower. It is believed steps will be taken immediately to develop the deposit for commercial purposes. Conditions are favourable for the enterprise.

Trade Inquiry for Salt. — Tenders are invited for the supply of about 500 tons of salt to be used on the streets in connection with snow removal during the winter, for the Birmingham Corporation. Conditions of contract, form of tender and schedules may be obtained at the office of Mr. H. H. Humphries, city engineer and surveyor, Council House, Birmingham. Tenders, sealed and endorsed, should be delivered at the City Engineer's Office by October 8.

British Iron and Steel Production.—The National Federation of Iron and Steel Manufacturers announce that the production of pig iron in August amounted to 599,800 tons, compared with 655,100 in July and 411,700 tons in August, 1922; the furnaces in blast at the end of the month numbered 196, a further decrease of 10 during the month. The output of steel ingots and castings amounted to 582,700 tons, compared with 624,300 tons in July and 528,400 in August, 1922.

Chemical Merchant's Affairs. — On September 21 the first meeting of creditors was held of Thomas James Shilvock (trading as Shilvock, Son and Co.) of Globe Chambers, 493, New Cross Road, S.E., dealer in chemicals, against whom a Receiving Order was made on September 11, 1923, on a creditor's petition. The statement of affairs lodged by debtor showed liabilities expected to rank for dividend £380. His assets consisted of shares in a limited company and one bad book debt, the realisable value of which was not stated. The estate was left in the hands of the Official Receiver.

Piece-dyers Price Proposals. — A meeting of merchants in the cotton trade, held in Manchester on Tuesday last, unanimously declined to accept the proposal by the Piece Dyers' Association to offer customers a rebate of 10 per cent. conditional upon those taking advantage of it signing an undertaking to place all orders with members of the Association.

Russian Chemical Works Electrified.—The central power station for the Bondyuzh chemical factory has just been started, states the *Electrical Review*. The construction was begun in 1917, but for various reasons its completion was delayed. It is a 750-k.w. station, and it is intended to add a 500-k.w. turbo-generator for reserve. It will be fuelled exclusively on peat from its own factory.

Ontario Gypsum Deposit.—The discovery is announced in Northern Ontario of an immense deposit of gypsum, which extends one mile along a tributary of the Moose River, running inland for 10 miles. The deposit is 40ft. deep at the outcrop on the bank of the river. Analysis shows that the deposit is 99.8 per cent. pure. Patent rights have been granted to the discoverer, Mr. T. J. McDermid, Saulte St. Marie, Ontario.—*Engineer*.

Working Life of Electrical Machinery. — Electric motors are of so recent introduction that records of great longevity must be few. An interesting example is reported from Sacramento, California, where what is known as a Westinghouse Tesla type B. alternating-current induction motor has been running for 27 consecutive years, or since 1896. It is 15-horse-power, 3-phase, 60-cycle, 500volt, and makes 1,200 revolutions per minute.

Camphor Production in India.—As a result of investigations conducted by the Forest Research Institute, Dehra Dun, it is concluded that camphor may be easily cultivated in all parts of India with a rainfall of 40 inches and over, but that as a commercial enterprise its cultivation should not be attempted outside the tropical areas, and that even in the latter areas the financial returns are likely to be small while camphor remains about its present price.

Soap Manufacture in Esthonia.—The glut on the market, which was already heavily stocked with foreign products, has lessened the profits of soap production in Esthonia. Protective measures in support of the home industry are in contemplation, notwithstanding the fact that the existing duty on imported soaps is high. The general policy of the Esthonian Government, however, states a Department of Overseas Trade Consular Report, is to favour the reviving industries of the country by means of a protective tariff.

Canadian Production of Heavy Chemicals. — According to the Dominion Bureau of Statistics, the value of acids, alkalies, salts and compressed gases, manufactured in Canada during 1922, amounted to nearly 17,600,000 dollars, an increase of more than 4,000,000 dollars over the value of the output of 1921. The production of sulphuric acid was 67,280 tons (an increase of more than 20,000 tons), valued at 1,390,000 dollars. The total production of compressed gases (including oxygen, acetylene, carbon-dioxide, anhydrous ammonia and hydrogen) was valued at 2,000,000 dollars.

Caustic Soda in Brazil. — In the annual report of the British Chamber of Commerce of Sao Paulo, it is stated that with reference to a proposal in the Brazil Chamber of Deputies to increase the duties on imported caustic soda and bleaching powder by 133 per cent., the Chamber in co-operation with the Rio Chamber approached the various commercial associations concerning the iniquity of such a proposal merely to protect a small Brazilian plant, which was unable to supply more than ten per cent. of the local demand. Protest against the proposed action was so strong that it is understood the project has been withdrawn.

Aluminium Chloride in Petroleum Refining.—The refining of petroleum uses the largest amount of aluminium chloride at present, and seems likely to demand additional supplies of the chloride in the future, states the *Engineer*. This salt converts all unsaturated compounds into saturated compounds. Frequently this conversion is made by throwing out the excess of carbon over hydrogen in the hydrocarbon, whereupon the carbon blackens the aluminium chloride and forms a coke; gases need not be liberated. The most astonishing consequence of this saturating action is that unstable petrol and lubricating oils made from asphalt-base petroleum yield excellent stable products of good colour and odour; in fact, they are almost paraffin-base products.

Iodine in the Tanning Industry.—H. F. Smyth and E. F. Pike (*Amer. Jour. Hygiene*, 1923, 11, 224) state that iodine is the most effective disinfectant for anthrax in hides and skins, and may be applied without the slightest injury to the hides. The iodine may be used as vapour, in aqueous solution, or in solution in carbon tetrachloride.

Eczema from Potassium Persulphate.—Mr. A. R. Tankard, F.I.C., Public Analyst for the City of Hull (The *Lancet*, August 11), states that the use of potassium persulphate as a flour "improver" may give rise to a severe form of "eczema" in the bakers who manipulate flour containing it. The persulphate when moistened decomposes with formation of potassium acid sulphate, and this, in contact with delicate skin surfaces, causes the trouble.—*The Pharmaceutical Journal*.

Ferric Hydroxide in Arsenic Poisoning.—H. C. Wood (*Jour. Amer. Pharm. Ass.*, 1923, xii., 482-483) advocates strongly the use of ferric hydroxide as an antidote in arsenic poisoning. Ferric hydroxide forms a relatively insoluble compound with arsenic, and thereby greatly retards the absorption of the latter. The insoluble compound is removed from the stomach by the vomiting which is an almost constant symptom of arsenical poisoning, or by the administration of emetics and laxatives.—*J. of Fr. Inst.*

Multiple Helix Tower Filling. — In an article entitled "Tower Fillings for Industrial Arbsorption," in *Chemical and Metallurgical Engineering*, September 10, 1923, Mr. P. D. V. Manning draws attention to the increasing use of the Brégeat multiple helix filling. This element consists of two, three, or four wire helices coiled coaxially. The four helix type is most commonly used. This filling presents an effective surface for volume occupied greater than that of any other element, and this is further increased in use through the formation of films of liquid between the turns of wire.

The Schiff's Reaction for Aldehydes. — Schiff's reaction, states K. Josephson (*Ber.*, 1923, 56, 1771), can be applied to aldehydes only under definite conditions with regard to the acidity of the solution; the development of a not too weak, violet colouration is regarded as a fairly definite proof of the presence of the aldehydic group. A red colouration is caused by a number of organic substances (proteins) which in all probability do not contain the aldehydic group; the tint is identical with that of rosaniline solutions. The effect is attributed to the withdrawal of a portion of the sulphurous acid from combination with rosaniline (to form salt-like compounds with the proteins) whereby rosaniline is liberated. A red colouration is also developed when Schiff's solution is treated with phosphate buffer solutions of p 4.5–7.8, the maximum intensity being observed at p 5.9–6.1.—*J.S.C.I.*

COMING EVENTS.

Society of Dyers and Colourists (Manchester Section).—Meeting, **Friday, September 28,** at **7 p.m.**, at the Manchester Literary and Philosophical Society, 36, George Street. Paper: "Colloid-chemical Researches in Connection with Naphthol AS.," by Dr. J. Julius Rath.

National Gas Exhibition.—September 17 to October 3, at Bingley Hall, Birmingham.

Institution of the Rubber Industry (London Section).—Meeting, **Monday, October 1,** at **8 p.m.**, at the Engineers' Club, Coventry Street, London, W. Paper: "Plantation Life from a Topical Point of View," by C. Baxendale.

Society of Public Analysts.—Meeting, **Wednesday, October 3,** at **8 p.m.**, at the Chemical Society's Rooms, Burlington House, Piccadilly, W. Papers: "The Sampling of Coal," by J. H. Coste, E. R. Andrews, and W. E. F. Powney; "A New Test for Distinguishing Castor Oil," by H. G. Stocks; "The Volumetric Estimation of Vanadium in Steel," by A. E. Etheridge; "The Iodimetric Determination of Sugars," by C. L. Hinton and T. Macara.

Chemical Society. — Meeting, **Thursday, October 4,** at 8 p.m., at Burlington House, Piccadilly, London, W. 1. Several papers will be read.

Society of Chemical Industry (Bristol Section).—Meeting, **Thursday, October 4,** at **7.30 p.m.**, at the University, Woodland Road. Paper: "An Outline of Rubber Manufacture," by J. F. Reid.—**(Manchester Section)**: Meeting, **Friday, October 5.** Address: "Recent Progress in Chemistry," by the chairman of the Section, Dr. H. Levinstein.

REPORTS OF COMPANIES.

Nobel Industries, Ltd.

The annual general meeting was held on Friday, September 21, in London, Sir Harry McGowan in the chair.

The Chairman, in moving the adoption of the report and accounts, said:—Our primary industry, as you are aware, is explosives of all kinds, detonators, fuses, etc., for mining purposes. Shareholders will be interested to learn that the company's trade in blasting explosives in South Africa has shown distinct improvement during the past year. You will remember that I mentioned at our last meeting that, in conjunction with American explosives manufacturers, we had decided to erect a factory in Chile. That factory is now operating, and will be in full working order by the end of the present year. With the Continent disturbed as it is, one cannot expect great things from our investments in explosives factories in the various European markets in which we are interested, but our factory in Czecho-Slovakia is now manufacturing and working at a profit, and it is anticipated that the factories in which we are interested in Hungary and Roumania will be operating by the end of the present year.

The future of commerce is still uncertain There has been undoubtedly a reaction in business during the past two or three months, and it is impossible for one to express an opinion as to when we shall see a return to normal conditions. It may be because the Ruhr and other European problems appear unsolvable at the moment that a settlement might come more quickly than many of us dare hope, but until we have a settlement of these problems those of us engaged in running big commercial undertakings such as this have got to walk warily and take no undue risks. The first six months' results of the present year are of a promising character, and in the absence of any great upheaval, political or commercial, I see no reason to anticipate that the results of the present year will fall short of 1922, and as these were so much better than in 1921 I think this must be a source of gratification to our shareholders.

British Glues and Chemicals, Ltd.

The report for the year to May 31 last states that the balance brought forward from last year amounted to £64,696; add net profit for the year, after allowing for depreciation £31,814.) and bad and doubtful debts, £35,814.; total, £100,510.; deduct net amount paid on account of taxation, £22,041., leaving to be carried forward, subject to balance of taxation liability, £78,469. Notwithstanding unceasing efforts to come to agreement with the Inland Revenue Authorities, it has not been possible to ascertain the company's taxation liability. The directors regret they cannot recommend the payment of dividends on the preference and ordinary shares. No dividend has been paid on the preference shares since September 30, 1921.

Pilbara Copper Fields, Ltd.

Accounts for two years to June 30, 1922, show a loss for period of £5,043., increasing the debit balance to £10,792. In accordance with agreement with second mortgage debenture holders, no interest accrues until July 1, 1925. Shareholders were advised in June last of an agreement having been entered into to adopt the treatment process controlled by Minerals Separation, Ltd. That company's metallurgist and assistants arrived on the mine early this month, and are erecting a small experimental plant for systematically testing various classes of ore and consulting as to installation of a commercial plant. Meanwhile development work is being proceeded with in the mine.

DIVIDENDS.

British Cotton-seed Products, Ltd.—Accounts for year ending March 31 show a loss of £3,935., which increases debit balance to be carried forward to £10,105.

English China Clays, Ltd.—Interim dividend at rate of 4 per cent. per annum, less tax, on ordinary for half-year. Last year no dividend.

American Cyanamid Company.—A dividend of 1½ per cent. has been declared on the preferred stock and 1 per cent. on the common stock.

English Margarine Works, Ltd.—It is announced that no dividend will be paid on the preference shares.

LEGAL INTELLIGENCE.

AMMONIUM PERCHLORATE DURING THE WAR.

Frederick William Jenkins.

On Tuesday the public examination was concluded of F. W. Jenkins, described as of 18, Belgrave Road, Pimlico, and Lightcliffe, Lower Warberry Road, Torquay, against whom a receiving order was made on May 16, 1923, on a creditor's petition. The statement of affairs showed liabilities expected to rank £9,001. 18s. 11d., and assets consisting of interest in a contract to receive certain shares, the value of which were stated to be uncertain, also one bad book debt £1,000., estimated to produce nil. Debtor stated that he had failed on a previous occasion in 1907, when he was adjudged bankrupt. He obtained his discharge on November 16, 1911. About 1915 he was introduced to the inventor of a high explosive known as "High Explosive 30." The inventor said the British patent had lapsed, but he had the remainder of the term of the American patent. Amongst the constituents of the explosive was ammonium perchlorate. To manufacture the explosive it was essential to get a supply of ammonium perchlorate, but at that time it was difficult to obtain. Professor Henry Jenkins about this time was interested in various chemical patents, and he was approached with a view to ascertaining whether his patent could be utilised for the manufacture of ammonium perchlorate, and eventually it was proved that the perchlorate could be manufactured much more cheaply by the Professor Jenkins' process than under any other process. Subsequently a contract was given by the Ministry of Munitions for 20 tons of ammonium perchlorate per week at 1s. per lb.; the cost of manufacture was estimated at 5d. per lb. The patent of the process for the perchlorate was vested by Professor Jenkins in a company called the C.I. 1914 Syndicate, Ltd. Arrangements were made for the production of the ammonium perchlorate at a factory in Halifax, but no actual business was done, and debtor estimated his loss in connection with this venture at £1,000.

VOLUNTARY LIQUIDATION OF OIL REFINERS.

The Veglene Oil Refinery and Chemical Works, Ltd.

A meeting of the creditors of the above was held on September 21, at Cardiff, when a statement of affairs was submitted which showed liabilities of £1,228. 16s. 8d., of which £968. 18s. 1d. was due to unsecured creditors. There were debentures for £2,000., and interest accrued £15., while there was an amount of £33. 5s. due to a Mr. Fisher. The assets totalled £1,818. 5s. 7d., from which had to be deducted £29. 19s. 2d. for preferential claims, leaving net assets of £1,788. 6s. 5d., which was not sufficient to cover the claim of the debenture holders, and there would, therefore, be nothing available for the unsecured creditors. The issued capital was £2,000., thus showing a deficiency as regarded the shareholders of £3,228. 16s. 8d. The company was registered on September 24, 1921, with a nominal capital of £5,000., divided into 5,000 £1. shares, and it appeared that the trading had never been successful. Balance-sheets prepared showed that for the period from September 24, 1921, to December 31, 1921, there was a loss of £430. For the period from December 31, 1921, to September 30, 1922, the loss was £660.; while from October 1, 1922, to August 31, 1923, there was a loss of £409. It was stated that the assets had been written down very considerably in the statement of affairs, as it was not anticipated that at a forced sale they would realise any more than the figures at which they were set down.

A resolution was passed confirming the voluntary liquidation of the company, with Mr. S. E. Clutterbuck as liquidator, while a committee of inspection was also nominated.

The Barium Test for Sulphates.—The presence of ferric salts seriously impairs the delicacy of the barium test for sulphates, but reduction of the iron salt with hydrazine or hydroxylamine, states F. L. Hahn (*Ber.*, 1922, 56, 1723), enables the detection of the sulphate ion to be made with certainty. Without reduction it is impossible to detect less than 0.1 per cent. SO_4 in 0.4—0.8 gramme Fe_2O_3, but with preliminary reduction, as little as 0.02 per cent. may be detected. Salts of aluminium and of chromium do not appreciably affect the delicacy of the test for sulphates.—*J.S.C.I.*

FERTILISER NEWS.

Nitrate of Soda.—After a long spell of comparative inactivity, the nitrate market has experienced another spurt of buying, some 280,000 tons having been sold by the Producers' Association during the past fortnight. Total sales for shipment after July 1, 1923, having now reached 1,225,000 tons, compared with about 860,000 tons at this time last year, much is being heard on the one hand of the desirability of purchasing nitrate shares, while on the other, it is forecasted that higher prices are bound to ensue as a result of the increased production thought to be necessary. Of the 280,000 tons sold, it is stated that nearly two-thirds of the quantity has been taken by the United States, the remaining 100,000 tons being destined for Europe. It is rather surprising to find so large a purchase on behalf of this side, considering the heavy commitments already entered into, and the quiet tone on the Continent. It is known that the producers, in view of the assistance provided by the Chilean Government in the matter of postponing export duties, have exported large shipments of unsold nitrate to consuming markets, there to await purchase. This practice is mainly accountable for the export figures exceeding those of 1913, as they have been doing lately. During the first fortnight of September, for instance, a total of 113,000 tons left Chile, compared with 96,000 tons during the same period of 1913. Shipments to Europe and Egypt were the same, in spite of the continued absence of Germany as the largest buyer, while the U.S. took 27,000 tons against 16,000 tons, and "other countries," 15,000 tons against 9,000 tons. There is little doubt that merchants, and the larger consumers, have been holding back their purchases in the hope that nitrate prices would be reduced, until, fearful that the price of 21s. per quintal for shipment next spring might be raised, a rush to secure supplies at the advertised quotation was the result. Those who believe that prices will be raised, however, base their contention on the presumption that buying will continue at the rate indicated by the September rush, but this is hardly likely to be the case. Dr. H. Foster Bain, who has been visiting Chile on behalf of the U.S. Government in connection with the investigations into the world nitrate position, has returned to America, and presented a short preliminary report to Dr. Curtis of the Bureau of Commerce. According to Dr. Bain, he has been given every facility by the Chilean producers to collect information suitable for his purpose. In one or two of his generalisations, however, he directly contradicts certain statements issued by the U.S. Department of Agriculture in a report some three or four months ago. Most of what appears in the preliminary report is already known, and on the most important question, that of finding out how much prices might be reduced to meet possible competition from synthetic nitrogen, he does not feel free to speak publicly. His final report should be available in two or three weeks' time.

Sulphate of Ammonia.—The effect upon the sulphate market consequent on the disaster in Japan is very difficult to estimate, and, judging from the exports from this country, there is no falling off in shipments at the present time. It is a significant commentary on the general confidence in Japanese credit, but, nevertheless, it is extremely likely that orders from that country will fall off during the remainder of the year. The disorganisation in industrial and commercial circles, and the immediate need to concentrate on the reconstruction of the capital, Tokio, and the principal port, Yokohama, will absorb the national credit for some time. In these circumstances, it is probable that fertiliser purchases will diminish. In America, where a fair amount of material is exported to Japan on contract, it is thought that the material will have to be retained in the States, and, coming into the resale market, effect a slight reduction in prices. The market for British sulphate in France appears to be rather better, and prices are more on a level with the British export figure. The association for the protection of French buyers of British sulphate, referred to recently in this column, does not appear to have progressed at all. Indeed, it is surmised that the idea has died out. It is interesting to learn that the "Comptoir Francais du Sulfat d'Ammoniaque" has changed its name to the "Comptoir Francais de l'Azote." In an interesting paper before the North of England Gas Managers' Association at Bridlington on September 21 last, Mr. R. C. Taylor, B.Sc., Gas Engineer at Bridlington, painted a rather gloomy picture of the future of sulphate of ammonia, which, he said, was by no means assured. The acidity due to its breakdown in the soil, the fact of the uselessness of the sulphate radicle, the need of lime as a corrective, were disadvantages not to be overcome. In view of the coming competition from synthetic nitrogenous fertilisers, therefore, he suggested that members of the Association should concentrate on finding processes for the conversion of the ammonia liquor into compounds of the nature of urea, nitrate and phosphate of ammonia, with the idea of restoring the financial return which was so seriously threatened by the fixation processes.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Reliance Fuel Company, Ltd., London, E.C.—Registered September 6 (by order on terms), £750., £400., and £700. morts., to Mrs. F. I. Nalty, Glenarthan, New Road, Llanelly; Mrs. M. J. Hopkin, Delfan, Coedcae, Halfway, Llanelly; and H. Alexander, Court Gardens, Tunbridge Wells, and another.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Signet Salt Company, Ltd. — Resolved August 24: That the company be voluntarily wound up. J. Lonie, 32, Ilfracombe Gardens, Monkseaton, liquidator.

Veglene Oil Refinery and Chemical Works, Ltd.—Resolved September 5: That the company be voluntarily wound up. S. E. Clutterbuck, 31, Queen Street, Cardiff, liquidator.

Wheelton Cop Dyeing and Bleaching Company, Ltd.—Resolved September 1: That the company be voluntarily wound up. W. Howarth, 21, The Square, St. Annes-on-the-Sea, liquidator.

BANKRUPTCY INFORMATION.

Richardson, Thos., 95, Bank Road, Bootle, late trading at Shorey Bank, Darwen, as Evergloss Company, polish manufacturer. 1st meeting, O.R.'s, Liverpool, September 27. Exam., C.C., Liverpool, October 23.

Shilvock, Thos. Jas. (trading as Shilvock, Son and Co.), Globe Chambers, 493, New Cross Road, dealer in chemicals. R.O., September 11. 1st meeting, 29, Russell Square, London, W.C., September 21. Exam., C.C., Greenwich, October 16. Adjourned September 13.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," September 29, 1888.)

The Salt Syndicate.—The landowners are now being settled with, and by the time this article appears in print it is probable that all arrangements will be so far completed as to allow the prospectus to be issued. As a sop towards the larger buyers, the Syndicate has just issued a circular to them offering them priority of allotment of shares before issuing the prospectus to the public. Thus the outside world will be offered the remnant; and if the prospectus can state, or does state, that a very large proportion of the shares have been already taken up, there will be a run upon them, and the Stock Exchange will do the needful by rapidly running up the shares to a premium for the benefit of the promoters; and if they raise anything like three million sterling for capital, the present owners of the works will receive a great deal more for them than has hitherto been considered relative value to the production of salt per ton and per annum. It has hitherto been understood that the capital value of a salt works has been in about the relation of £1,000. for every one thousand tons of salt made yearly—that is, one pound sterling was capable of turning out one ton of salt at a profit every year, and thus three millions of pounds sterling should make in the same proportion far more salt than has hitherto been made. But the intention is, we are told, to reduce the output, so that the cost of production will be greatly increased by this heavily weighted capital account, doing less work than it is capable of doing under ordinary circumstances. If this is so, then "up must go the quartern loaf."

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN AUGUST.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of August, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the returns.

ARTICLES.	QUANTITIES. Month ended August 31.			VALUE. Month ended August 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):						
Acids:						
Acetic (including Acetic Anhydride) tons	180	507	316	6,111	17,908	14,611
Tartaric, including tartrates, not elsewhere specified . cwts.	2,163	5,707	1,237	18,765	27,567	7,546
Bleaching Materials ,,	2,491	3,410	1,290	12,888	8,184	3,601
Borax ..... ,,	1,645	7,399	4,150	2,983	7,910	5,095
Calcium Carbide ,,	38,663	21,421	50,896	37,575	15,755	33,816
Coal Tar Products not elsewhere specified ..... val.	—	—	—	35,488	155,426	181,562
Glycerine:						
Crude ..... cwts.	1,004	3,485	—	3,076	8,676	—
Distilled ..... ,,	190	361	286	1,047	1,347	1,088
Lead Compounds:						
Red Lead and Orange Lead ... ,,	2,218	2,206	4,785	3,893	3,631	8,333
Nickel Oxide .... ,,	2,080	—	7,129	12,000	—	33,172
Potassium Compounds:						
Nitrate (Saltpetre) ... cwts.	9,883	16,147	6,263	13,514	19,117	7,354
Other C'pounds ,,	14,199	195,248	138,923	21,779	62,892	37,162
Sodium Compounds:						
Nitrate ..... ,,	19,197	128,681	262,313	15,803	78,565	162,671
Other C'pounds ,,	11,722	19,034	17,517	17,150	22,280	13,465
Tartar, Cream of ,,	3,454	3,736	2,646	21,089	19,101	11,145
Zinc Oxide ..... tons	509	502	626	19,294	16,374	21,345
All other Sorts .. val.	—	—	—	183,751	194,160	233,896
DRUGS, MEDICINES, AND MEDICINAL PREPARATIONS containing no Dutiable Ingredient:						
Quinine and Quinine Salts ..... oz.	11,570	77,122	122,025	1,545	8,357	12,010
Bark, Chinchona (Bark, Peruvian, etc.) ..... cwts.	635	244	4	8,474	1,155	14
Other Sorts ..... val.	—	—	—	93,306	85,474	207,955
DYES and DYE STUFFS (except Dye Woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning; Intermediate Coal Tar Products used in the manufacture of Dyes (including Aniline Oil and Salt, and Phenyl-Glycine) ..... cwts.	—	2	—	—	27	—
Finished Dye Stuffs obtained from Coal Tar:						
Alizarine ..... cwts.	4,162	522	238	26,397	7,599	2,263
Indigo, synthetic ,,	—	—	—	—	—	—
Other Sorts..... ,,	1,365	3,252	3,928	63,159	97,040	68,052
Extracts for Dyeing:						
Cutch ..... ,,	2,100	6,389	3,439	3,141	9,787	5,399
All other Sorts . ,,	1,529	9,265	5,190	13,350	42,562	22,139
Indigo, natural .. ,,	—	117	70	—	3,646	1,883
Extracts for Tanning (solid or liquid) ,,	47,917	82,002	57,378	53,751	94,972	57,100
PAINTERS' COLOURS and MATERIALS, not elsewhere specified:						
Barytes, ground (including Blanc Fixe) ..... cwts.	28,714	70,909	46,008	8,889	15,820	10,860
White Lead (basic carbonate) .... ,,	2,705	8,496	11,349	5,307	14,574	20,796
Other Sorts ..... ,,	32,408	59,496	56,505	57,372	85,115	131,462
OILS, REFINED:						
Essential (other than Turpentine):						
Natural ..... lb.	139,447	256,141	306,731	31,814	61,874	93,447
Petroleum:						
Lamp Oil ..... galls.	9,784,263	5,003,698	9,060,960	358,330	196,346	186,573
Motor Spirit .... ,,	21,146,947	29,107,464	34,527,191	1,886,735	2,005,374	1,755,872
Spirit other than Motor Spirit ... ,,	1,330	—	1,037,442	272	—	38,917
Lubricating Oil .. ,,	2,176,031	4,939,937	2,603,749	232,765	378,523	181,700
Gas Oil ..... ,,	11,601,765	5,527,994	9,772,582	293,605	96,423	160,963
Fuel Oil ..... ,,	52,422,202	52,477,736	46,189,067	1,050,500	706,961	615,907
Other Sorts ..... ,,	20,500	—	—	2,334	—	—
Total ..... ,,	97,153,038	97,056,829	103190991	3,833,541	3,383,627	2,939,932

ARTICLES.	QUANTITIES. Month ended August 31.			VALUE. Month ended August 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
SOAP, not containing Spirit:						
Soft ..... cwts.	4	11	4	15	63	13
Hard, Household and Laundry, in bars and tablets ..... cwts.	6,605	10,679	8,790	19,684	25,434	18,043
Polishing and Scouring ..... ,,	10,351	8,231	2,620	13,259	10,756	3,792
Hard Toilet Soap and Shaving Soap ,,	2,312	6,501	5,290	15,799	30,075	25,522
Soap not elsewhere specified ..... ,,	24	518	109	70	921	428
Total ..... ,,	19,296	25,940	16,813	48,827	67,249	47,798
TURPENTINE..... ,,	83,665	34,385	59,048	284,749	129,622	212,799
WAX:						
Paraffin Wax .. ,,	88,693	92,508	65,389	132,523	75,173	62,826
OILS and FATS, refined edible:						
Animal (except Marine Animal), refined:						
Lard:						
From U.S.A. .... tons	9,064	6,137	9,771	747,404	432,336	606,471
,, Other C'tries ,,	1,048	1,870	3,554	84,678	125,533	222,393
Total ..... ,,	10,112	8,007	13,325	832,082	557,869	828,864
Lard, Imitation . ,,	1,043	277	250	74,240	20,155	14,928
Oleo - margarine and Oleo-oil and Refined Tallow . ,,	2,098	3,024	2,736	115,020	150,214	135,577
Vegetable, other than Essential, Refined:						
Coconut Oil, Refined ..... ,,	2,134	746	776	125,643	35,593	36,786
Cotton - seed Oil, Refined ..... ,,	692	473	613	42,828	21,322	26,550
Olive Oil, Refined ,,	248	270	244	27,716	23,338	23,725
Palm and Palm-Kernel Oil, Refined ,,	106	—	30	5,960	—	1,393
All other Sorts, Refined ..... ,,	406	697	484	26,173	40,908	28,008
Total ..... ,,	16,839	13,494	18,458	1,249,662	849,399	1,095,921
SEEDS for expressing Oil						
Castor ..... tons	1,066	844	717	16,763	14,578	14,315
Cotton:						
From Egypt .... ,,	15,410	14,150	14,275	193,168	160,329	153,984
,, Brit. India ,,	2,690	7,584	7,816	29,824	68,159	74,155
,, Other C'tries ,,	8,866	6,347	8,049	75,446	53,053	71,656
Total ..... ,,	26,966	28,081	30,140	298,438	281,541	299,795
Flax or Linseed:						
From Russia .... ,,	—	—	313	—	—	5,611
,, U.S.A. ... ,,	—	—	—	—	—	—
,, Argentine Republic ,,	49,543	12,331	1,988	928,173	244,058	37,654
,, British East Indies ... ,,	2,996	8,889	26,017	58,103	188,441	532,676
,, Canada ... ,,	—	—	—	—	—	—
,, Other C'tries ,,	5,515	582	550	53,337	11,380	11,108
Total ..... ,,	58,054	21,802	28,868	1079,613	443,879	587,049
Rape:						
From B. East Indies ,,	2,196	1,109	5,687	44,119	19,943	86,439
,, Other C'tries ,,	57	1	66	1,746	17	1,432
Total ..... ,,	2,253	1,110	5,753	45,865	19,960	87,871
Sesame (or Sesamum, Benni, Gingelly or Teel):						
From China ..... tons	—	—	—	—	—	—
,, Other C'tries ,,	120	—	—	3,000	—	—
Total ..... ,,	120	—	—	3,000	—	—
Soya Beans:						
From Russia ... ,,	—	1,573	2,811	—	17,604	31,135
,, China ..... ,,	—	2,837	—	—	35,082	—
,, Japan .... ,,	—	6	—	—	76	—
,, Other C'tries ,,	—	—	—	—	—	—
Total ..... ,,	—	4,416	2,811	—	52,762	31,135
Other Sorts, including Sunflower ..... tons	471	4,324	3,164	9,831	51,164	43,393
NUTS and KERNELS for expressing Oil therefrom:						
Copra ..... tons	4,117	6,446	6,189	129,509	161,033	173,959
Ground Nuts (Arachide, Pea, or Monkey Nuts .. ,,	2,064	880	2,707	38,820	19,079	49,473
Palm Kernels ... ,,	21,125	21,925	29,110	472,335	348,088	499,546
Other Sorts ..... ,,	730	60	2,506	22,587	2,045	77,956
Total ..... ,,	28,036	29,311	40,512	663,251	530,245	810,934

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN AUGUST.

(Concluded from page 342.)

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during August, 1923, compared with 1921 and 1922. As from April 1, 1923, export trade of the Irish Free State is excluded from the Returns.

ARTICLES.	QUANTITIES. Month ended August 31.			VALUE. Month ended August 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
OILS, FATS and GREASES:				£	£	£
Animal (except Marine Animal), not refined ..... tons	2,137	1,440	1,114	68,404	41,166	32,737
Vegetable, other than essential:						
Castor Oil ..... ,,	288	221	217	15,741	13,667	13,085
Coconut Oil, unrefined ..... ,,	—	—	4	25	38	183
Cotton-seed Oil, Unrefined ..... ,,	23	141	55	1,373	3,059	2,545
Linseed Oil ..... ,,	5,835	3,597	2,390	234,890	161,805	107,084
Olive Oil, unrefined ,,	2	—	1	104	10	62
Palm Oil, unrefined ,,	11	2	38	460	64	1,353
Palm Kernel Oil, unrefined ..... ,,	1,027	45	671	52,800	1,711	24,402
Rape Seed Oil ... ,,	78	250	377	4,595	12,470	17,245
Soya Bean Oil ... ,,	574	845	351	27,005	39,928	15,398
Other Seed Oils . ,,	212	35	16	9,554	1,557	673
Other Vegetable Oils, not elsewhere specified . ,,	157	526	109	5,417	20,232	2,954
TAR, Coal Tar .... tons	492	759	384	5,195	4,926	2,951
PITCH, Coal Tar Pitch ,,	3,248	4,339	1,074	14,268	15,578	9,348
CEMENT, Calcareous, for Building and Engineering purposes:						
To Netherlands ... tons	250	5,811	506	1,351	10,020	1,131
,, France ..... ,,	—	1	—	—	37	1
,, Brazil ..... ,,	899	1,864	20	4,600	5,753	71
,, Argentine Rep. ,,	—	—	235	—	—	518
,, Brit. S. Africa . ,,	97	1,301	71	496	3,503	217
,, Brit. East Indies ,,	9,573	9,662	4,062	53,237	33,574	10,831
,, Australia ..... ,,	1,501	1,208	261	7,442	3,666	632
,, New Zealand .. ,,	—	33	319	—	481	1,181
,, Other C'tries .. ,,	12,575	17,898	20,480	62,230	51,022	55,833
Total ..... ,,	24,895	37,778	25,963	129,356	108,056	70,415
FERTILISERS not elsewhere specified:						
Basic Slag ..... tons	1,620	282	4,872	5,305	599	11,045
Superphosphates ,,	28	363	196	349	2,251	1,299
Guano, Manufactured, and Compound Manures (including Bone Meal, and other Manufactured Fertilisers) ..... tons	836	4,576	2,038	9,779	31,498	18,357
GELATINE ..... cwts.	385	1,073	539	5,844	10,375	6,639
GLUE and SIZE ... ,,	4,316	14,521	7,276	11,103	27,665	16,072
LEAD:						
To Russia ..... tons	—	71	—	—	1,794	—
,, Sweden ..... ,,	18	82	98	493	2,277	2,913
,, Germany .... ,,	28	892	39	598	13,811	1,075
,, France ..... ,,	176	480	100	4,122	12,181	2,424
,, China (including Hong Kong) ,,	25	14	4	782	444	139
,, Japan ..... ,,	—	—	—	—	—	—
,, U.S.A. ..... ,,	—	—	50	—	35	1,209
,, British S. Africa ,,	26	52	34	986	2,020	1,415
,, British E. Indies ,,	249	222	129	9,786	8,179	4,204
,, Canada ..... ,,	56	36	8	2,152	1,706	333
,, Other C'tries.. ,,	277	533	481	8,683	17,342	17,686
Total: Pig ..... ,,	372	1,801	363	8,980	26,753	9,460
Total: Sheet ..... ,,	336	411	346	12,426	15,463	11,919
Total: Pipes ..... ,,	99	129	179	3,623	4,582	6,451
Total: Foil ..... ,,	6	—	4	502	103	352
Total: Manufactures not elsewhere specified.. ,,	42	41	51	2,371	3,188	3,216
Total ..... ,,	855	2,382	943	27,902	60,089	31,398
TIN: Blocks, Ingots, Bars and Slabs:						
To Russia ..... tons	—	—	—	—	—	—
,, Sweden ..... ,,	31	72	56	5,737	11,017	10,923
,, Germany .... ,,	45	25	11	7,222	3,948	2,015
,, France ..... ,,	215	208	116	34,438	32,814	21,052
,, Turkey ..... ,,	7	8	29	1,107	1,447	5,275
,, U.S.A. ..... ,,	125	50	766	20,518	7,763	141,756
,, Canada ..... ,,	16	59	99	2,612	9,386	18,286
,, Other C'tries.. ,,	274	376	457	45,918	58,511	82,331
Total ..... ,,	713	798	1,534	117,552	124,886	281,638
ZINC, Crude, and Manufactures thereof . ,,	550	146	564	15,498	9,469	16,723

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[SPECIALLY CONTRIBUTED.]

Two or three weeks ago iron smelters in Cumberland and the Furness district who use most of the coke that is made in this district were gloomily anticipating a further decrease of output, and it was stated indeed that at least three furnaces would be damped down before the end of this month. To-day it may be said with some confidence that the worst of the depression has passed, and that smelters may look forward to a steady absorption of their output and to the prospect sometime during the winter, though whether before Christmas is as yet uncertain, of an expansion of the make. It is certainly the case that users are regaining confidence and ordering more freely, and there is even a chance in the event of affairs on the Continent taking a more favourable turn that users may begin to place forward contracts. At all events there is a distinct improvement, however temporary it may be, in the position as it affects this district, and coke makers are disposed to believe that all the coke they can produce will be required throughout the winter. Important developments are expected in the coking industry. It is no secret that the Whitehaven Colliery Company, as the new method of working at Haig Pit comes into operation, anticipate that they will be able so to develop the Bannock land as to obtain selected coal from which they can make a coke equal in quality to that of the East Coast and at the same time a good deal cheaper. The importance to the hematite pig-iron smelters on the North-West coast of having at command a coke as low in phosphorus and as hard as that of the East Coast at a figure that will enable the cost of smelting iron to be considerably reduced cannot easily be over-estimated. Of course it will be some time before the plans of the company can be carried to maturity, but the prospect of one at least of the local coking plants furnishing a coke entirely acceptable to the smelter of low-phosphorus iron is exciting keen interest and arresting attention in an area beyond the confines of the hematite pig-iron producing district. Meantime the make of local coke is rising and the whole of the production is being absorbed. The larger part of it is going to the furnaces in West Cumberland and to the Furness district at 29s. to 33s. per ton according to carbon content, and what is left is finding a market on the Continent at 34s. to 37s. per ton, f.o.b. The ovens are taking practically all the small coal, and the Irish market is thus deprived of the nuts and smalls which are so eagerly wanted. Best round coal on the other hand is not in brisk request, though as the Whitehaven Colliery Company is still engaged in filling its Irish yards the shipments across Channel are fairly heavy. In other directions business is on the slow side. House coal is easy at 38s. 2d. at pit and the iron ore mines' needs of best steam at 30s. and of washed steam at 29s. are diminished. Residuals and chemical products are a fairly active market. East Coast coke supplies are 8,200 tons.

NEW COMPANIES.

Ashby Soaps, Ltd.—Private company. Capital £30,000., £1. shares (15,000 7 per cent. A. cumulative preference, 9,000 7 per cent. B. preference, and 6,000 ordinary). Office: 51, Wardwick, Derby.

Briquette Binders, Ltd. — Private company. Capital £30,000. Office: Letricheux Buildings, Swansea.

John Greenhalgh (Vigo Products), Ltd. — Private company. Capital £3,000. Tallow merchants and refiners, etc. Office: 61, Old Broad Street, London, E.C.

Robt. Ingham Clark and Co. (Scotland), Ltd. — Private company. Capital £20,500., in 20,000 7 per cent. participating preference of £1. and 10,000 ordinary of 1s. Manufacturers of paints and chemical products, etc. Address: West Ham Abbey, Stratford, London, E. 1.

T. F. Steele and Co., Ltd. — Private company. Capital £500. Manufacturers and distributors of and dealers in cleansing and polishing compounds, etc. Office: 57, Fenchurch Street, London, E.C.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

September 10 to 15 (inclusive).

Centrifugal Separators. Aktiebolaget Separator. 22,703 and 22,708.
Treatment of Bitumen, Pitch, etc. Anglo-Mexican Petroleum Co., Ltd.; and Cox, E. M. 23,075.
Artificial Leather. Archdeacon, S. B. 23,157.
Adhesives. Arnot, R. 23,180.
Dyes. Beckett, E. G.; and Scottish Dyes, Ltd. 23,093.
Brown Coal Wax. Boyen, E. von. 23,087.
Articles of Quartz. British Thomson-Houston Co., Ltd. (*General Electric Co.*). 22,934.
Resinous Compositions. British Thomson-Houston Co., Ltd. (*General Electric Co.*). 22,999.
Prevention of Rot in Timber. Brown, R. F. 23,111.
Gas and By-products from Peat. Eller, K. B. E. 23,091.
Carbonising Compound. Ellis, G. B. (*Lecar Carbon Co.*). 23,019.
Treating Crude Petroleums. Gane, G. 23,076.
Granulating Slag. Gelsenkirchener Bergwerks-Akt.-Ges.; and Opderbeck, E. 22,746.
Ink. Goldsmith, B. B. 22,830.
De-arsenification of Materials in Solution. Gregory, A. W. 23,165.
Artificial Wood. Higham, J. W. 22,838.
Distillation of Tars. Kahl, L.; and Rütgerswerke Akt.-Ges. 23,096.
Purifying Gases. Koppers Co. 23,002.
Utilisation of Fish Waste. Krämer, H.; and Reiffen, A. 23,088.
Cooling Fats. Maw, Son, and Sons, Ltd., S. 22,713.
Saturators for Gas Plant. Mitchell, J. 23,119.
Separating Volatile Ingredients from Mixtures. Naamlooze Vennootschap Koninklijke Stearine Kaarsenfabriek Gouda. 23,086.
Purification of Liquids. Ravnestad, A. J. 22,821.
Vulcanisation of Rubber. Ricard, Allenet, et Cie. 22,910.
Dehydration of Alcohol. Ricard, Allenet, et Cie. 23,084.
Gas Calorimeters. Stewart, J. G. 23,036.
Maintaining Constant Temperature in Gas-heated Apparatus. Stewart, J. G. 23,037.
Printing-inks. Trist, A. R. 22,926.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1*s. in stamps to the Comptroller, Patent Office Sales Branch*, 25, *Southampton Buildings, Chancery Lane, W.C.* 2.

1922.

Titanic Acid. Weizmann, C.; and Blumenfeld, J. 6,086 **203,352**
Purifying Oils. Ridge, H. M.; and Hodgkinson, W. R. 6,479. **203,354**
Iron Chromium Alloys. Saltrick, W. R. 6,691. **203,357**
Refined Copper from Copper Oxide. Perkins, W. G.; and Beasley, W. H. 15,597. **203,383**
Low-temperature Carbonisation. Koppers, H. 17,834. **203,444**
Regenerating Base-exchanging Compounds after Use. Hilditch, T. P.; Wheaton, H. J.; and Crosfield and Sons, Ltd., J. 22,095. **203,497**
Distilling and Fractionating Column. Bloomfield, A. L.; and Boake, Roberts, and Co., Ltd., A. 22,781. **203,506**
Artificial Manures. Gradl, J. 23,067. **189,419**
White Oxide of Antimony. Germot, A. 24,362. **203,519**
Distilling-apparatus for Continuous Operation. Parodi, P. 24,702. **186,329**
Dyestuffs and Intermediate Products. Johnson, J. Y. (*Badische Anilin and Soda Fabrik*). 25,362. **203,533**
Purification of Sewage. Hartley, J. W.; Hartley, C. J.; and Hartley, J. A. 25,398. **203,534**
Plastic Composition. Elektrizitatswerk Lonza. 31,606. **189,146**
Acetose Silk. Zdanowich, J. O. 34,062. **203,599**
N-mono-and Dicarboxylic Acid Esters of Asymmetrically Substituted Alkylenediamines. Imray, O. Y. (*Soc. of Chemical Industry in Basle*). 25,500. **203,608**

1923.

Purification of Waste Liquids. Westen, F. 4,282. **194,278**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

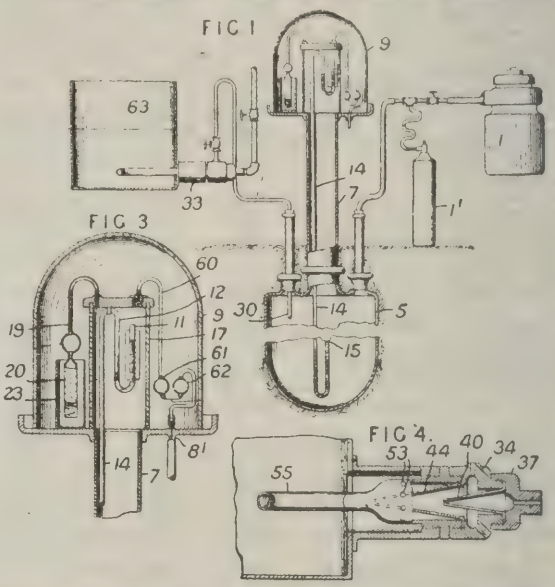
1923.

Preserving Farinaceous Substances. Schoen, M. 17,500. **203,661**
Rotating Kilns for Cement. Wingvist, N. 21,391. **203,673**
Manufacture from Cyanamide of Manures Containing Soluble Organic Nitrogen. Soc. d'Etudes Chimiques pour l'Industrie. 22,076. **203,683**
Furfural. Quaker Oats Co. 22,280. **203,691**
Preservatives. Quaker Oats Co. 22,281. **203,692**
Alloys of Molybdenum. Norske Molybdenprodukter Aktieselskabet. 22,322. **203,693**
Aluminium-fluoride-alkali-fluoride Double Compounds Technically Free from Iron. Chemische Fabrik Griesheim-Elektron. 22,616. **203,708**
Chromates and Bi-chromates. Jouve, A. J. B.; Helbronner, A.; and Soc. Hydro-Electrique et Métallurgique du Palais. 22,625. **203,709**
Ultra-filter Membranes. Duclaux, J. 22,639. **203,713** and **203,714**
Porous Building-materials. Bayer, E. C. 22,832. **203,718**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Chlorinating Liquids. J. W. van Meter, San Francisco, California, U.S.A. British Patent, **201,214**, of 1922.

Liquids are chlorinated by introducing a mixture of chlorine with steam, air, or other gas, into the liquid by means of a spirally-grooved nozzle which imparts a whirling movement to the mixture of gas and liquid. The chlorine is stored as gas in an underground container which is provided with means above ground for indicating the amount and rate of flow of the chlorine. The underground container 5, Fig. 1, is supplied with chlorine from a still 1 or cylinder 1'; it communicates by a pipe 7 with a glass bell 9 containing the indicating devices, and a pipe 30 with the injector 33 which supplies the gas to the liquid in the container 63. The injector, Fig. 4, comprises a nipple 37 connected to a steam supply and carrying a conical nozzle 40, a casing 34 connected to the chlorine supply and carrying a second conical nozzle 44, and the nozzle 55 which is provided with holes 53 for admission of the liquid, and is spirally-grooved



to give the mixture a whirling movement. The indicating-devices are shown in Fig. 3; the pipe 7 leads into a cup 17 contained in the bell 9; two bulbs 61, 62 containing liquid are connected to atmosphere by a vent 8' and to the cup 17 by a tube 60; the rate of bubbling through the bulbs 61, 62 serves to indicate the rate of flow of the chlorine into or out of the container 5. An additional device for indicating the rate of flow comprises an open-ended graduated cylinder 20, which is immersed in a jar 23 containing liquid and communicates with the cup 17 by pipe 19. The amount of chlorine in the container 5 is indicated by means of a U-tube 11, 12 containing liquid and connected to the leg 14 of the U-tube 14, 15 which extends into the chamber 5 and contains liquid in its lower part.

Apparatus for Gas Analysis. D. M. Macdonald, London. British Patent, **201,408**, of 1922.

In a portable apparatus of the Orsat type for the complete analysis of coal gas and like combustible gases: (1) the burette is centrally placed to reduce errors due to the capillary; (2) the graduation and the dimensions of the burette are selected with a view to enabling a comparatively large portion of the gas to be taken for explosion; (3) both water and mercury are used as confining agents, the explosion occurring over mercury in a vessel having a shape and dimensions stated to reduce the speed of the explosion; and (4) the capillary is of ½ mm. bore.

Fire-Extinguishing Chemicals. L. E. Eckelmann, New York, U.S.A. British Patent, **201,379**, of 1922

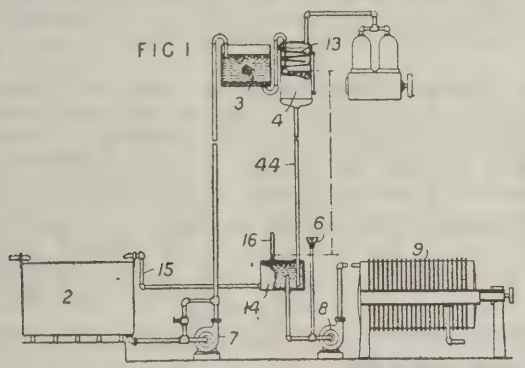
An emulsion formed of a plurality of polychlorinated hydrocarbons of different specific gravities is added to one of the reagents employed in the generation of fire-extinguishing foam, so that the latter is capable of supplying an air-excluding blanket of non-inflammable vapour over the fire, even if itself destroyed by the heat. Carbon-tetrachloride may be employed together with one or more lighter chlori-

nated hydrocarbons and an emulsifier, such as saponin, soap, gum-arabic, etc., and one to three per cent. of light oils may be added to increase the permanency and fluidity of the emulsion. The emulsion is mixed with a foam-producing reagent (such as a solution of aluminium sulphate, to be afterwards mixed with sodium bicarbonate solution), so concentrated as to have a specific gravity approximately equal to that of the emulsion.

Precipitating Metals. E. C. R. Marks, London. (Merrill Company, San Francisco, California, U.S.A.) British Patent, **201,231**, of 1922.

In the precipitation of precious and other metals from cyanide and other solutions, by chemical precipitants, interfering dissolved gases are removed from the solution by means other than heating the solution or by the action of the precipitant itself, for example by chemical or mechanical means. The chemical elimination may be effected by a reducing agent such as sodium sulphide or hydrogen; the mechanical elimination may be effected by exhaustion; and the elimination may be effected prior to or during the precipitation. In the plant shown, solution to be treated is pumped from a tank 2 to a feed tank 3 from which it is drawn by a vacuum pump and caused to pass over baffle-

FIG 1



plates 13 in a vessel 4 connected by a barometric tube 44 to a tank 14 fitted with a stand-pipe 16 and overflow 15. From the tank 14 the solution is pumped to a filter press 9, the precipitant, which may be zinc, being admitted from a hopper 6. The apparatus is so arranged that the pressures existing in the plant prevent the ingress of atmospheric air. In modified forms of plant, the tanks 2, 3 may be so arranged that the solution flows directly from one to the other without the intervention of a pump 7; a tank such as 14 may be dispensed with; the precipitant may be admitted into the vessel 4; or the pump 8 may pass the solution to zinc precipitation chambers instead of precipitant being previously added to the solution, the precipitation chambers being either exhausted or left open to the air, the hydrogen evolved serving in the latter case to prevent reabsorption of interfering gases.

Lead Alkaline-earth Metal Alloys. W. Mathesius, Berlin. British Patent, **200,408**, of 1922.

An alloy of lead with two or more, preferably with three, of the alkaline earth metals, is made by electrolysis of a mixture of the fused salts with a lead cathode. The bath is subjected to a preliminary electrolysis until it attains a constant composition. A mixture of salts in the required proportions is added during the main operation in small portions. The alloy obtained during the preliminary operation may be mixed with that obtained afterwards. Lead may be charged and the alloy discharged continuously.

Camphor. J. Schindelmeiser, Dorpat, Esthonia. British Patent, **201,332**, of 1922.

Camphor is obtained by passing borneol or isoborneol vapour in admixture with air or other oxygen-containing gas over heated "highly active" charcoal. The charcoal is preferably produced by saturating wood charcoal with a solution of potassium carbonate, partially drying, and then calcining the product in the absence of air. The borneol or isoborneol is heated to a temperature near the boiling point in a distilling vessel provided with a tower containing a number of perforated trays supporting the charcoal, and air heated to a slightly higher temperature is then introduced into the liquid. The reaction product passes into a condenser where the camphor separates out.

Purification by Peptisation. A. G. Bloxam, London. (Elektro-Osmose Akt.-Ges. (Graf Schwerin Ges.), Berlin.) British Patent, **200,533**, of 1921.

In the usual process for peptising substances, for example clay, ores, or graphite, by the addition of electrolytes, the latter are so chosen that they eliminate the ions which tend to hinder peptisation, such as calcium or sulphate ions, and thereby a purification of the required substance is effected. In addition to the purifying electrolyte, which may for example be an oxalate or citrate of an alkali metal, of ammonia, or of an organic base, there are preferably present hydroxyl ions, which, in the case where the substance contains sulphate ions, may be added in the form of barium hydroxide. In examples crude kaolin is suspended in water and treated with sodium oxalate solution, and a suspension of clay is treated with sodium oxalate and with barium hydrate. The purified substances may be obtained from their suspensions by known methods. Specifications 6560/09 and 168,927 are referred to. *Reference has been directed by the Comptroller to Specifications* 175,050, 184,271, *and* 186,855.

Protective Coatings on Metals. A. Mai, München, Germany. British Patent, **200,892**, of 1922.

Iron, iron alloys, and steel are treated, to produce a protective layer thereon, in an alkaline bath—*e.g.*, caustic soda, containing an oxidising agent and also slaked lime or other caustic alkaline earth. The oxidising agents may be bichromates, permanganates, nitrates, nitrites, peroxides, chlorates, etc., and also organic oxidising agents—*e.g.*, nitrocellulose, nitrophenol, nitrotoluol, or organic peroxides. The bath is employed at temperatures of 120°–130° C. or higher, such as 180°–200° C., the treatment at higher temperatures and with more concentrated baths occupying less time than the treatment at lower temperatures. The oxidation and colouration of the metal surface takes place more rapidly if small quantities of decomposition products of the oxidising agent are added to the bath at the beginning of the operation. The same result may be obtained by adding small quantities of an iron salt—*e.g.*, ferric nitrate. Brighter colours are obtained if the metal is first provided with a preliminary protective coating—*e.g.*, by immersion in dilute copper sulphate solution or by heating in air. The bath subsequently employed is preferably concentrated and employed at 180°–200° C. On removal from the bath, the objects may be immersed in dilute acetic acid or other liquid to dissolve any adhering lime, and then washed in water, dried, and lacquered, varnished, or oiled.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Cellulose Carboxylates. Soc. de Stéarinerie et Savonnerie de Lyon, Lyons, France. British Patent, **201,510**. Convention date, July 29.

Cellulose esters of organic acids containing more than five atoms of carbon such as capric, caproic, caprylic, lauric, myristic, palmitic, and stearic acid, or saturated cyclic acids such as naphthenic acids are obtained by condensation of cellulose with the acid or a derivative of the acid such as the acid chloride or anhydride. An acid chloride is preferably used with the addition of an organic base such as pyridine or quinoline; and an acid anhydride with the addition of a dehydrating agent such as melted zinc chloride. Diluents may be such as chloroform, carbon tetrachloride, halogen derivatives of acetylene, or benzine. According to the proportions used monoesters, diesters, or triesters of cellulose are formed, the two latter being soluble in the diluents mentioned while the monoesters are insoluble. The esters are soluble in many organic solvents, and in particular in the aromatic hydrocarbons. The solutions yield on evaporation colourless and transparent pellicles without the addition of plasticising substances. Specifications 22029/98, 20977/11, and 20978/11 are referred to.

Cyanamide as Vulcanisation Accelerator. D. J. Chatelan, Lausanne, Switzerland. British Patent, **201,570**. Convention date, July 28, 1922.

An accelerator for the vulcanisation of rubber consists of cyanamide or dicyandiamide. By adding an amount of dicyandiamide equal to the sulphur present, the time of vulcanisation is reduced to half that required when using sulphur alone.

SOUTH WALES NOTES.

[SPECIALLY CONTRIBUTED.]

The tone of the tinplate trade is better, but buyers do not seem anxious to place any large orders. It is considered that a reduction in prices should be made, but as manufacturers intend to continue business at present quotations until the end of the year, merchants are not inclined to enter into contracts over a prolonged period and are content to buy from month to month. The patent fuel trade is in a better condition and some large export business is being transacted. This week a cargo of over 6,000 tons of pitch from Pensacola arrived at Swansea. The efforts made to render this pitch suitable for binding purposes have so far proved very successful. Deposits of limonite have been discovered in the village of Ystrádfellte and further investigations are being made. Negotiations are in progress for establishing a new cement works at Portskewelt entailing an expenditure of several thousand pounds. The spelter trade is fairly satisfactory. The well known Emu works which have been idle for many years are about to restart. Cokes have a quieter market, and as the production is on the increase prices have given way a little. Stocks are accumulating, but with the approach of winter the demand is bound to increase and there does not seem any likelihood of a reduction in the number of ovens now operating. By-products are selling very satisfactorily. The galvanised trade is much better, the demand from Argentina increasing of late, while quantities shipped to the Phillippines are of greater volume.

Among the imports for the week were 25 tons calcined magnesite from Hamburg, 300 tons gypsum from Rouen to Cardiff; 162 tons copper ore, 10 tons ferro phosphorus from Hamburg, 4,800 tons sulphur from Licate, 2 tons copper precipitate from Carthagena, 6,000 tons pitch from Pensacola, and 49cwt. tin oxide from Antwerp to Swansea; 40 tons cement from Hamburg to Newport. Included in the exports from Cardiff were 1,887 tons creosote oil to Savannah and 493 tons sulphate of ammonia to Dunkirk.

PUBLICATIONS RECEIVED.

Radio-Activity.—By Kasimir Fajano (Professor of Physical Chemistry in the University of Munich). Translated from the Fourth German Edition by T. S. Wheeler, B.Sc., A.R.C. Sc.I., A.I.C., and W. G. King. London: 1923: Methuen and Co., Ltd.; price 8s. 6d. net.

Department of Overseas Trade Reports.—Published by H.M. Stationery Office. **Canada** (to June, 1923), by Mr. F. W. Field, H.M. Trade Commissioner at Toronto, together with a supplementary report on **Western Canada**, by Mr. L. B. Beale, H.M. Trade Commissioner at Vancouver; price 3s. 6d. net. **Esthonia** (to June, 1923), by Mr. J. E. P. Leslie, H.M. Consul, Reval, assisted by Mr. W. J. Sullivan, British Vice-Consul, Reval; price 1s. net. **Austria** (to August, 1923), by Mr. O. S. Phillpotts, O.B.E., Commercial Secretary to H.M. Legation, Vienna; price 2s. net.

Report of the Government Chemist (for the year ending March 31, 1923), with appendices. London: H.M. Stationery Office; price 1s. 6d. net.

Alloys Resistant to Corrosion.—A general discussion held jointly by the Faraday Society and the Sheffield Section of the Institute of Metals, April, 1923. The Faraday Society, 10, Essex Street, Strand, London, W.C. 2; price 5s. 6d. net.

Air Ministry Publication.—The Book of Normals of Meteorological Elements for the British Isles for Periods Ending 1915, Section IV.A.—The Range of Variation of Temperature and Rainfall, Section IV.B.—Frequency Tables for Hail, Thunder, Snow, Snow Lying, and Ground Frost. London: H.M. Stationery Office; price 3s. 6d. net.

Northampton Polytechnic Institute, St. John Street, London, E.C.—Announcements for the Session 1923-1924. On this occasion the new issue deals with evening work only, there being only small changes in the day section, which will be practically the same as last session.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. WEDNESDAY.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—This market keeps fairly steady, although business is still rather poor in volume. Some few slight reductions in prices are recorded, but there is no general movement in this direction. **Acetic Acid,** 80% technical, £47.; 80% pure, about £50.; 98% glacial, £60. in casks, and £75. in glass demijohns, ex wharf London; the spot position keeps very steady, with good inquiry on hand. **Acetone,** British Government specification, £125. to £127. per ton, in drums; the spot position holds well up to this level, and business has been good. **Alum,** lump, in casks, £10. to £10. 10s. per ton; dealers continue to offer at these rates, but are doing but small business. **Arsenic,** Cornish white powdered, about £62. per ton, f.o.r. Cornwall; prices are much lower this week, but, in view of an improvement in the American market, a recovery is expected here. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; inquiry is now poor, and dealers' prices are unaltered. **Barium Chloride,** 98—100%, about £14. 10s. to £15. per ton; slightly easier prices are being quoted by dealers, but business remains poor. **Bleaching Powder,** 35—37%, about £10. to £10. 10s. per ton; dealers' prices are level on the week, with the demand slow. **Borax,** commercial, granulated £24. 10s., crystals £25., powdered £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are unchanged; dealers are quoting under similar conditions at—commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers continue to quote at these prices for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; dealers are offering some grades at competitive rates. **Cream of Tartar,** 99—100%, about 88s. per cwt., less 2½%; at this price the spot position is fairly steady, and some business has been done. **Citric Acid,** B.P., about 1s. 5d. per lb., less 5%; there seems to be hardly any demand for this article, and spot holders who have been trying to clear out have had difficulty in getting any bids. **Epsom Salts,** commercial quality, about £4. 10s. to £5. per ton; dealers are offering some spot parcels at these lower rates, but there is no improvement in demand so far. **Formaldehyde,** 40%, about £73. to £75. per ton; the position is rather easier this week, but the market now seems quite steady. **Glauber's Salt,** commercial quality, about £3. 15s. to £4. per ton, in bags; dealers offering at these rates find business very slow. **Lead Acetate,** brown, about £41.; white, about £42. per ton; dealers' prices, which are generally based on Continental offerings, are somewhat firmer this week. **Litharge,** about £35. 10s. to £36. per ton; dealers' prices keep steady at these prices, with business quiet. **Lithopone,** 30% Continental red seal, about £22. to £22. 10s. per ton; importers offerings are a little lower this week, with a fair volume of business being done. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; spot material is steady at this rate, although the demand is rather slow. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at about these prices. **Oxalic Acid,** about 6d. per lb.; inquiry remains poor, with the price maintained, but the market is not at all steady. **Carbonate of Potash,** 90—92%, £26. to £27.; 96—98%, about £29. per ton; dealers' prices have been reduced, and the market is now steady, but business remains poor. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; this market is still dull, with quoted rates unchanged. **Caustic Potash,** 88—92%, about £31. to £31. 10s. per ton; dealers' prices for spot material seem to

be well maintained at these better rates. **Permanganate of Potash,** commercial quality, about 9½d. per lb.; if anything, the spot position is a shade easier at the rate quoted. **Prussiate of Potash,** yellow, about 1s. per lb.; dealers are very steady at this figure, and business has been a little brighter. **Sulphate of Potash,** 90%, £11. 10s per ton, ex ship; there is no change on the week. **Mercury,** about £9. per bottle of 75—76lb.; this market remains quiet, with quoted rates rather unsteady. **Red Lead,** imported, about £35. 10s. to £36. per ton; dealers are doing a fair business at about these prices. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £43.; fine white crystals, £25. to £26. per ton; spot holders' prices are much steadier this week, and something in the way of an advance is expected. **Saltcake,** ground and unground, home trade, about £4. per ton; export, about £5. 5s. per ton, f.o.b.; this market is steady, with inquiry sustained. **Acetate of Soda,** about £24. to £24. 10s. per ton; dealers are offering at slightly cheaper rates this week. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers' prices are maintained at these levels, with little good business about. British makers' prices, for home trade only, are unchanged at: 70—72%, £16. 17s. 6d.; 76—77%, £18. 7s. 6d. per ton, in drums, carriage paid in Great Britain; makers' prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers quoting at this price, for home trade only, in free bags, carriage paid to destination. **Bichromate of Soda,** home trade, about 4½d. per lb.; British makers' price shows no change. **Cyanide of Soda,** 98—100%, export, 8½d. to 9d. per lb.; British makers' prices are maintained at these levels **Hyposulphite of Soda,** pea crystals, about £14. to £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £9. per ton, in casks; dealers offering at these rates for spot supplies; c.i.f. offers are under these figures. **Nitrate of Soda,** 96%, £13. 5s. per ton, f.o.r. or f.o.b.; there is no change to report; market steady. **Nitrite of Soda,** 100%, about £26. 10s. per ton; the position keeps very steady at this unaltered price. **Prussiate of Soda,** about 6d. per lb.; dealers are still offering at this figure, but business is slow, and generally the market is not firm. **Sodium Sulphide,** 60—62% solid, about £14.; do., broken, about £15. 5s. per ton, in drums; dealers quoting at these prices, with not much business about. **Sulphate of Copper,** on spot, about £25. 10s. per ton; the demand is still slow and small, with prices rather unsteady. **Tin Crystals,** about 1s. 4d. per lb.; the market is unchanged on the week. **Tartaric Acid,** B.P., crystals, about 1s. 1¾d. per lb., less 5%; the spot position is very unsatisfactory, with supplies heavy, and the demand persistently poor; any sales would be well under the nominal price quoted above. **White Lead,** imported, about £42. per ton; dealers offering at about this figure are doing some moderate business. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers report there is no change in their prices.

Pharmaceutical Chemicals.—A fairly steady tone continues to govern this market, and once more there is little change to report. Business is certainly being done, but most of it is for small quantities. **Acetanilid,** crystals and powder, 1s. 7d. to 1s. 8d. per lb.; this market is firmer, with prices advanced. **Acetyl-Salicylic Acid,** B.P., about 3s. 1d. per lb.; supplies on spot seem short, and the price quoted is now firm. **Benzoic Acid,** B.P., 2s. 3d. to 2s. 6d.; inquiry remains very light; quoted rates unchanged. **Diethylbarbituric Acid,** B.P. (barbitone), about 17s. per lb.; no further decline in value is recorded; demand slow. **Salicylic Acid,** B.P., about 2s. 3d. to 2s. 4d. per lb.; the market has kept steady at these rates, and some fair business has been done. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; the market is unchanged, with little doing. **Amidopyrin,** about 14s. 6d. per lb.; inquiry is only occasional; spot price unchanged. **Ammonium Bromide,** about 7d. per lb.; some few small orders have been booked at about this figure on spot. **Benzonaphthol,** about 5s. per lb., nominal; market remains idle. **Betanaphthol,** resublimed, 1s. 10d. to 2s. per lb.; sales have been slow and small, with values rather easy. **Benzaldehyde 03,** about 3s. per lb.; the market keeps steady at this figure, but the demand is poor. **Calcium Lactate,** about 1s. 9d. per lb.; some slightly cheaper offers of large quantities are on the market. **Chloral Hydrate,** duty paid, about 4s. per lb.; spot offers are at about this rate, with not much demand. **Creosote, B.P.,** about 2s. 6d. per lb.; the market is steady, but not at all active. **Creosote Carbonate,** about 8s. 6d. per lb.; inquiry has been very poor; quoted rates unaltered. **Guaiacol Carbonate,** about 8s. 3d. per lb., nominal; no business recorded. **Hexamine,** about 3s. 6d. to 3s. 9d. per lb.; the position on spot is fairly steady, but business continues to drag, and is small in size. **Hydroquinone,** about 3s. 6d. per lb.; the spot position is firmer on account of dearer offers from the Continent; demand on spot small. **Methyl Salicylate,** 2s. 6d. to 2s. 6d. per lb.; prices quoted on spot are inclined to be firmer, while business is fairly good. **Methyl Sulphonal,** about 15s. per lb.; this item remains neglected, with quoted rates unaltered. **Paraformaldehyde,** about 3s. 6d. per lb.; the tone is steadier on spot after last week's easier rate, but business is poor. **Paraldehyde,** 1s. 5d. to 1s. 6d. per lb.; there is little offering on spot below these prices. **Phenacetin,** about 6s. 1d. to 6s. 3d. per lb.; prices are a little better this week. **Phenazone,** 7s. 3d. to 7s. 6d. per lb.; most offers on spot are at these rates, with the demand slow. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; at these prices the spot market is quite steady. **Potassium Bromide,** B.P., crystals and granular, 6d. to 6½d. per lb.; prices of spot offers vary, with demands light; the market is unsteady. **Potassium Permanganate,** B.P., about 9½d. per lb.; the spot market is a shade easier this week, but is now quite steady. **Potassium Sulphoguaiacolate,** 5s. 6d. per lb.; little or no inquiry being received; quotations unchanged. **Resorcin,** about 5s. 9d. per lb.; some slightly cheaper offers have been made, with business slow. **Salol,** about 2s. 9d. per lb.; at this price the spot position is easy and unsteady. **Sodium Benzoate,** about 2s 6d. per lb.; nominal; no inquiry on the market. **Sodium Bromide,** B.P., crystals and granular, about 7d. to 8d. per lb.; slightly better prices are being quoted for this product, and some little business has been done. **Sodium Salicylate,** powder, about 2s. 5d. to 2s. 6d.; crystals, about 2s. 7d. to 2s. 8d. per lb.; holders of spot supplies are firm in their offers, and inquiry has been good. **Sulphonal,** about 14s. 6d. per lb.; quoted nominal on an idle market. **Terpin Hydrate,** about 1s. 9d. per lb.; a steady but quiet market. **Thymol,** about 15s. per lb.; this market has been quiet, but spot holders' prices are unchanged.

Coal-tar Products, Intermediates, Etc.—A number of changes of importance are recorded here, with the market still dull throughout. Pitch is again easier. Pure methyl alcohol has dropped sharply. Hexamethylene is cheaper. Pyridine is a shade dearer. **Aniline Oil,** about 9d. to 9½d. per lb., drums free; the market remains dull, with quoted values unchanged. **Aniline Salt,** 9½d. to 10d. per lb., casks free; business remains poor, with prices unaltered. **Betanaphthol,** about 1s. 1d. to 1s. 2d. per lb.; the demand has been slow, with quoted rates level. **Benzol,** about 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; makers are quoting at this unchanged price, but a slight decline is looked for at an early date. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; makers' quoted price is steady, with very little business about. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; dealers' offers are at these prices, with little business about. **Naphtha,** about 1s. 4d. per gallon; at this rate the market is easy and dull. **Solvent Naphtha,** 90/160, 1s. 3d. per gallon, drums extra; the market is steady at these recently reduced rates, but there is little doing. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; the demand has been slow, with quoted rates steady. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; this market keeps very steady, although on the quiet side. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; quoted at the old rates, with business quiet. **Creosote Oil,** about 9½d. per gallon, f.o.b.; merchants are offering at this price, with business restricted. **Carbolic Acid,** crystals, about 1s. 2d. per lb., f.o.b.; at this price the position seems steady, and inquiry is being dealt with. **Naphthalene,** about £19. 10s. to £20. per ton; after the recent slight weakening the market is steadier, but there is not much doing; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; this market remains dull, with quoted prices unchanged. **Pyridine,** about 21s. per gallon; a further advance in price is recorded, with the position still firm, and still higher prices not unlikely. **Hexamethylene,** about 3s. 6d. per gallon; at this reduced price the spot position is dull and rather easy. **Pure Methyl Alcohol,** about £90. per ton, ex wharf London, in drums; dealers have made a sharp reduction in their price, and the market is now steady. **Pitch,** about 125s. per ton, f.o.b. East Coast; the market has sustained a further fall in price, and remains dull and rather weak.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £63. 5s. to £63. 7s. 6d., cash; £63. 12s. 6d. to £63. 15s., three months; electrolytic, £67. 10s. to £68. **Tin**: Standard, £200. 5s. to £200. 7s. 6d., cash; £200 5s. to £200. 7s. 6d., three months; Straits, £203. 15s.; English, £201. **Lead**, soft foreign, £26., prompt; English, £27. 5s.; chemical sheet, 34s. per cwt. for 2-ton lots, delivered. **Spelter**, prompt, £33. 17s. 6d.; hard, £27. 10s. **Antimony**, English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium**, 98—99%, £115.; foreign, £110., c.i.f. **Nickel**, £130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 5s. **Bismuth**, 10s. **Platinum**, 500s. per oz. **Wolfram**, spot, 12s. 3d. to 12s. 6d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 90—92%, £47. 10s. per ton, delivered; Beaver brand, 90%, £47 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand for heavy chemicals during the past week has been on the small side, and business transacted is only for spot and near requirements. Values, as a whole, continue in buyers' favour, and, with few exceptions, prices have a downward tendency. In the alkali trade, quotations are maintained at recent rates with the exception of **58% Alkali**, the spot price of which is reduced to £7. 10s. on rails as from October 1. **Bleaching Powder** continues dull at £11. 5s. on rails for soft wood casks. **Roasted Saltcake**, unchanged at £4. 10s., carriage paid. **Glauber's Salt** continue easy at £4. per ton, carriage paid. Imported American **Sulphur**, firmer at £5. 7s. 6d. on rails, and there is a fairly good inquiry. **Chlorates** are only moving off slowly, **Potash** at 3d., and **Soda** 2¾d. per lb. **Bichromates** unaltered. **Copper Sulphate** is in small request, and price remains nominal at £25. 10s. to £26., f.o.b. **Phosphate** and **Commercial Hyposulphite of Soda** are neglected. **Nitrite of Soda**, steady at £26. 10s., ex store. Concentrated **Sodium Sulphide**, dull at £14., carriage paid; crystals, £9. per ton. White powdered Cornish **Arsenic** is again lower at £62., on rails at works, with only small inquiry Yellow **Prussiates** are lower; **Potash** at 1s. 0½d., and **Soda** 5½d., per lb., carriage paid. **Carbonate of Potash**, 88—90%, easy at £25., c.i.f. Solid **Caustic Soda**, 88—90%, firm at £29. per ton. Grey and brown **Acetate of Lime** are unchanged in position or value, and supplies continue scarce. **Acetic Acid** and **Acetate of Soda** steady. **Lead Salts** are slightly easier; white **Acetate** £41., brown £42.; and **Lead Nitrate** £42. per ton, delivered. Miscible **Wood Naphtha**, quiet at 6s. 6d. per gallon. **Acetone** firm at £127. per ton. **Barium Chloride**, slow of sale at £15. 10s. per ton. **Oxalic Acid**, quiet at 5¾d. per lb. **Permanganate of Potash**, commercial quality, lower at 9d., carriage paid.

SWANSEA MARKET REPORT. Wednesday.

Tinplates were very steady on the fixed basis of £1. 3s. 1½d. per standard box f.o.b. **Galvanised Sheets** continue to be steady, with fair quantity of business transacted at £18. 17s. 6d. per ton. **Copper** easier at £63. 2s. 6d. per ton prompt, and £63. 12s. 6d. three months. **Tin** quiet and irregular, with prompt at £199. 17s. 6d. per ton, and three months £200. 7s. 6d. **Lead** firm and dearer, with foreign at £25. 12s. 6d. per ton prompt, and £25. 7s. 6d. forward; English, £27. per ton. **Spelter** rather easier at £33. 12s. 6d. per ton cash, and £33. 15s. 6d. forward. **Zinc Sheets** in fair demand at £39. 12s. 6d. per ton. **Sulphate of Ammonia** quiet at fixed home-trade prices. **Sulphate of Copper** dull at £26. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda** quiet, with prompt 13s. 6d. per cwt., in bags; forward slightly higher. **Bone Meal** slow, with Ceylon at £9. 2s. 6d. per ton. **Oxalic** showed no improvement at 6¼d. per lb., f.o.r. **Copperas** dull at £2. 2s. 6d. per ton, delivered London or equal. **Arsenic** in better inquiry at £69. 7s. 6d. per ton for white powdered. **Sulphuric Acid** in good demand. **Pitch** showed lower quotations, but little business done at £6. 2s. 6d. per ton at docks. **Rape Oil** steady, with refined, prompt, at £2. 3s 3d. per cwt. **Cod Oil** quiet; Newfoundland £2. 2s. 3d., and English, prompt, £1. 14s. 3d. per cwt., f.o.b. **Linseed Oil** firmly held, with raw at £2. 5s. 3d., and boiled £2. 7s. 3d. per cwt., net, in barrels. **Cottonseed Oil** in good demand; common edible £2. 3s. 3d., and deodorised £2. 6s. 3d. per cwt., net. **Coconut Oil** very firm, with Ceylon at £2. 4s. 3d. per cwt. **Olive Oil** quiet, with prompt at £63. 17s. 6d. per ton. **Palm Oil** rather quiet; Lagos, prompt, £36. 17s. 6d.; softs, £36. 2s. 6d.; mediums, £36. 12s. 6d.; and hards, £36. 17s. 6d. per ton. **Benzol** in strong demand, with unaltered rates. **Turpentine** steady, with American prompt at £3. 17s. 3d. per cwt. **Coal** in much better supply: Best Admiralty smokeless, £1. 8s.; seconds, £1. 6s. 6d.; ordinaries, £1. 6s.; Monmouthshire black vein, £1. 7s. 6d.; smalls, £1. 2s., down to 18s. per ton, all f.o.b. **Cokes** in better demand; export, £2. to £2. 7s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, in truck, at ovens. **Anthracite**, best, was firm, but for lower grades prices eased; best large, £2. 10s.; seconds, £2.; French nuts, £3. per ton, all f.o.b. **Patent Fuel**, quiet at late rates.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Inquiries for chemicals of the heavier class for use in the home branch of the trade have been fairly numerous, the general demand being steady and of fair aggregate volume. In the export branch shipments have been moderately active. **Bleaching Powder** has been steadily called for, and is £10. 5s. to £10. 7s. 6d. per ton for the home trade, and £11. 5s. to £11. 17s. 6d. per ton for export. **Chloride of Calcium** has been quieter, and is £5. 12s. 6d. per ton. **Caustic Soda** has been in rather good request for use in the United Kingdom, and has had a very fair shipment to overseas ports; the price is £19. to £20. per ton for 76%, carriage paid, for the home trade. **Bicarbonate of Soda** has again had a fairly free sale for home-trade uses, and has been shipped on a rather large scale; it is £10. 10s. per ton, carriage paid, for the home trade. **Soda Crystals** have been more in request for use in the United Kingdom, but continue quiet in the export branch; the price is £5. 5s. per ton, for use in the United Kingdom, carriage paid. **Nitrate of Soda** has had a moderate sale, and is £13. 5s. to £13. 10s. per ton. **Borax** has been more in request for the home trade and on export account; commercial crystals are £25. per ton, and powdered £26.; higher-grade crystals are £29. per ton, and powdered £30.; superfine is £31. per ton. **Saltcake** has again been in good demand, and is £4. 10s. to £5. per ton for home-trade use, and £5. to £6. per ton for export. **Bichromate of Soda** continues in very fair demand; it is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has been steadily called for on home-trade account, and has had an active shipment for export; it is £7. 12s. 6d. per ton for the United Kingdom, and £8. per ton for overseas, the export price varying according to destination. **Hyposulphite of Soda** has had a fair sale, and is £10. to £11. per ton, in 2cwt. bags, for commercial; and £15. to £17. per ton for photographic quality, in 1cwt. kegs. **Sulphide of Soda** has been quiet; solid is £14. 10s. to £15. per ton, and crystals £8. 10s. to £9. per ton. **Chlorate of Soda** has moved but slowly, and is 3d. to 3½d. per lb. **Phosphate of Soda** continues quiet, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been but little in demand, and is 6½d. per lb. **Yellow Prussiate of Potash** has been in fair demand, and is 1s. 1d. per lb. **Red Prussiate** has been rather more in request, and is 3s. per lb. **Carbonate of Potash** has been in quietly steady demand, and is £25. to £31. per ton, according to quality. **Nitrate of Potash** has been more in request, and is £29. to £30. per ton. **Chlorate of Potash** continues quiet, and is 3½d. to 4d. per lb. **Caustic Potash** has had a steady sale, and is £29. to £30. per ton. **Permanganate of Potash** continues to meet with a very fair inquiry, and is 9½d. to 9¾d. per lb. **Bichromate of Potash** has been steadily called for, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been rather more in demand; first quality is £60. per ton, and second quality £57. per ton. **Sulphate of Ammonia** has been quiet on home-trade account, but has been shipped largely for foreign ports: neutral of 25¾% is £14. 10s. per ton, and ordinary of 25¼% £13. 7s. per ton, for use in the United Kingdom. **Carbonate of Ammonia** has been in rather good request, and is 4d. per lb. **Muriate of Ammonia** has been in moderate demand; grey is £32. per ton. **Magnesia** has sold somewhat freely; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been in quietly steady demand; for the home trade £12. per ton is the price, and for export £11. to £11. 10s. per ton. **Sulphate of Alumina** has been in fair request; it is £8. to £10. 10s.

per ton, according to quality. **Sulphur** has had a rather free sale; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s., and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has been steadily called for, and is 1s. 2d. to 1s. 2½d. per lb. **Cream of Tartar** has sold with some freedom, and is £4. 10s. per cwt. **Boric Acid** has been rather more in request; commercial crystals are £48. per ton, and powdered £51. per ton, and £2. more per ton if in casks. **Citric Acid** continues quiet, and is 1s. 6½d. to 1s. 7d. per lb. **Oxalic Acid** has been but little in request, and is 6d. per lb. **White Acetate of Lead** has had a very limited sale, and is £42. to £43. per ton. **Sulphate of Copper** continues quiet for use in the United Kingdom, and has had a light shipment for export; the price is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been in fair request; the price is materially lower, £63. per ton now being taken for white powdered.

WEST OF SCOTLAND CHEMICALS. WEDNESDAY.

There are signs of a little more activity in this market, and the day-to-day demand on home account has been well maintained during the week. Fresh inquiry on export account continues to be limited, however, though there is a fair trade passing in several lines. Prices generally are steady, and quotations, net at Glasgow, are as follows:—**Alum**, lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic**, white powdered, lower at £72. per ton on spot; new supplies coming in are round about £70. per ton; a quiet market. **Barium Chloride**, £15. per ton; this figure is unchanged, and there is nothing of interest to record. **Bleaching Powder**, quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under these figures. **Boric Acid**, crystals, £48. per ton, makers' prices; demand rather poor. **Borax**, crystals, fairly steady at the recently reduced figure of £25. per ton, delivered; granulated, £24. 10s. per ton. **Calcium Chloride**, 70—75%, solid, £5. 12s. 6d. per ton on spot; Continental material quoted at slightly below this figure. **Citric Acid**, 1s. 6d. per lb., less 5%; little business about at last week's easier quotation. **Copper Sulphate**, £27. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar**, £4. 4s. per cwt. for 99% at Glasgow; quotation unchanged, and inquiry small. **Lead Acetate**, white, £41. 10s. per ton on spot; brown, more inquiry at £42. 10s. per ton; Continental material offering at cheaper rates. **Magnesium Chloride**, £3. 7s. 6d. per ton, ex store; a rather better tone is noticeable in this market, although foreign supplies now arriving are quoted at under this figure. **Oxalic Acid**, quiet at about 6½d. per lb.; little doing at this figure. **Paraffin Wax**, 2½d. per lb.; a steady export trade. **Potassium Bichromate**, 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate**, lower at 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate**, 1s. 2½d. per lb.; this is a dull market, in spite of the reduction of ½d. on the week. **Salammoniac**, first and second lump, £60. and £57. per ton respectively; crystals, £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre**, £1. 11s. per cwt., net; a better market, with quotation still rising. **Sodium Bichromate**, 4½d. per lb.; unchanged. **Sodium Chlorate**, 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate**, 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate**, £9. 15s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic**, 43—44%, 1s. 1d. per lb.; rather easier in tone, and inclined to be dull. **Tartaric Acid**, 1s. 2d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending September 22.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 71 cks.

BARYTES—
Bremen, 400 bgs.; Hamburg, 79 cks., 750 dble. bgs.

CALCIUM CARBIDE—
Trondhjem, 2,965 drms.

CAUSTIC POTASH—
Hamburg, 29 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 7 cs.

COAL TAR PRODUCTS—
Tar Oil
Hamburg, 25 cs.

DEXTRINE—
Hamburg, 500 bgs.
Newport News, 860 bgs.

FERRO PHOSPHORUS—
Hamburg, 18 pkgs.

FORMALDEHYDE—
Bremen, 9 crbys.

GLUCOSE—
Hamburg, 134 cks.
New York, 661 brls.

GLUE—
Antwerp, 114 bls.

IRON OXIDE—
Malaga, 10 brls.

IRON PYRITES—
Huelva, 3,481 t.

KIESELGUHR—
Antwerp, 286 bgs.

LITHOPONE—
Antwerp, 40 cks.

MAGNESITE—
Madras, 318 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 262 drms.

OCHRE—
Norfolk (Va.), 453 brls.

PLUMBAGO—
Bremen, 28 bgs.

POTASH ALUM—
Hamburg, 48 pkgs.

SALT—
Bremen, 2,700 bgs.
Hamburg, 325 t. and 1,300 bgs.

SOAP—
Antwerp, 9 cs.
Hamburg, 26 cs.
New York, 3 ctns.

SODIUM ACETATE—
Rouen, 34 cks.

SODIUM BICHROMATE—
Baltimore, 16 cs.

SODIUM SULPHATE—
Hamburg, 784 bgs.

STEARINE—
New York, 140 brls.

TANNING MATERIALS—
Valonia
Smyrna, 282 bgs.

WHITE LEAD—
Bremen, 32 cks.; Hamburg, 59 cks.; Rouen, 27 cks.

ZINC OXIDE—
Antwerp, 18 brls.
Bremen, 75 cks.

GOOLE.

Week ending September 22.

BARYTES—
Antwerp, 100 bgs.

CAUSTIC POTASH—
Hamburg, 24 drms.

DYESTUFFS (NATURAL)—
Logwood
Amsterdam, a qty.

GLUE—
Antwerp, 70 bgs.

HYDROGEN PEROXIDE—
Ghent, 160 crbys.

GRANGEMOUTH.

Week ending September 22.

ACETIC ACID—
Rotterdam, 17 crbys., 59 cks.

ALBUMEN—
Rotterdam, 36 cs.

ALUMINA—
Rotterdam, 525 pkgs.

CASEIN—
Rouen, 67 bgs.

FERRO CHROME—
Norway, 30 cs.

LITHOPONE—
Rotterdam, 20 cks.

GRIMSBY.

Week ending September 22.

CALCIUM CARBIDE—
Hommelvik, 2,000 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Dieppe, 3 pkgs.

GLUE—
Antwerp, 70 bls.

GUANO—
Haugesund, 3,272 bgs.

HULL.

Week ending September 22.

CALCIUM CARBIDE—
Christiania, 46 t. 5 c.

CAUSTIC POTASH—
Bremen, 5 t.

CHEMICALS (*otherwise undescribed*)
Antwerp, 5 t.
Bordeaux, 1 t.
Genoa, 6 t.
Bremen, 5 t. 13 c.
Hamburg, 3 t. 10 c.
Rotterdam, 5 c.

COAL TAR PRODUCTS—
Pitch
Gothenburg, 1 t.
Tar
Hamburg, 7 t. 10 c.

DEXTRINE—
Harlingen, 2 t.

DYESTUFFS (NATURAL)—
Logwood
Kingston, 19 t. 15 c.
Savannah La Mar, 40 t. 15 c.

FERRO CHROME—
Christiania, 8 t.; Dunkirk, 52 t.

FERRO SILICON—
Christiania, 60 t.; Gruz, 50 t.

FULLER'S EARTH—
Norfolk, 45 t.

GLUE—
Antwerp, 6 t. 9 c.

LEAD ACETATE—
Bremen, 2 t. 9 c.
Hamburg, 9 t. 15 c.

MAGNESITE—
Hamburg, 25 t.

MAGNESIUM SULPHATE—
Rotterdam, 1 t.

MANGANESE ORE—
Dunkirk, 10 t.
Gothenburg, 20 t.

PHOSPHATES—
Tunis, 1,050 t.

ROSIN—
Bordeaux, 34 t.
Christiania, 1 t.
Antwerp, 318 t. 10 c.
Rotterdam, 18 t. 4 c.

SALT—
Hamburg, 25 t.

SALTPETRE—
Rotterdam, 1 t. 12 c.

SOAP—
Dunkirk, 8 c.

SULPHUR—
Sabine, 110 t.

TALLOW—
Christiania, 2 t. 1 c.
San Francisco, 45 t.

TANNING MATERIALS—
Sumac
Valencia, 20 t.
Wattle
Natal, 10 t.

TAR (WOOD)—
Danzig, 30 t.

TURPENTINE—
Bordeaux, 6 t.

LEITH.

Week ending September 22.

ACETIC ACID—
Rotterdam, 3 cks.

ALUMINIUM SULPHATE—
Rotterdam, 135 bgs.

BARYTES—
Hamburg, 150 dble. bgs.

CARBON BLACK—
Baltimore, 10 cs.

FORMIC ACID—
Rotterdam, 65 bllns.

FULLER'S EARTH—
Baltimore, 432 bgs.

GLUE—
Hamburg, 100 bgs.
Nantes, 60 bgs.

LACTIC ACID—
Hamburg, 9 cks.

LITHOPONE—
Amsterdam, 400 cks.
Hamburg, 20 cks.

MAGNESITE—
Amsterdam, 40 bgs.

OCHRE—
Baltimore, 459 brls.

SALT—
Antwerp, 22 bgs.
Hamburg, 300 bgs., 150 pkgs.

SALTPETRE—
Amsterdam, 100 cks.

SOAP—
Copenhagen, 2 cs.

LIVERPOOL.

AMENDMENTS.

In Returns for Weeks ending September 8 and 15,

For Switzerland, *read* Sweden.

Week ending September 22.

ACETIC ACID—
Holland, 6 cks.

ACETONE—
Austria, 21 drms.

ARGOLS—
France, 37 cks., 48 bgs.

BEESWAX—
Egypt, 68 bgs.
U.S.A., 7 cs.
W.C. Africa, 267 blcks.

BORIC ACID—
Italy, 27 cks.

CALCIUM CARBIDE—
Norway, 100 drms.

CARBON BLACK—
U.S.A., 110 cs.

CAUSTIC POTASH—
Czecho-Slovakia, 20 drms.

COAL TAR PRODUCTS—
Carbolic Acid
Belgium, 25 drms.
U.S.A., 132 drms.
Pitch
U.S.A., 1 brl.

CREAM OF TARTAR—
Spain, 20 brls.

CRYOLITE—
Denmark, 5 bxs., 200 bgs.

DYESTUFFS (NATURAL)—
Fustic
France, 10 cks.
Logwood
France, 23 cks.
U.S.A., 3 cs., 24 cks.
Unspecified
France, 3 cks.

FERRO SILICON—
Norway, 740 cs.

FERRO VANADIUM—
Germany, 16 drms.

FERTILISER (DRIED BLOOD)—
Argentine, 1,420 bgs.

GELATINE—
Belgium, 40 bls.; U.S.A., £120.

GLUE—
Belgium, 80 bgs.; France, 20 cs.

GLYCERINE—
France, 276 drms.

IODINE—
Chile, 142 brls.

IRON OXIDE—
Spain, 200 bgs., 13 brls.

KIESELGUHR—
U.S.A., 1,000 bgs.

LITHARGE—
Italy, 14 cks.

LITHOPONE—
Belgium, 20 cks.

MAGNESITE (CALCINED)—
Holland, 50 bgs.

MANGANESE ORE—
India, 5,488 t. 15 c.

MANGANESE OXIDE—
Germany, 26 brls.

METHYL ALCOHOL—
Germany, 48 drms.

OCHRE—
France, 33 brls., 19 cks.
Spain, 20 brls.

PARAFFIN SCALE—
U.S.A., 2,459 brls.

PARAFFIN WAX—
Burmah, 400 bgs.
U.S.A., 1,062 bgs., 133 cs.

PHOSPHATE ORE—
India, 750 t.

PHOSPHATE ROCK—
U.S.A., 3,150 t.

PITCH (*otherwise undescribed*)—
Germany, 6 cks.

POTASSIUM CARBONATE—
Germany, 18 brls.

PYRITES (*otherwise undescribed*)—
Peru, 103 t., 4,398 t.
Spain, 3,420 t.

RED LEAD—
Germany, 16 cks.

ROSIN—
U.S.A., 7,700 brls.

SALTPETRE—
Germany, 10 dble. bgs.
Holland, 4 cks., 20 kgs.

SOAP—
Canada, £570.; France, £564.; U.S.A., £1,225.

SODIUM ACETATE—
Belgium, 112 cks.

SODIUM NITRATE—
Chile, 10,588 bgs.

SODIUM PERBORATE—
Italy, 13 pkgs.

SUPERPHOSPHATE—
U.S.A., 522 brls.

TALLOW—
Argentine, 470 cks.
Australia, 60 cks.

TANNING MATERIALS—
Chestnut
France, 196 cks.
Italy, 100 cks.
Gambier
Belgium, 170 cs.; Straits, 102 cs.; Sumatra, 408 cs.
Myrabolans
India, 104 bgs., 8,000 pkts.
Oak
Gruz, 46 brls., 16 bgs.; Italy, 317 cks.; Jugo-Slavia, 60 bgs.; Sicily, 200 brls.
Quebracho
Argentine, 5,757 bgs.
Sumac
Sicily, 400 bgs.
Wattle
South Africa, 12,959 bgs.
Unspecified
France, 10 bgs.; U.S.A., 292 bgs.

TAR (*otherwise undescribed*)—
Germany, 300 brls.

TIN ORE—
Bolivia, 490 t.
W.C. Africa, 284 t. 10 c.

TURPENTINE—
U.S.A., 1,050 brls., 50 cks.

ULTRAMARINE BLUE—
France, 2 cks.

WHITE LEAD—
Germany, 59 cks.
Holland, 20 drms.

ZINC ASHES—
U.S.A., 37 t.

ZINC OXIDE—
Holland, 13 cks.

ZINC WHITE—
Holland, 20 cks.

LONDON.

Week ending September 22.

ACETIC ACID—
Austria, 41 cks. F. Boehm
Canada, 257 pkgs.
Germany, 100 cs. V. Blagden
,, 118 crbys. C. H. Haigh

ACETONE—
Germany, 2 t. 3 c. V. Blagden

ALUMINIUM SULPHATE—
Germany, £1,895. Ohlenschlager

AMMONIA (ANHYDROUS)—
U.S.A., £1,699. Morris

AMMONIUM CHLORIDE—
Germany, 38 brls. Van Oppen
,, 35 pkgs. Bush
Beach & Gent

AMMONIUM NITRATE—
Germany, 42 cks. Stott & Hotopf

ANTIMONY SULPHIDE—
Cuba, £84. Cookson

ARGOLS—
France, 479 bgs.
Italy, 18 cks.
,, 17 Morison, Pollexfen & Blair
Portugal, 241 pkgs.
Spain, 58 bls.

ARSENIC—
Japan, £570.
Victoria, 14 cks.
Queensland, 40 Atlas Preservative

ARSENIOUS ACID—
Greece, 496 cs. W. & S. Bowditch
Japan, 48 ,,
Portugal, 83 cks. ,,

ARSENIOUS OXIDE—
Greece, £5,523. Dixon

BARIUM CHLORIDE—
Germany, £58.

BARIUM SULPHATE—
Germany, £9. J. Schnurmann

BARYTES—
Belgium, 700 bgs. Felton & Crepin
Germany, 300 H. Smart
,, 35 brls. G. Elliott
,, 459 cks. Pallister Luck
,, 58 D. M. Henderson
U.S.A., 225 cks. Taylor & Cox

BEESWAX—
B.W.I., 3 pkgs. T. Meadows
Anglo-Egypt. Sudan, 538 bgs. Baxter Hoarth
Fr. Indo-China, 19 cs.
Fr. Somaliland, 63 pkgs. Leach
Germany, 10 bgs. Holroyds Oil & Cer.
Tanganyika Terr., 26 cs.

BLEACHING POWDER—
Germany, 25 t. 1 c. J. M. Steel

BORAX—
Belgium, 10 c.
U.S.A., 2

BUTYRIC ACID—*
——— £930.

CALCIUM CARBIDE—
Jugo-Slavia, 100 t.
Norway, 51 J. Spurling
Trieste, 79 t. 8 c. Gen. Light

CALCIUM CHLORIDE—
Germany, 14 t. 12 c. Bush Beach & Gent

CARBON BLACK—
Germany, 2 cks. Haller & Phillips
U.S.A., 50 cs. Binney & Smith
,, 299

CARNAUBA WAX—
Brazil, 112 bgs. Holroyds Oil & Cer.
,, 524 Weber Smith & Hoare
,, 1,250 Davies Turner
,, 55 Poth Hille

CASEIN—
Argent. R., £377. Williams & Geils
France, £334. A. C. Puttick
,, £100.

CAUSTIC SODA—
Germany, 6 c.

CELLULOSE ACETATE—*
——— £157.

CHEMICALS (*otherwise undescribed*)
Czecho-Slovakia, £5. Crowe
France, £63.
Germany, £120. Petri
,, £17. Johnson
,, £36. Baker
,, £979.
,, £16. Ryley
,, £16. H. Maclaine
,, £10. Van Oppen
,, £800. M. Emanuel
,, £76. Ronsheim & Moore
,, £5. C. E. Mayer
Poland, £11. H. Keller
Spain, £78. H. W. Allen
Sweden, £51.
U.S.A., £211.
,, £11. T. Christy
,, £32. Sewell & Crowther
,, £103. Morison Pollexfen & Blair

CHEMICALS (*otherwise undes.*)—*
——— £2,510.

CHLOROPHYLL—
Germany, £388. Stephens

CITRATE OF LIME—
Italy, 80 pkgs.

COAL TAR PRODUCTS—
Pitch
Belgium, 50 brls. Pure Russ. Liq. Paraffin
Tar
U.S.A., 100 C. T. Bowring

* Entered under the Safeguarding of Industries Act.

CREAM OF TARTAR—
France, 60 cks.
Spain, 100 kgs. Leach

DEXTRINE—
Holland, 38 t. 6 c.
,, 2 14 H. W. Winter

DYESTUFFS (ARTIFICIAL)—
Unspecified
France, £21. Greeff
Germany, 6 kgs.
,, 8 cks. Greeff

DYESTUFFS (NATURAL)—
Annatto
Brit. India, 10 pkgs.
Java, 38 bgs.
Turmeric
Brit. India, 5 bgs.
Unspecified
Smyrna, £540. Phillips, Conquest & Damala

FERTILISERS (*otherwise undes.*)—
Natal, 2 t.

FORMALDEHYDE—
Germany, £298.

GELATINE—
France, £352. Soc. des Prod. Chim.
Germany, £23. W. A. J. Tilleray
,, £870. Crowe
,, £17, C. W.
,, £1,100. Hartroat.
,, £43. Williams & Geils
,, £741. Townsend
,, £349. H. W. Winter
Switzerland, £392. Europ. & Gen. Exp.

GLUE—
Austria, £320. Gerhard & Hey
,, £65. J. Spurling
Belgium, £412.
,, £3,000. H. H. Poole
,, £126. P. Ingenlath
,, £470. Duche
France, £55. O. Murray
,, £615. Soc. des Prod. Chim.
Holland, £165. P. Ingenlath
,, £104. Stancourt & Muir
Hungary, £74. Van Oppen
U.S.A., £171. H. C. Hackney

GLYCERINE—
Holland, £114.

ISINGLASS—
Brazil, 2 cs.
,, 23 pkgs.
Japan, 42 bls. R. Warner
Straits Setts., 1 cs. J. Baumann

KETONE (*otherwise undescribed*)—
Germany, £664. V. Blagden

KIESELGUHR—
Algeria, 10 t. J. A. McLaren

LITHOPONE—
France, 40 cks. Taylor & Cox
Holland, 45 F. T. H. Nye

MAGNESITE—
Brit. India, £6. Paul & Preston
Holland, £180. Ray
,, £48.

MINERAL COLOURS (*otherwise undescribed*)—
Italy, 21 brls. M. Isaacs

MONTAN WAX—
Germany, 77 H. F. Farman
,, 40 bgs. C. E. Mayer
Holland, 30 bls. J. Knill

OCHRE—
U.S.A., 20 brls. J. Johnson

OXALIC ACID—*
——— £378.

OZOKERITE—
Germany, 30 bgs. Holroyds Oil & Cre.

PARAFFIN WAX—
Burmah, 50 t.
,, 25 H. Hill
,, 25 Asiatic Petr.
Holland, 54 ,,
U.S.A., 170 Anglo-Amer. Oil
,, 1 16 Vacuum Oil
,, 22 9 F. Chiesman
,, 25 Gerhard & Hey

PHOSPHATE OF LIME—
Belgium, 4 t. H. H. Poole

PITCH (*otherwise undescribed*)—
France, 1 pkg.
Germany, 20 pkgs. Poth Hille
U.S.A., 25 brls.

PLUMBAGO—
Ceylon, 19 brls. Morgan Crucible
France, 115 bgs. Symons
Germany, 29 Hall & Hall
,, 39 Friedlander
Madagascar, 216 G. G. Blackwell
Sweden, 26 cs.
Japan, 750 cks.

POTASSIUM CARBONATE—
Germany, 15 cks. Petri
U.S.A., 10

POTASSIUM CHLORATE—
France, 4 drms. T. P. Priestley
Germany, 10 kgs.

POTASSIUM NITRATE—
Germany, 1,850 bgs. Stott & Hotopf

POTASSIUM PERMANGANATE—*
——— £565.

PRUSSIAN BLUE—
France, 10 cks. H. H. Poole
Germany, 10 Stancourt & Muir
Holland, 8 H. Keller

QUININE ETHYL CARBONATE—*
——— £244.

RED LEAD—
Belgium, 13 cks. G. Farmiloe

ROSIN—
France, 100 cks. Lowden Connell
,, 30
Germany, 112 bgs. C. W. Hartrodt
,, 2 brls. E. Friedlander
Norway, 6 Wright Kerr
Portugal, 72 W. R. Green
Sweden, 213 brls. Stromwall
U.S.A., 800 brls. Rosin & Turp. Imp.
,, 300 H. Hill

SALT—
Germany, 30 t. G. J. Kanaat
,, 10

SHELLAC—
Brit. India, 1 t. 17 c. J. W. Cook
,, 14 14 Litchfield & Saundy
,, 35 4 Dunlop
,, 5 c. E. Friedlander

SOAP—
Belgium, £121.
Canada, £7,986. Gerhard & Hey
Denmark, £57.
France, £8. Mory
,, £9.
,, £64. E. Fischel
Germany, £33. S. Kalisky
,, £21.
,, £4. W. A. J. Tilleray
,, £274. C. W. Hartrodt
Palestine, £6. G. W. Wheatley
U.S.A., £12. G. W. Sheldon
,, £7. H. A. Lane
,, £226. H. C. Hackney

SODA ASH—
Belgium, 30 t. J. Bailey

SODA CRYSTALS—
Poland, 10 t. Berkenske

SODIUM SALTS (*otherwise undes.*)
Germany, 10 t. 16 c. Scheuer

STEARINE—
N.S.W., 100 cks.

TALLOW—
Belgium, 30 brls.
France, 5 t. 18 c. Symons
Holland, 90 t.
N.Z., 72 t. 12 c. Goad, Rigg
,, 50 cks. Weber, Smith & Hoare
,, 21 t. 10 c. ,,

TALLOW—
N.Z., 354 t. 11 c.
,, 25 17 Anning & Cobb

TANNING MATERIALS—
Divi Divi
B.W.I., 4 bgs. Perkins & Homer
Gambier
Straits Setts., 255 cs.
Myrabolans
Brit. India, 2,045 bgs. J. W. Cook
,, 500 R. E. Drummond
,, 4,000 pkts. Williamson
,, 83 bgs.
Sumac
Switzerland, 4 cks.
Valonia
Smyrna, 99 t. Gough, Kidstone
Unspecified
B.W.I., 1 t. 10 c.

TAR (*otherwise undescribed*)—
Poland, 50 brls. W. Rogers
,, 121 Bergenske
,, 130 Sale
Sweden, 200
,, 1 C. Shaw Lovell

THORIUM NITRATE—*
——— £1,199.

TURPENTINE—
France, 3 brls. Hernu, Peron
,, 50 Lowden, Connell.
,, 50 Fairclough, Dodd & Jones
Russia, 125. F. Chiesmann
U.S.A., 750 Goodlake & Nutter
,, 1,000
,, 100 Lowden Connell

ULTRAMARINE—
Belgium, 5 brls.

WHITE LEAD—
Belgium, 55 cks. G. Farmiloe
Germany, 58 brls. Stephens
Holland, 2 Chance & Hun

ZINC OXIDE—
Belgium, 25 brls.
,, 66 cks. M. Ashby
Holland, 200 cks. F. T. H. Nye
,, 50 M. Ashby

MANCHESTER.

Week ending September 22.

ACETIC ACID—
Amsterdam, 8 cs.: Hamburg, 17 crbys.; Rotterdam, 6 brls.

BARIUM CHLORIDE—
Hamburg, 43 cks.

CALCIUM CARBIDE—
Christiania, 300 bxs.
Hamburg, 850 drms.

CARBON (DECOLOURISING)—
Amsterdam, 103 bgs.

CARBON BLACK—
New Orleans, 500 cs.
New York, 200 cs.

CHEMICALS (*otherwise undescribed*)
Christiania, 16 cks.
Rotterdam, 490 brls.

CHLOROPHYLL—
Antwerp, 3 cs.

CREAM OF TARTAR—
Bordeaux, 2 cks.
Hamburg, 4 cks.

DEXTRINE—
Amsterdam, 450 bgs.
Newport News, 440 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 20 brls.
Unspecified
Hamburg, 5 cks.
Rotterdam, 36 pkgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 135 cks.
Unspecified
Baltimore, 2 bxs.

FORMALDEHYDE—
Hamburg, 68 cks., 158 crbys.
New York, 12 brls.

FORMIC ACID—
Hamburg, 81 crbys.

GLUCOSE—
New York, 25 brls.

LEAD ACETATE—
Hamburg, 20 cks., 38 brls., 20 sks.

LITHOPONE—
Rotterdam, 300 cks.

MAGNESITE—
Rotterdam, 128 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 23 drms.

OCHRE—
Bordeaux, 65 cks.
New York, 17 brls.

OXALIC ACID—
Hamburg, 6 cks.

OXIDE (*otherwise undescribed*)—
Hamburg, 10 cks.

PARAFFIN WAX—
Baltimore, 140 brls.
New Orleans, 200 brls.

POTASSIUM CARBONATE—
Hamburg, 10 cks.

POTASSIUM PERMANGANATE—
Hamburg, 30 drms.

ROSIN—
Bordeaux, 150 cks.

SOAP—
Antwerp, 11 cks.

SODA—
Antwerp, 40 kgs., 13 cks.

SODIUM ACETATE—
Hamburg, 131 cks.

SODIUM BICARBONATE—
Baltimore, 16 cks.

SODIUM HYPOSULPHITE—
Hamburg, 47 cks.

SODIUM SULPHITE—
Hamburg, 19 drms.

STEARINE—
Antwerp, 10 bgs.
Hamburg, 14 bgs.
Rotterdam, 30 brls.

SUPERPHOSPHATE—
New York, 522 brls.

TALLOW—
Christiania, 720 brls.

TARTARIC ACID—
Amsterdam, 20 kgs.

THIOCARBANILID—
New York, 8 cs., 2 bxs.

WAX (*otherwise undescribed*)—
Baltimore, 601 brls.
Philadelphia, 1,534 brls.

WHITE LEAD—
Ghent, 1 ck.

ZINC OXIDE—
Antwerp, 80 cks.
Rotterdam, 15 cks.

NEWCASTLE-ON-TYNE

Week ending September 22.

CALCIUM CARBIDE—
Christiania, 150 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 102 cks.

FERRO SILICON—
Gothenburg, 20 bls.

OXIDE (*otherwise undescribed*)—
Malaga, 38 brls.

SOAP—
Copenhagen, 7 cs.

SODIUM ACETATE—
Antwerp, 8 kgs.

SODIUM NITRATE—
Christiania, 51 bgs.

STEARINE—
Antwerp, 13 bgs.

N. & S. SHIELDS.

Week ending September 22.

NIL.

* Entered under the Safeguarding of Industries Act.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending September 22.

BITUMEN—
Hong Kong, £50.

BOILER COMPOSITION—
Gothenburg, 2 t. 10 c.

BONE OIL—
Hamburg, 2 t.

CARNAUBA WAX—
Aden, 6 t.

CAUSTIC SODA—
Pt. Sudan, 5 drms.
Rangoon, 80 drms.

CHEMICALS (*otherwise undescribed*)
Alexandria, 1,006 pkgs.; Barcelona, 10 pkgs.; Beira, 595 pkgs.; Beyrout, 5 pkgs.; Brisbane, 20 pkgs.; Cape Town, 1 pkg.; Callao, 20 pkgs.; Delagoa Bay, 1,965 pkgs.; Demerara, 74 pkgs.; Durban, 215 pkgs.; East London, 40 pkgs.; Famagusta, 1 pkg.; Genoa, 16 pkgs.; Hamburg, 49 pkgs.; Hong Kong, 2,134 pkgs.; Huelva, 1 pkg.; Jaffa, 100 pkgs.; Kobe, 4,000 pkgs.; Lisbon, 15 pkgs.; Melbourne, 12 pkgs.; Marseilles, 63 pkgs.; Oporto, 12 pkgs.; Rangoon, 109 pkgs.; Rouen, 145 pkgs.; Shanghai, 45 pkgs.; Singapore, 2 pkgs.; Valparaiso, 63 pkgs.; Vera Cruz, a qnty.; Yokohama, 50 pkgs.

COAL TAR PRODUCTS—
Creosote Oil
Delagoa Bay, 7 t. 5 c.
Pitch
Alexandria, 14 t. 18 c.; Algoa Bay, 5 t. 17 c.; Karachi, 4 t.; Gothenburg, £65.
Tar
Alexandria, 86 t. 5 c.; Arica, £29.; Beira, 3 t. 6 c.; Cape Town, 6 t. 5 c.; Delagoa Bay, 36 t. 7 c.; Durban, 10 t. 4 c.; Rangoon, £90.; Singapore, 9 t. 2 c.
Unspecified
Alexandria, 17 t. 18 c.; Halifax (N.S.), £22.; Rangoon, £213.; San Antonio, £3,442.

DISINFECTANTS (*otherwise undes.*)
Alexandria, £52.; Algoa Bay, 14 c.; Cape Town, 17 drms.; Durban, 251 galls.; Singapore, 120 galls.

DYESTUFFS (NATURAL)—
Logwood Chips
Oporto, £24.

GELATINE—
Karachi, £45.

GLUCOSE—
Lisbon, £29.

GLUE—
Hong Kong, 4 c.; Montreal, 6 c.; Shanghai, 1 t. 5 c.

LITHARGE—
Delagoa Bay, 5 t.

MAGNESITE—
Antofagasta, 116 pkgs.

PARAFFIN WAX—
Algiers, 7 t. 4 c.; Delagoa Bay, 15 t. 3 c.; Leghorn, £270.; Lisbon, £178.; Montreal, 3 c. 2 qr.

POTASSIUM BICHROMATE—
Dalny, 10 t. 6 c.; Hamburg, 33 t. 11 c.; Tientsin, 8 t.

ROSIN OIL—
Hamburg, 18 c. 2 qr.

SALT—
Demerara, 10 c.
Hong Kong, 16 c.

SHEEP DIP—
Algoa Bay, 9 t. 9 c.; Beira, 18 t. 19 c.; Delagoa Bay, 9 t. 9 c.; Durban, 11 t. 8 c.; Hamburg, 15 c.

SOAP—
Beira, 1 t. 9 c.; Calcutta, 13 c.; Cape Town, 18 t. 1 c.; Demerara, 2 c.; Hong Kong, 1 t.; Oporto, 1 t. 12 c.; Rangoon, 3 t.; Singapore, 4 t.; Vera Cruz, 1 c.

SODA CRYSTALS—
Rangoon, 2 t. 10 c.

SODIUM BICHROMATE—
Hamburg, 5 t.

SODIUM CYANIDE—
Fremantle (W.A.), 50 t.

SPERMACETTI WAX—
Gothenburg, £20.; Hamburg, 3 c.; Rouen, £175.

TANNING MATERIALS—
Unspecified
Cape Town, 4 t. 11 c.

WAX (*otherwise undescribed*)—
Algoa Bay, 1 t.; Pt. Said, £79.; Shanghai, £135. and 2 c.; Valparaiso, £10.

GRANGEMOUTH.

Week ending September 22.

COAL TAR PRODUCTS—
Creosote Oil
Rotterdam, 1 t. 19 c.

PARAFFIN WAX—
Hamburg, 10 t.

POTASSIUM BICHROMATE—
Antwerp, 2 t. 17 c.

SODIUM BICHROMATE—
Antwerp, 1 t. 17 c.

HULL.

Week ending September 18.

ALUM—
Sydney, 54 brls.

ALUMINA—
Seville, 13 brls.

AMMONIUM SULPHATE—
Oporto, 200 bgs.

CHEMICALS (*otherwise undescribed*)
Abo, 317 drms.; Antwerp, 5 drms.; Alexandria, 25 drms.; Bremen, 2 cs.; Bombay, 736 cs.; Christiania, 85 drms.; Copenhagen, 11 pkgs., 2 cks.; Christiania, 12 drms.; Ecuador, 7 cks.; Fiume, 100 bgs.; Genoa, 11 brls., 12 drms.; Gothenburg, 31 cs., 78 pkgs.; Hamburg, 8 cs.; Mantyluoto, 162 drms.; Melbourne, 13 cks.; Naples, 500 bgs.; Rouen, 3 cks., 10 bgs.; Rotterdam, 10 cks.; Wasa, 290 drms.

COAL TAR PRODUCTS—
Creosote
Bergen, 95 cks.; Copenhagen, 25 brls.; Genoa, 50 cks.
Pitch
Baltimore, 675 brls.
Bilbao, 3 cs.
Pyridine
Havana, 4 drms.
Tar
Copenhagen, 10 drms.
Stavanger, 5 cks.
Wasa, 50 cks.
Tar Oil
Lisbon, 75 drms.

DISINFECTANTS (*otherwise undes.*)
Ecuador, 5 brls.; Melbourne, 25 cs.; Oporto, 25 cs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Aalesund, 1 kg.; Copenhagen, 10 cs.; Stavanger, 2 kgs.

FERTILISERS (*otherwise undes.*)—
Baltimore, 3,913 bgs.
Copenhagen, 1 bg.

GLUE—
Antwerp, 10 cs. Christiania, 1 bg.

LEAD ASHES—
Antwerp, 16 bgs.

RED LEAD—
Stockholm, 20 cks.

SALT—
Copenhagen, 15 cs.

SALTCAKE—
Moss, 525 t.

SOAP—
Amsterdam, 500 cs.; Bergen, 1 ck.; Copenhagen, 1 cs.; Christiania, 500 cs.; Gothenburg, 15 cs.; Pt. Said, 30 drms.; Reykjavik, 23 cs.

STEARINE—
Newfairwater, 56 brls.
Reykjavik, 6 brls.

TANNING MATERIALS—
Unspecified
Melbourne, 94 cks.

TURPENTINE—
Alexandria, 4 drms.
Gothenburg, 28 cs.

LEITH.

Week ending September 22.

ALBUMEN—
Copenhagen, 8 cs.

AMMONIUM SULPHATE—
Moji, 6,000 bgs.
Yokohama, 8,000 bgs.

BITUMEN—
Amsterdam, 60 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 20 bgs.

CHLOROFORM—
Hamburg, 1 cs.

COAL TAR PRODUCTS—
Tar
Amsterdam, 175 drms.
Larnaca, 2 brls.

GLYCERINE—
Amsterdam, 12 drms.

IODINE—
Dunkirk, 2 cks.

MAGNESIA—
Amsterdam, 4 cs.

PARAFFIN WAX—
Amsterdam, 167 brls.; Dunkirk, 56 bgs.; Hamburg, 16 bgs.; Kobe, 997 brls.; Rouen, 208 bgs.

POTASSIUM BICHROMATE—
Dunkirk, 13 cks.; Rouen, 6 cks.

SOAP—
Sandevaag, 6 cs.

SODIUM BICHROMATE—
Rouen, 108 cks.

TALLOW—
Rotterdam, 20 cks.

TALLOW OIL—
Copenhagen, 50 trcs.

LIVERPOOL.

Week ending September 20.

ALUM—
Calcutta, 1 t., £16.
Sydney, 2 t. 1 c., £21.

ALUMINIUM SULPHATE—
Bombay, 2 t., £20.

AMMONIA—
Calcutta, 5 c., £14.
Jersey, 3 c., £20.

AMMONIUM CARBONATE—
Amsterdam, 2 t., £58.; Bahia, 19 c., £39.; Buenos Ayres, 1 t. 19 c., £90.; Bilbao, 1 t., £26.; Braila, 10 c., £12.; Calcutta, 10 c., £18.; Copenhagen, 10 c., £14.; Galatz, 10 c., £12.; Hamburg, 12 t. 16 c., £316.; Havana, 2 t., £57.; Marseilles, 2 t., £53.; New York, 11 t. 9 c., £347.; Pasages, 2 t. 9 c., £80.; Rotterdam, 1 t., £31.

AMMONIUM CHLORIDE—
Shanghai, 10 c., £18.

AMMONIUM CITRATE—
Bombay, 2 c., £25.

AMMONIUM SULPHATE—
Alicante, 123 t. 12 c., £1,684.; Kobe, 150 t., £2,550.; Lisbon, 20 t., £290.; Las Palmas, 31 t. 10 c., £457.; Tarragona, 148 t., £1,924.; Teneriffe, 50 t., £800.; Yokohama, 550 t., £9,074.

AMYL ACETATE—
Santos, 4 c., £28.

ANTIFOULING PAINT—
Amsterdam, 10 c., £30.; Piraeus, 1 t., £80.; Talcahuano, 19 t. 12 c., £1,617.; Valparaiso, 3 t. 12 c., £72.

BITUMEN—
Genoa, 41 t. 18 c., £799.

BLEACHING POWDER—
Calcutta, 15 t. 4 c., £183.; Cape Town, 1 t., £12.; Malaga, 5 t. 2 c., £53.; Tientsin, 10 t., £150.

BOILER COMPOSITION—
Colombo, 5 t., £30.
St. Kitts, 1 t. 10 c., £19.

BORAX—
Gijon, 5 t., £140.; Lagos, 4 c., £6.; Sydney, 4 t. 2 c., £111.; Sourabaya, 10 c., £13.

BORIC ACID—
Duala, 1 c., £3. 5s.; Karachi, 2 qr., £3.; Melbourne, 1 c., £4.; St. Johns (N.F.), 2 qr., £1. 15s.

CALCIUM CARBIDE—
Calabar, 1 c., £50.

CALCIUM CHLORIDE—
Rangoon, 20 t., £113.
Sydney, 1 t. 10 c., £45.

CARBONIC ACID GAS—
Lisbon, 7 c. 2 qr., £18.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 11 t., £575.; Auckland, 5 t. 1 c., £12.; Brisbane, 2 t., £84.; Dunedin, 10 c., £14.; Durban, 42 t. 3 c., £304.; Fremantle, 2 t., £80.; Hong Kong, 4 t. 3 c., £122.; Kotka, 30 t., £240.; Lisbon, 10 t., £63.; Melbourne, 4 t. 1 c., £139.; Newcastle, 1 t., £30.; Penang, 1 t., £12.; Rosario, 100 t. 3 c., £701.; Santos, 2 t., £21.; Shanghai, 4 t. 3 c., £131.; Sydney, 3 t. 5 c., £96.; Trinidad, 3 qr., £12.; Tientsin, 10 t., £250.; Wellington, 1 t., £28.

CHLORSULPHONIC ACID—
Switzerland, 4 t. 12 c., £130.

CITRIC ACID—
Fremantle, 3 c., £26.
Rangoon, 2 c., £32.

COAL TAR PRODUCTS—
Carbolic Acid
Calcutta, 1 c., £10.
Genoa, 2 t. 19 c., £400.
Hamburg, 10 t. 1 c., £1,219.
Creosote
New York, 1 t. 7 c., £41.
Perth, 1 t., £24.
Durban, 28 t. 8 c., £361.
Dinitrochlorbenzol
Riga, 80 t. 4 c., £6,315.
Mirbane Oil
Hobart, 4 c., £14.
Sydney, 4 c., £14.
Naphthalene
Lagos, 1 t., £16.
Pitch
Braila, 1 t. 8 c., £12.
Pyridine
New York, 10 t. 5 c., £1,863.
Tar
Accra, 1 t. 5 c., £15.
Bathurst, 2 t. 4 c., £20.
Winnebah, 11 c., £15.
Unspecified
Cape Town, 5 c., £111.
Durban, 2 c., £12.

COPPER SULPHATE—
Bombay, 4 t. 2 c., £107.
Galatz, 10 t., £268.
Sourabaya, 20 t., £496.

CREAM OF TARTAR—
Calcutta, 10 c., £42.
Cape Town, 10 c., £44.

DISINFECTANTS (*otherwise undes.*)
Calcutta, 2 t. 16 c., £105.; Demerara, 2 t. 5 c., £39.; Melbourne, 2 t. 5 c., £150.; Rio de Janeiro, 2 t. 2 c., £370.; Santos, 2 t. 19 c., £272.; Sekondi, 2 q., £14

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 5 t., £816.
New York, 1 t., £130.
Indigo
Dairen, 23 t. 16 c., £3,100.
Sydney, 2 t. 10 c., £397.
Tientsin, 40 t. 14 c., £5,301.
Unspecified
Algoa Bay, 6 c., £117.; Calcutta, 12 c. 2 qr., £762.; Genoa, 4 c. 2 qr., £37.; Kingston, 2 c., £25.; Lagos, 4 c. 1 qr., £70.; Launceston, 1 c., £14.; Melbourne, 1 t. 7 c. 2 qr., £608.; Montreal, 2 t. 15 c., £726.; Malacca, 1 c., £62.; Oporto, 1 t. 1 c., £181.; Rosario, 4 c., £170.; Pt. Swettenham, 1 c. 2 qr., £19.; Rio de Janeiro, 1 c., £17.; Santos, 1 t. 6 c., £585.; Sydney, 6 t. 11 c., £900.

DYESTUFFS (NATURAL)—
Cudbear
New York, 2 t. 5 c., £276.
Cutch
Bilbao, 1 t. 15 c., £50.

ESSENTIAL OILS (SYNTHETIC)—
Kobe, 9 c., £607.

FERTILISER (DRIED BLOOD)—
Colombo, 39 t. 15 c., £725.

GLYCERINE—
Antwerp, 10 c., £42.; Cape Town, 230 t. 7 c., £11,003.; Copenhagen, 3 t. 2 c., £207.; Delagoa Bay, 75 t., £6,375.; Kobe, 55 t. 7 c., £4,331.; Melbourne, 3 c., £15.; Pt. Elizabeth, 1 t., £94.

GUANO (FISH)—
Teneriffe, 10 t., £135.

HYDROFLUORIC ACID—
Bahia, 3 c., £18.; Beira, 5 c., £12.

IODOFORM—
Penang, 2 qr., £60.

IRON PERCHLORIDE—
Quebec, 1 t., £20.

LEAD NITRATE—
Fremantle, 2 t. 10 c., £103.

MAGNESIA—
Marmagoa, 5 c., £40.
Rosario, 5 c., £37.

MAGNESIA (CALCINED)—
Lisbon, 2 qr., £15.

MAGNESIUM CARBONATE—
Bombay, 1 t., £38.; Brisbane, 1 t., £14.; Calcutta, 2 t., £66.; Valparaiso, 3 c., £12.

MAGNESIUM CHLORIDE—
Rangoon, 2 t. 5 c., £19.

MAGNESIUM SULPHATE—
Beira, 10 c., £5.; Bluefields (Nicaragua), 5 c., £6. 15s.; Cartagena (Col.), 2 t. 3 c., £32. 10s.; Champerico, 6 c., £4. 5s.; Duala, 3 c., £3. 5s.; Durban, 5 c., £3.; Demerara, 1 t., £7.; Falklands, 1 qr., £1.; Karachi, 14 c., £22.; Koko, 1 c. 2 qr., £1. 10s.; Kingston, 1 c., £1. 5s.; Pt. Harcourt, 7 c., £9.; St. Johns (N.F.), 1 c., £1. 5s.

METHYL ALCOHOL—
Calicut, 2 qr., £17.

NAPHTHA (WOOD)—
Durban, 1 t. 15 c., £159.

NICKEL SULPHATE—
Buenos Ayres, 2 t. 3 c., £84.

NITRIC ACID—
Beira, 12 c., £35.

PHOSPHORIC ACID—
Hobart, 2 t., £210.

PHOSPHORUS (AMORPHOUS)—
Durban, 1 t. 7 c., £318.

PITCH (*otherwise undescribed*)—
Antwerp, 10 t. 2 c., £183.

POTASSIUM BICHROMATE—
Alexandria, 12 t., £575.

POTASSIUM CITRATE—
Bombay, 3 c., £45.

POTASSIUM CYANIDE—
Buenos Ayres, 6 c., £60.
Lagos, 2 qr., £21.
Montreal, 9 c., £59.

POTASSIUM IODIDE—
Accra, 1 c. 2 qr., £42.; Duala, 37½lb., £40.; Penang, 2 qr., £46.

POTASSIUM PRUSSIATE—
Hamburg, 10 t. 1 c., £1,136.
Oporto, 8 c., £58.
San Francisco, 1 t. 2 c., £120.

SALAMMONIAC—
Singapore, 9 c., £26.

SALTPETRE—
Bahia, 1 t., £48.

SHEEP DIP—
Algoa Bay, 3 t. 16 c., £289.; Bombay, 5 c. 2 qr., £52.; Buenos Ayres, 29 t. 5 c., £1,554.; Brisbane, 2 t. 7 c., £87.; Commodoro Rivadavia, 18 t. 13 c., £1,225.; Durban, 11 t. 14 c., £818.; Napier, 2 t. 7 c., £87.; Puerto Deseado, 11 t. 14 c., £437.; Punta Arenas (Chile), 3 t. 7 c., £223.; Puerto Colombia, 4 c., £20.

SHEEP DIP—
Pt. Stanley, 7 t. 17 c., £477.
Santa Cruz (Arg.), 4 t. 9 c., £375.

SUPERPHOSPHATE—
Las Palmas, 9 t. 15 c., £63.

SUPERPHOSPHATE (BONE)—
Orotava, 5 t., £33.

TANNING MATERIALS—
Unspecified
Algoa Bay, 7 t. 14 c., £145.; Antwerp, 11 t., £307.; Auckland, 1 t. 13 c., £103.; Cape Town, 10 t. 2 c., £176.; Copenhagen, 3 t. 8 c., £77.; Durban, 1 t. 2 c., £23.; Dantzig, 2 t., £121.; East London, 13 c., £17.; Hamburg, 4 t., £257.; Melbourne, 2 t. 11 c., £80.; Mossel Bay, 10 t. 4 c., £179.; Stavanger, 2 t., £64.

TARTARIC ACID—
Adelaide, 2 t., £252.; Fremantle, 2 c., £13.; Melbourne, 3 t., £379.; Rangoon, 3 c., £34.; Sydney, 1 t., £124.; St. Johns (N.F.), 2 c., £20.

TIN OXIDE—
Buenos Ayres, 4 t., £850.
Kobe, 14 c., £170.

WOOD PRESERVATIVE—
Algoa Bay, 18 c., £31.
Talcahuano, 1 t. 14 c., £34.

ZINC CHLORIDE—
Shanghai, 3 t., £84.

ZINC OXIDE—
Hamburg, 1 t., £76.

Week ending September 21.

CALCIUM CHLORATE—
Brisbane, 38 pkgs.
Melbourne, 70 pkgs.

CAUSTIC POTASH—
Alexandria, 41 drms.

CAUSTIC SODA—
Aarhus, 15 drms.: Antofagasta, 28 drms.; Adelaide, 170 drms.; Arica, 24 drms.: Bari, 17 drms.; Batavia, 30 drms.; Belawan, 30 drms.; Beyrout, 25 drms.; Bombay, 25 drms.; Brisbane, 32 drms.; Calicut, 110 pkgs.; Christiania, 105 pkgs.: Callao, 18 drms.; Cannanore, 50 drms.; Carupano, 21 pkgs.: Cochin, 100 pkgs.; Durban, 98 drms.; Corral, 50 pkgs.; Fremantle, 59 cs.; Genoa, 5 drms.; Hamburg, 508 drms.; Helsingfors, 240 drms.; Hong Kong, 84 drms.; Jaffa, 35 drms.; Karachi, 100 drms.; Kobe, 1,835 drms.; Lagos, 40 drms.; La Guaira, 73 pkgs.; Melbourne, 50 cs., 155 pkgs.; Monte Video, 100 drms.; Newcastle, 90 drms.; Oporto, 34 drms.; Pt. Said, 10 cs., 17 drms.; Rangoon, 74 drms.; Rio de Janeiro, 501 drms.; Riga, 50 drms.; Rockhampton, 10 cs.; Rosario, 102 drms.; Rotterdam, 42 drms.; Shanghai, 504 drms.; Sierra Leone, 8 cs.; Singapore, 75 drms.; Stockholm, 14 drms.; Suva, 11 cs.; Sydney, 118 drms., 150 cs.; Valparaiso, 77 drms.; Yokkaichi, 161 drms.; Zanzibar, 73 drms.

FERRO MANGANESE—
Baltimore, 669 t.; Durban, 5 t.; Gefle, 400 t.; Gothenburg, 10 t.; Los Angeles, 105 t.: Lyttleton, 4 t.; Montreal, 10 t.; New Orleans, 50 t.: Norrkoping, 20 t.; San Francisco, 175 t.

FERRO NICKEL—
Gothenburg, 3 cs.

GLUE, SIZE, AND GELATINE—
Antwerp, 3 pkgs.; Auckland, 27 pkgs.: Barcelona, 1 cs.; Boston, 100 cks.; Bombay, 209 cks.; Calcutta, 35 pkgs.; Colombo, 10 pkgs.: Copenhagen, 2 pkgs.; Guayaquil, 10 pkgs.; Hong Kong, 20 pkgs.: Melbourne, 50 pkgs.: Melilla, 10 bgs.; Montreal, 15 brls., 40 bgs.; Penang, 6 pkgs.: San Francisco, 20 dble. bgs.; Shanghai, 100 bgs.; Sydney, 10 pkgs., 4 bls.

LEAD (ANTIMONIAL)—
Sydney, 5 t.

MANGANESE ORE—
Melbourne, 6 t.

PARAFFIN WAX—
Famagusta, 16 bgs.
Maracaibo, 30 bgs.

SALT—
Accra, 4 t.; Axim, 15 t.; Auckland, 521 t.; Barbados, 4 t.; Buenos Ayres, 50 t.; Brisbane, 31 t.; Burutu, 39 t.; Calcutta, 5,450 t.; Delagoa Bay, 1 t.; Demerara, 59 t.; Dunedin, 145 t.; Durban, 5 t.; Fremantle, 41 t.; Ghent, 100 t.; Halifax (N.S.), 23 t.; Horsens, 30 t.: Iddo, 264 t.; Koko, 23 t.; Kingston (Ja.), 50 t.; Lyttleton, 155 t.; Montreal, 339 t.; Newcastle, 15 t.; Norrkoping, 125 t.; Onitsha, 24 t.; Pt. Stanley, 2 t.; Puerto Novo, 31 t.; Rio de Janeiro, 48 t.; Sapele, 43 t.; Sherbro, 38 t.; Sourabaya, 2 t.; St. Johns (N.F.), 9 t.; Stockholm, 10 t.; Sydney, 100 t.: Warri, 22 t.; Wellington, 293 t.

SOAP—
Addah, 100 pkgs.; Akyab, 100 pkgs.; Alexandria, 738 pkgs.; Amboina, 100 pkgs.; Antigua, 52 pkgs.; Arica, 50 pkgs.; Auckland, 80 bxs.; Bandjermassin, 90 cs.: Barbados, 425 pkgs.; Bangkok, 1,823 pkgs.: Barcelona, 6 pkgs.; Batavia, 150 cs.; Beira, 11 cs.; Black River, 50 brls.; Bombay, 3,878 pkgs.; Bourgas, 200 cs.; Buenos Ayres, 1,142 pkgs.; Burutu, 18 cs.; Callao, 150 pkgs.; Canea, 14 pkgs.; Cochin, 10 pkgs.: Colombo, 547 pkgs.; Christchurch, 20 pkgs.; Calcutta, 559 bxs.; Colon, 610 pkgs.; Commodoro Rivadavia, 51 bxs.; Constantinople, 536 bxs.; Cochin, 55 pkgs.; Demerara, 3,467 pkgs.: Dunedin, 60 pkgs.; Durban, 579 pkgs.; Eloby, 10 pkgs.; Ghent, 100 t.; Gisborne, 10 t.; Gothenburg, 256 pkgs.: Gorontalo, 100 pkgs.; Guayaquil, 4 pkgs.; Half Assinee, 150 pkgs.; Hong Kong, 168 pkgs.; Iddo, 52 bxs.; Jaffa, 12 pkgs.; Karachi, 490 bxs.; Kingston (Ja.), 110 bxs.; Lagos, 362 bxs.; Las Palmas, 2 bxs.; Leghorn, 250 pkgs.; Malta, 25 pkgs.; Marmagoa, 314 pkgs.; Menado, 50 cs.; Melbourne, 5 cs.; Mollendo, 6 cs.; Monte Video, 40 cs.; Oamaru, 2 cs.; Panama, 225 bxs.; Penang, 6 cs.; Perim, 2 cs.; Pt. Said, 618 pkgs.; Pt. Sudan, 4 cs.; Punta Arenas, 1 cs.; Rangoon, 1,662 pkgs.; Rio de Janeiro, 3 cs.; Rotterdam, 2 cs.; Rouen, 5 bxs.; Salonica, 500 cs.; Sandakan, 60 bxs.; Santos, 3 cs.; Sarawak, 20 cs.; Sekondi, 94 cs.; Shanghai, 1,666 pkgs.; Sierra Leone, 3 cs.; Singapore, 2,041 pkgs.; Sherbro, 31 cs.; Sourabaya, 815 cs.; St. Lucia, 1 cs.; Stockholm, 250 cs.; Talcahuano, 25 cs.; Teneriffe, 131 bxs.; Tandjong Balci, 400 bxs.; Timaru, 160 cs.; Trinidad, 1,773 pkgs.; Tumaco, 302 pkgs.; Valparaiso, 14 cs.; Victoria (B.C.) 300 bxs.; Wellington, 714 cs.; Warri, 10 pkgs.; Yokohama, 1 cs.; Zanzibar, 8 pkgs.

SODA ASH—
Adelaide, 187 cs., 363 bgs.; Bombay, 3,000 bgs.; Brisbane, 78 pkgs.; Buenos Ayres, 484 cks.; Calicut, 1,000 bgs.; Calcutta, 4,800 bgs.; Cochin, 1,000 pkgs.; Copenhagen, 200 pkgs.; Hong Kong, 2,800 pkgs.; Kobe, 13,676 pkgs.; Marmagoa, 300 bgs.; Melbourne, 263 pkgs., 1,362 bgs.; Moji, 350 bgs.; New Orleans, 1,450 bgs.; Rio de Janeiro, 288 bgs.; Riga, 150 pkgs.; Santos, 301 pkgs.; Shanghai, 2,800 bgs.; Singapore, 125 cks.; Sydney, 460 cks., 251 bgs.; Yokkaichi, 1,082 bgs.

SODA CRYSTALS—
Demerara, 13 pkgs.; Puerto Stephens, 1 pkg.; Punta Arenas, 10 pkgs.; Sourabaya, 55 kgs.

SODIUM ARSENITE—
Rouen, 4 cks.

SODIUM BICARBONATE—
Adelaide, 72 pkgs.; Barcelona, 20 cs.; Brisbane, 109 pkgs.; Champerico, 20 pkgs.; Kobe, 3,662 pkgs.; Demerara, 30 pkgs.; Genoa, 113 pkgs.; Leghorn, 200 pkgs.; Melbourne, 1,162 pkgs.; Oporto, 9 pkgs.; Perth, 154 pkgs.; Rangoon, 250 pkgs.; Reval, 200 pkgs.; Rosario, 20 pkgs.; Santos, 200 kgs.; Sydney, 413 bgs., 139 drms., 252 kgs.; Trieste, 50 kgs.; Trinidad, 90 kgs.

SODIUM BISULPHITE—
Callao, 20 pkgs.
Colombo, 140 pkgs.
Danzig, 10 pkgs.

SODIUM CYANIDE—
Cuidad Bolivar, 22 cs.

SODIUM FLUORIDE—
Sydney, 5 cks.

SODIUM HYDROSULPHITE—
Gothenburg, 31 pkgs.
Sydney, 120 kgs.

SODIUM PHOSPHATE—
Danzig, 3 pkgs.

SODIUM PRUSSIATE—
Genoa, 19 cks.; Kobe, 100 pkgs.

SODIUM SILICATE—
Boston, 50 cks.; Callao, 20 pkgs.; Catania, 20 pkgs.; Calcutta, 85 pkgs.: Fremantle, 52 pkgs.; Genoa, 32 pkgs.; Pt. Said, 17 pkgs.; Rangoon, 19 pkgs.; Rio de Janeiro, 33 pkgs.; Sydney, 229 bgs.; Shanghai, 48 cks.; Tripoli (Syria), 16 cks.

SODIUM SULPHIDE—
Cannanore, 50 drms.; Durban, 17 pkgs.; Genoa, 82 pkgs.; Lisbon, 14 pkgs.; Rio de Janeiro, 20 drms.; Sydney, 78 drms.

STEARINE—
La Guaira, 14 pkgs.
Shanghai, 5 bgs.

TALLOW—
Alexandria, 6 brls.

WAX (*otherwise undescribed*)—
Barcelona, 2 cs.

LONDON.

Week ending September 19.

ACETIC ACID—
Brisbane, 10 cs., £35.; Callao, 1 cs., £5.; Comodora Rivadavia, 2 cs., £9.; Fremantle, 2 cs., £6.; East London (F.), 3 cs., £9.; Melbourne, 6 cs., £18.; Sydney, 10 cs., £35.

ACETONE—
Antwerp (F.), 4 drms., £114.

ACETYL SALICYLIC ACID—
Amoy, 1 cs. (pt.), £10.; Melbourne, 1 cs., £17.; Shanghai, 2 cs. (pt.), £8.; Singapore, 1 cs. (pt.), £5.

AMMONIA—
Alexandria, 4 cs., £7.; Beira, 7 cs., £17.; Bombay, 12 cs., £21.; Italy, via Boulogne, 4 cs., £7.; Calcutta, 34 cs., £60.; Cape Town, 4 cs., £7.: Colombo, 2 cs. (pt.), £10.; Delagoa Bay, 4 cs., £9.; Durban, 28 cs., £51.; Madras, 19 cs., £31.; Pt. Elizabeth, 13 cs., £22.; Rio de Janeiro, 8 cs., £14.; Rotterdam, 4 cs., £12.; Shanghai, 10 cs., £17.; Zanzibar, 3 cs., £8.

AMMONIA (ANHYDROUS)—
Iddo, 6 cs., £24.; Penang, 9 cylds., £44.; Pulo Samboe, 3 cylds., £23.; Rio de Janeiro, 2 cylds., £18.; Sarawak, 1 cyld., £8.

AMMONIUM BIFLUORIDE—
Paris, (F.), 1 ck., £14.

AMMONIUM BROMIDE—
Adelaide, 1 cs., £5.
Wellington, 1 cs., £5.

AMMONIUM CARBONATE—
Barcelona, 1 t., £35.; Berbice, 2 c., £9.; Brussels, 2 t., £56.; Calcutta, 5 c., £18.; Colombo, 5 c., £20.; Durban, 5 c., £9.; Dunedin, 2 c., £5.; Hong Kong, 5 c., £16.; Madras, 2 c., £8.; Paita, 3 c., £10.; Palembang, 6 c., £19.; Penang, 4 c., £12.; Trinidad, 1 c., £5.

AMMONIUM MOLYBDATE—
Calcutta, 2 cs., £50.

AMMONIUM NITRATE—
Dunkirk, 20 t. 2 c., £200.
Perth, 2 c., £14.

AMMONIUM SULPHATE—
Colombo, 100 t., £1,450.; Demerara, 70 t., £1,055.; Dunkirk, 41 t. 10 c., £593.; Jamaica, 100 t., £1,450.; Las Palmas, 5 t., £74.

ANTIMONY OXIDE—
Paris, 13 cks., £163.
Rouen, 3 cks., £38.

ANTIMONY SULPHIDE—
Brussels, 2 cks., £19.; Gothenburg, 7 cks., £144.; Hamburg, 14 cks., £123.; Los Angeles, 30 cks., £283.; Osaka, 10 cks., £166.; Singapore, 5 cks., £48.; Rotterdam, 1 kg., £7.; Sydney, 42 pkgs., £581.

ARSENIC—
New York, 20 kgs., £112.
Penang (F.), 2 drms., £12.

BARIUM PEROXIDE—
Rotterdam, 30 drms., £446.

BARIUM SULPHATE (BLANC FIXE)—
Paris, 50 bgs., £100.

BISMUTH CARBONATE—
Adelaide, 1 cs., £71.
Melbourne, 1 cs., £72.

BISMUTH CITRATE—
Melbourne, 1 cs., £33.

BISMUTH SALICYLATE—
Adelaide, 1 cs. (pt.), £7.

BISMUTH SALTS (*otherwise undes.*)
Amoy, 1 cs. (pt.), £41.
Calcutta, 3 cs., 1 cs. (pt.), £134.
Melbourne, 1 cs. (pt.), £54.

BISMUTH SUBNITRATE—
Adelaide, 1 cs. (pt.), £30.
Perth, 1 cs. (pt.), £8.

BITUMEN—
Dunkirk, 50 drms., £30.
Mauritius, 3 brls., £10.
Singapore, 40 brls., £100.

BONE FERTILISER—
Hamburg, 10 t., £180.

BONE SUPERPHOSPHATE—
Las Palmas, 5 t., £30.

BORAX—
Antwerp, 6 t. (F.), £147.; Switzerland, via Antwerp, 5 c., £26.; Beira, 3 c., £5.; Buenos Aires, 2 c., £7.; Callao, 2 c., £5.; Colon, 3 c., £5.; Malta, 3 c., £5.; Panama, 4 c., £7.; Pt. Elizabeth, 6 c., £16.; Rotterdam, 2 t. (F.), £52.

BORIC ACID—
Batoum, 2 c., £6.; Calcutta, 1 t., £74.; Canton, 2 c., £8.; Cape Town, 3 c., £10.; Hong Kong, 2 c., £6.; Limon, 2 c., £6.; Melbourne, 2 c., £6.; Shanghai, 5 c., £16.

CALCIUM CARBIDE—
Basra, 5 t., £50.; Beira, 3 c., £6.; Jamaica, 4 c., £7.; Kilindini, 5 t. 3 c., £80.; Pt. Harcourt, 16 c., £59.; Sekondi, 2 t. 10 c., £42.; Singapore, 2 t., £33.

CALCIUM CHLORIDE—
Aden (F.), 3 t. 13 c., £22.; Rio de Janeiro, 11 c., £5.; Singapore, 2 c., £6.

CALCIUM GLYCEROPHOSPHATE
Melbourne (F.), 1 cs. (pt.), £8.
Perth, 1 cs. (pt.), £7.

CAUSTIC POTASH—
Adelaide (F.), 1 cs. (pt.), £6.

CAUSTIC SODA—
Kilindini, 5 c., £11.
Townsville, 1 t., £41.

CHEMICALS (*otherwise undescribed*)
Adelaide, 12 cs. (pt.), £38.; Alleppey, 9 pkgs., £23.; Antwerp, 4 cs., £11.; Switzerland, via Antwerp, 50 pkgs., £125.; Auckland, 20 pkgs. (pt.), £237.; Bagdad, 1 cs., £13.; Barcelona, 20 pkgs. (F.), £50.; Beira, 7 pkgs., £20.; Bluff, 6 pkgs., £9.; Bombay, 39 pkgs. (pt.), £304.

CHEMICALS (*otherwise undescribed*)
Calcutta, 26 pkgs. (pt.), £134.; Callao, 4 pkgs. (pt.), £35.; Canterbury, 2 cs., £37.; Canton, 3 pkgs., £7.; Christchurch, 6 pkgs., £15.; Christiania, 22 pkgs., £57.; Christiania, 7 pkgs. (F.), £32.; Colombo, 11 cs., £27.; Constantinople, 1 cs. (pt.), £7.; Cristobal, 2 cs., £7.; Dantzig, 150 pkgs., £368.; Demerara, 13 pkgs., £7.; Dunedin, 2 cs. (pt.), £7.; Durban, 8 cs., £20.; East London, 14 cs., £12.; East London, 1 drm. (F.), £7.; Fremantle, 6 cs., £31.; Gothenburg, 13 pkgs. (F.), £19.; Hamburg, 100 pkgs., £246.; Inhambane, 2 cs., £32.; Kilindini, 4 cs. (pt.), £12.; Kobe, 4 cs., £116.; Lagos, 2 pkgs., £17.; Launceston, 1 pkg., £5.; Limon, 2 kgs., £7.; Lourenco Marques, 6 pkgs., £9.; Madras, 7 pkgs., (F.), £18.; Madras, 47 pkgs. (pt.), £103.; Mauritius, 15 cs., £18.; Melbourne, 66 pkgs. (pt.), £694.; New York, 2 cs. (pt.), £17.; Otago, 5 cs., £18.; Panama, 12 pkgs. (pt.), £21.; Perth, 2 pkgs. (pt.), £6.; Pt. Elizabeth, 15 pkgs. (pt.), £414.; Rio de Janeiro, 3 pkgs. (pt.), £8.; Rangoon, 40 pkgs., £49.; Rotterdam, 110 pkgs., £271.; Shanghai, 7 pkgs. (pt.), £27.; Singapore, 14 pkgs. (pt.), £118.; Sydney, 18 cs. (pt.), £514.; Valencia, 20 pkgs., £50.; Wellington, 4 cs., £12.

CITRIC ACID—
Amsterdam, 5 c. (F.), £30.; Cape Town, 10 c. (F.), £96.; Colombo, 1 c., £10.; Lisbon, 3 c. (F.), £27.; Malta, 2 c., £18.; Melbourne, 10 c., £91.; Rio Gallegos, 1 c., £7.; Toronto, 2 c., £25.

COAL TAR PRODUCTS—
Benzol
Hamburg, 14 drms., £151.
Carbolic Acid
Beira, 1 cs. (pt.), £6.
Canton, 4 cs., £17.
Creosote Oil
Beira, 50 drms., £22.
Mirbane Oil
Lyttleton, 1 brl., £15.
Naphthalene
Adelaide, 5 cs., £16.; Beira, 20 brls., £11.; Buenos Aires, 1 cs., £6.; Lagos, 2 cs., £7.; Sydney, 20 cs., £50.
Pitch
Alexandria, 94 cks., £185.; Demerara, 20 firkins, £28.; Genoa, 10 brls., £30.; Kilindini, 2 cks., £6.; Mauritius, 15 brls., £37.; Nantes, 990 t., £5,198.
Tar
Beira, 295 drms., £67.; Calcutta, 3 brls., £8.; Cape Town, 42 drms., £6.; Delagoa Bay, 50 drms., £29.; Dunedin, 20 drms., £10.; East London, 55 pkgs., £31.; Kilindini, 22 drms., £12.; Mauritius, 25 pkgs., £74.; Zanzibar, 5 brls., £15.

COBALT ACETATE—
Sydney, 1 kg., £30.

COBALT OXIDE—
Amsterdam (F.), 1 cs., £88.; Melbourne, 1 cs. (pt.), £7.; Rotterdam (F.), 1 cs., £22.; Rotterdam, 2 cs., £90.

COBALT SULPHATE—
Brussels (F.), 2 cks., £82.

COPPER CARBONATE—
Copenhagen, 2 cs., £23.

COPPER SULPHATE—
Durban, 10 c., £15.

COPPERAS—
Shanghai, 3 cks., £5,

CREAM OF TARTAR—
Auckland, 1 t., £86.; Beira, 1 c., £6.; Bombay, 1 c. (F.), £5.; Bombay, 1 c., £9.; Calcutta, 1 c. (F.), £9.; Colombo, 2 c., £11.; Durban, 1 c., £5.; East London, 1 c. (F.), £7.; Hong Kong, 1 c. (F.), £6.; Malta, 1 c., £5.; Montreal (tranist), 7 t. 2 c. (F.) £572.

CREAM OF TARTAR—
Pt. Elizabeth, 2 c., £12.; Pt. Elizabeth, 4 c. (F.), £28.; Sydney, 10 c., £45.; Winnepeg, 13 c., £64.

DISINFECTANTS (*otherwise undes.*)
Acajutla, 11 c., £19.; Ascension, 2 c., £9.; Auckland, 2 c., £24.; Bangkok, 5 t. 13 c., £393.; Basra, 1 t. 2 c., £46.; Batavia, 16 c., £45.; Beira, 3 c., £13.; Belewan, 2 t. 5 c., £67.; Berbice, 4 c., £8.; Bombay, 11. 2 c., £29.; Calcutta, 10 c., £50.; Canton, 1 t., £30.; Cape Town, 3 t. 18 c., £128.; Christchurch, 2 t. 9 c., £441.; Colombo, 2 t. 1 c., £81.; Demerara, 14 c., £17.; Dixcove, 3 c., £8.; Duala, 5 c., £9.; Dunedin, 3 c., £39.; Durban, 19 t. 7 c., £663.; Gibraltar, 4 c., £7.; Hong Kong, 4 t. 12 c., £180.; Jamaica, 2 c., £12.; Karachi, 18 c., £23.; Kilindini, 2 t. 8 c., £69.; Lagos, 10 c., £20.; Libau, 4 c., £5.; Limon, 2 c., £12.; Malta, 3 c., £46.; Medan, 2 t. 12 c., £109.; Melbourne, 1 c., £8.; Mombasa, 2 c., £6.; Montreal, 1 c., £8.; Penang, 2 t., £57.; Paris, 7 t. 12 c., £98.; Pt. Elizabeth, 4 t. 15 c., £187.; Pt. Swettenham, 1 t. 17 c., £16.; Rangoon, 5 c., £12.; Rio de Janeiro, 2 t. 10 c., £44.; Shanghai, 6 t. 9 c., £274.; Singapore, 5 c., £13.; Timaru, 5 c., £30.; Trinidad, 4 c., £6.; Wellington, 4 c., £5.; Zanzibar, 1 c., £5.

DYESTUFFS (ARTIFICIAL)—
Nigrosine
Perth, 1 cs., £10.
Unspecified
Auckland, 3 pkgs., £23.; Dunedin, 1 kg., £20.; Genoa, 37 pkgs., £150.; Jamaica, 3 cs. (pt.), £24.; Melbourne, 4 pkgs., 4 cs., £612.; New York, 1 cs. (pt.), £8.; Sydney, 3 pkgs., £53.; Wellington, 2 kgs., £33.

ETHER—
Canton, 6 cs., £25.; New York, 1 cs., £7.; Singapore, 2 cs., £9.

ETHYL CHLORIDE—
Auckland, 1 cs., £9.
Durban, 1 c., £15.

FERTILISERS (*otherwise undes.*)
Brisbane, 6 c., £40.; Channel Islands, 15 t., £108.; Demerara (F.), 68 t. 14 c., £1,116.

FORMALDEHYDE—
Shanghai, 1 ck., £23.

GALLIC ACID—
Calcutta, 1 cs. (pt.), £5.

GLYCERINE—
Buenos Aires, 2 c., £12.; Calcutta, 1 cs., £7.; Canton, 4 c., £19.; Comodoro Rivadavia, 1 c., £6.; Jamaica, 1 c., £8.; New York, 2 c., £16.

HYDROCHLORIC ACID—
Bahia, 7 c., £18.; Colombo, 7 c., £8.; Durban, 12 c., £21.; Madras, 10 c., £49.; Pt. Said, 3 c., £7.

HYDROCYANIC ACID—
Calcutta, 1 cs., £15.

HYDROFLUORIC ACID—
Shanghai, 1 cs., £6.; Singapore, 1 cs., £6.; Tokio, 2 cs., £29.

HYDROGEN PEROXIDE—
Colombo, 5 cs., £38.; Melbourne, 5 cs., £38.; Singapore, 3 cs., £10.

HYPOPHOSPHOROUS ACID—
New York, 6 crbys., £72.

IODIDES (*otherwise undescribed*)—
Calcutta, 1 cs. (pt.), 1 cs., £121.
Hong Kong, 1 cs. (pt.), £37.

IODINE—
Antwerp, 2 cs., £207.; Calcutta, 2 cs. (pt.), £52.; Melbourne, 1 cs., £54.

IODINE (RESUBLIMED)—
Adelaide, 1 cs. (pt.), £53.; Bombay, 2 cs., £216.; Genoa, 3 cs., £310.; Lyttleton, 1 cs., £27.; Melbourne, 1 cs., £27.; Perth, 1 cs (pt.), £26.

IRON AMMONIUM CITRATE—
Madras, 1 cs., £7.
Montreal, 4 cs., £72.

IRON PERCHLORIDE—
Bangkok, 3 cs., £121.

IRON PHOSPHATE—
Shanghai, 1 cs., £18.

IRON SULPHATE—
Bombay, 8 cks., £28.

KIESELGUHR—
Rio de Janeiro (F.), 14 c., £13.
Santos (F.), 12 c., £10.

LEAD ACETATE—
Alexandria, 2 cs. (pt.), £9.; Callao, 2 cks., £7.; Madras, 9 kgs., £19.

LEAD NITRATE—
Calcutta, 1 ck., £31.

LITHIUM IODIDE—
Shanghai, 1 cs. (pt.), £6.

MAGNESIA—
Brisbane, 2 cs., £9.
Otago, 6 cs., £14.
Sydney, 35 cs., £84.
Wellington, 30 cs., £72.

MAGNESIA (CALCINED)—
Panama, 2 cs., £9.
Rio de Janeiro, 3 cs., £39.

MAGNESIUM CARBONATE—
Bombay, 10 cs., £17.; Dunedin, 2 cs., £7.; Melbourne, 1 cks., £7.; Rio de Janeiro, 2 cs., £9.

MAGNESIUM SULPHATE—
Barbados, 18 c., £29.; Bluff, 16 c., £19.; Bombay, 1 t. 11 c., £43.; Brisbane, 7 t. 10 c., £168.; Cape Town, 6 c., £8.; Colom, 5 c., £6.; Cristobal, 1 t. 5 c., £35.; Dunedin, 3 t. 16 c., £95.; East London, 18 c., £25.; Hobart, 1 t., £25.; Launceston, 1 t. 5 c., £28.; Maryborough, 5 c., £6.; Melbourne, 11 t., £251.; Mombasa, 10 c., £12.; Pt. Elizabeth, 8 c., £13.; Sydney, 4 t. 18 c., £110.; Victoria, B.C., 3 c., £5.; Wellington, 5 c., £10.

MANGANESE DIOXIDE—
Auckland, 4 cks., £14.

MERCURIALS (*otherwise undes.*)—
Amoy, 1 cs. (pt.), £6.; Calcutta, 1 cs., £23.; Melbourne, 2 cs. (pt.), £18.

MERCURY BICHLORIDE—
Penang, 1 cs., £17.

MERCURY SUBCHLORIDE—
Adelaide, 1 cs. (pt.), £13.

METHYL ACETONE—
Paris (F.), 3 drms., £70.

METHYL SALICYLATE—
Alexandria, 2 cs. (pt.), £12.
Bangkok, 16 cs. (pt.), £83.

NITRIC ACID—
Colombo, 7 c., £29.; Madras, 9 c., £50.; Padang, 5 c., £24.

PALLADIUM CHLORIDE—
Fredrikstad, 1 cs., £120.

PHOSPHORIC ACID—
Lyttleton, 2 cs., £30.; Melbourne, 4 cs., £11.; Pt. Elizabeth, 1 cs., £6.; Quebec, 1 cs., £5.; Saigon, 2 cs., £6.

PHOSPHORUS—
Sydney, 8 cs., £69.

POTASH (*otherwise undescribed*)—
Sydney, 2 cs., £23.

POTASSIUM ACETATE—
Calcutta, 1 cs., £5.

POTASSIUM BICARBONATE—
Colombo, 7 cs., £29.; Calcutta, 1 cs., £6.; Cape Town (F.), 2 kgs., £5.; Melbourne, 2 cks., £15.; Rangoon, 2 cs., £6.

POTASSIUM BINOXALATE—
Adelaide, 1 kg., £7.

POTASSIUM BROMIDE—
Auckland (F.), 2 cs., £6.; Adelaide, 20 cs., £75.; Calcutta, 1 cs., £8.; Colombo, 6 cs., £33.; Melbourne, 1 ck., £9.

POTASSIUM CARBONATE—
Beira, 6 kgs., £17.; Durban (F.), 4 kgs., £9.; Melbourne, 1 ck., £6.; Melbourne (F.), 1 cs., £5.; Shanghai, 2 pkgs., £7.

POTASSIUM CHLORATE—
Beira, 18 kgs., £56.
Calcutta, 3 c., £6.

POTASSIUM CITRATE—
Bombay, 4 cs., £50.; Calcutta, 5 cs., 4 cs. (pt.), £107.; Colombo, 2 cs., £18.; Melbourne, 2 cs. (pt.), £14.

POTASSIUM CYANIDE—
Beira, 5 cs., £42.; Canterbury, 2 cs., £17.; Shanghai, 4 cs., £47.; Singapore, 1 cs., £7.; Swatow, 2 cs., £33.

POTASSIUM IODIDE—
Accra, 1 cs., £21.; Addah, 3 cs., £50.; Adelaide, 1 cs., £88.; Antwerp, 1 cs., £86.; Bangkok, 3 cs., £260.; Calcutta, 2 cs. 4 cs. (pt.), £483.; Dixcove, 1 cs., £17.; Hong Kong, 1 cs. (pt.), £45.; Genoa, 2 cs., £173.; Lyttleton, 1 cs., £88.; Melbourne, 2 pkgs., 2 cs. (pt.), £235.; Perth, 1 cs., £88.; Pt. Elizabeth, 1 cs., £20.; Quittah, 1 cs., £8.; Rotterdam, 2 cs., £190.; Rio de Janeiro, 4 cs., £363.; Sekondi, 1 cs., £10.; Shanghai, 2 cs., £175.; Wellington, 1 cs., £88.; Zanzibar, 1 cs. (pt.), £7.

POTASSIUM METABISULPHITE—
Sydney, 1 kg., £5.

POTASSIUM PERMANGANATE—
Buenos Aires, 1 cs. (pt.), £5.
Melbourne (F.), 1 kg., £5.

POTASSIUM PRUSSIATE—
Otago, 1 kg., £7.
Reval, 49 cks., £1,306.

POTASSIUM SULPHATE—
Las Palmas, 1 t., £12.

PRUSSIAN BLUE—
Christiania, 2 cks., £104.

PYROGALLIC ACID—
Paris, 2 cs., £70.
Quebec, 1 cs., £5.

ROCHELLE SALTS—
Vera Cruz, 3 c., £12.

SALAMMONIAC—
Dunedin, 2 kgs., £6.
Wellington, 2 kgs., £6.

SALICYLIC ACID—
Adelaide, 2 cs., £28.; Cape Town, 1 cs., £12.; Jamaica, 1 cs. (pt.), £6.; Melbourne, 4 cs., £46.; Pt. Swettenham, 1 cs., £13.

SALTPETRE—
Adelaide, 4 t., £463.; Auckland, 10 c., £20.; Bluff, 4 c., £9.; Cape Town, 6 c. (F.), £10.; Cape Town, 5 c., £11.; Colombo, 10 c., £20.; Dunedin, 2 t. 10 c., £99.; Durban, 2 t. 5 c., £93.; Limon, 2 c., £5.; Rio de Janeiro, 5 c., £10.; Timaru, 5 c., £10.; Wellington, 10 c., £20.

SHEEP DIP—
Baltimore, 9 t. 10 c., £202.
Hobart, 1 t. 4 c., £53.

SILVER NITRATE—
Alexandria, 1 cs., £83.; Bombay, 1 cs. (pt.), £98.; Cape Town, 1 cs., £48.; Copenhagen, 1 cs., £163.

SODA ASH—
Pt. Said, 1 t., £19.

SODA CRYSTALS—
Bangkok, 1 t., £10.; Cape Town, 5 t., £29.; Demerara, 15 c., £8.; Melbourne, 1 t., £23.

SODIUM BICARBONATE—
Barbados, 10 c., £7.; Calcutta, 1 t. 5 c., £70.; Cape Town, 6 c., £9.; Cristobal, 1 t. 5 c., £40.; Durban, 1 t. 10 c., £40.; East London, 18 c., £28.; Monte Video, 9 c., £33.; Pt. Elizabeth, 1 t. 3 c., £29.

SODIUM BISULPHITE—
Belawan, 7 t., £133.; Colombo, 2 t., £38.; Malacca, 2 t. 10 c., £49.; Penang, 1 t. 10 c., £29.; Pt. Swettenham, 1 t. 13 c., £32.; Singapore, 1 t., £20.

SODIUM BROMIDE—
Adelaide, 1 cs., £5.
Melbourne, 2 c., £7.

SODIUM CARBONATE—
Auckland, 4 c., £9.; Cape Town, 5 c., £8.; Durban, 5 c., £8.; Shanghai, 1 t. 2 c., £19.; Singapore, 7 c., £27.; Yokohama, 1 t., £19.

SODIUM CITRATE—
Bangkok, 2 c., £15.; Calcutta, 2 cs., 4 cs. (pt.), £25.; Montreal, 2 t. 5 c., £441.

SODIUM HYDROSULPHITE—
Bombay, 4 t. 19 c., £629.

SODIUM HYPOPHOSPHITE—
Melbourne, 1 cs., £9.
Sydney, 1 c., £16.

SODIUM HYPOSULPHITE—
Cape Town, 10 c., £8.; Demerara, 5 c., £7.; Durban, 10 c., £8.; Delagoa Bay, 2 c., £13.; Inhambane, 2 c., £8.; Lagos, 1 c., £7.; Singapore, 2 t. 3 c., £67.

SODIUM IODIDE—
Melbourne, 1 cs. (pt.), £13.

SODIUM PEROXIDE—
Durban, 1 t. 7 c., £185.

SODIUM PYROPHOSPHATE—
Melbourne, 1 kg., £6.

SODIUM SALICYLATE—
Colombo, 16 c., £75.
Melbourne, 1 c., £15.
Shanghai, 2 c., £28.

SODIUM SALTS (*otherwise undes.*)
Perth, 5 c., £6.

SODIUM SILICATE—
East London, 7 c., £11.

SODIUM SULPHATE—
Amoy, 1 c., £11.
Barbados, 1 t., £6.
Otago, 10 c., £68.

SODIUM SULPHIDE—
Auckland, 10 t., £170.
Melbourne, 5 t. 10 c., £78.
Sydney, 10 t., £130.

SODIUM SULPHITE—
Auckland, 1 t. 3 c., £29.; Cape Town, 5 c., £9.; Durban, 5 c. £9.; Penang, 1 t. 5 c., £32.; Shanghai, 8 c., £9.; Singapore, 4 c., £22.

SODIUM TARTRATE—
Melbourne, 5 c., £21.

SPENT OXIDE—
Antwerp, 212 t., £429.

SULPHUR—
Cape Town, 4 t. 9 c., £64.; East London, 2 t., £18.; East London, (F.), 10 c., £5.; Melbourne, 10 c., £7.; Montreal, 2 c., £6.; Yokohama, 1 t., £15.

SULPHURIC ACID—
Antofagasta, 2 t. 3 c., £70.; Accra, 5 c., £13.; Aden, 15 c., £23.; Antwerp, 13 c., £60.; Bangkok, 2 c., £7.; Cape Town, 1 cs., £8.; Calcutta, 3 c., £12.; Colombo, 2 t. 10 c., £91.; Madras, 10 c., £44.; Sekondi, 1 t. 11 c., £38.; Singapore, 6 c., £13.

TANNIC ACID—
Calcutta, 1 cs., 1 cs. (pt.), £13.
Wellington (F.), 1 cs. (pt.), £5.

TARTARIC ACID—
Beira, 1 c., £7.; Bombay, 15 c. (F.), £110.; Cape Town, 2 c., £13.; Channel Isles, 1 c., £7.; East London, 3 c., £27.; Jamaica, 3 c., £24.; Lyttleton, 10 c., £61.; Madras, 2 c. (F.), £13.; Montreal, 17 c., £133.; Pt. Elizabeth, 2 c. (F.), £14.; Pt. Sudan, 2 c., £14.; Singapore, 10 c. (F.), £60.; Toronto, 3 c., £32.; Vera Cruz, 2 c., £13.; Wellington, 3 c., £19.

TIN CRYSTALS—
Bombay, 5 cs., £39.

TIN OXIDE—
Brussels, 5 cks., £225.

TURPENTINE—
Singapore, 2 drms., £6.

ZINC OXIDE—
Batoum, 7 cks., £158.; Bombay, 4 cks., £40.; Brussels, 1 ck., £6.; Canton, 1 kg., £6.; Fremantle, 2 kgs., £5.; Genoa, 16 bgs., £46.; Limon, 2 kgs., £5.; Melbourne, 2 cs., £11.; Shanghai, 1 ck., £7.; Santander, 16 bgs., £50.; Shanghai, 2 kgs., £7.; Wellington, 22 bgs., £51.

ZINC SULPHATE—
Rangoon, 3 cs., £5.

ZINC SULPHIDE—
New York, 2 cks., £108.

Week ending September 22.

ANTIMONY REGULUS—
Melbourne, 10 t.

BEESWAX—
Iddo, 1 c.
Sydney, 1 t. 3 c.

CERESINE WAX—
Sydney, 10 c.

FULLER'S EARTH—
Bombay, 8 c.; New York, 55 t.; Rio de Janeiro, 20 t.; San Francisco, 30 t.

GLUE, SIZE, AND GELATINE—
Adelaide, 1 t. 3 c.; Arica, 1 c.; Auckland, 3 c.; Beira, 1 c.; Bombay, 5 t. 1 c.; Boston, 4 t. 16 c.; Brisbane, 1 c.; Calcutta, 13 t. 1 c.; Cape Town, 1 t.; Dunedin, 1 c.; Durban, 1 c.; Hong Kong, 4 t. 5 c.; Lagos, 1 c.; Madras, 5 c.; Melbourne, 1 t. 10 c.; Montreal, 1 t. 14 c.; Newchang, 2 t.; New York, 2 c.; Perth, 5 c.; Pt. Elizabeth, 11 c.; Pt. Swettenham, 10 c.; Rangoon, 1 c.; St. Johns, 10 t.; Shanghai, 5 t. 9 c.; Sydney, 4 t. 6 c.; Tientsin, 4 c.; Toronto, 2 t.; Townsville, 3 c.; Wellington, 1 c.; Yokohama, 1 c.

ISINGLASS—
Osaka, 3 c.

LEAD (RESIDUE)—
Antwerp, 78 t.

MINERAL WAX—
Sydney, 1 t.

NAPHTHA (WOOD)—
Durban, 224 g.

PARAFFIN WAX—
Delagoa Bay, 31 t. 10 c.

PLUMBAGO—
Durban, 10 c.; Sourabaya, 1 t.

QUININE—
Bombay, 5,440 oz.; Calcutta, 12,317 oz.; Hong Kong, 5,145 oz.; Melbourne, 100 oz.; Monrovia, 352 oz.; Perth, 600 oz.; Sydney, 5,000 oz.

ROSIN—
Callao, 2 c.; Iquique, 7 t. 10 c.; Santander, 10 c.; Valparaiso, 11 t. 4 c.

SALT—
Aden, 8 c.; Bangkok, 4 c.; Delagoa Bay, 17 c.; Durban, 4 t. 11 c.; East London, 8 c.; Hobart, 16 c.; Kobe, 4 c.; Malta, 1 c.; Matadi, 4 c.; Pt. Elizabeth, 6 c.; Pt. Said, 6 c.; Pt. Sudan, 16 c.; Rangoon, 9 c.; St. Kitts, 13 c.; Sydney, 1 c.

SHELLAC—
Italy, 6 c.

SOAP—
Addah, 5 t. 19 c.; Adelaide, 3 c.; Aden, 5 c.; Ahwaz, 2 t.; Antwerp, 1 c.; Auckland, 6 c.; Bangkok, 16 c.; Barbados, 4 t. 9 c.; Beira, 2 c.; Bombay, 14 c.; Boston, 5 t. 12 c.; Bourgas, 3 c.; Buenos Ayres, 9 t. 1 c.; Calcutta, 6 c.; Christchurch, 1 t. 5 c.; Colombo, 18 c.; Cuba, 5 t. 7 c.; Duala, 2 t. 13 c.; Dunedin, 17 c.; Durban, 8 c.; East London, 1 c.; Genoa, 12 c.; Gibraltar, 1 c.; Hong Kong, 8 c.; Iddo, 1 c.; Italy, 4 c.; Kilindini, 6 c.; Kobe, 2 c.; Lagos, 4 t.; Limon, 3 c.; Madras, 1 t. 16 c.; Malta, 18 c.; Manila, 1 c.; Melbourne, 10 c.; Mombasa, 2 c.; Monrovia, 18 c.; Montreal, 1 t. 5 c.; Napier, 3 c.; New York, 1 c.; Penang, 6 c.; Perth, 6 c.; Pt. Said, 1 c.; Rangoon, 10 c.; Rotterdam, 7 c.; Sapele, 2 t.; Singapore, 2 t. 11 c.; Suez, 3 c.; Sydney, 7 c.; Tientsin, 1 c.; Toronto, 17 c.; Trinidad, qnty.; Vancouver, 1 c.; Wellington, 7 c.; Yokohama, 1 c.

STEARINE—
Adelaide, 10 c.

TALLOW—
Danzig, 35 t. 2 c.; Harlingen 2 t. 15 c.; Nantes, 10 t. 3 c.; Oporto, 5 t. 4 c.; Singapore, 4 c.; Winnebah, 3 c.

TAR (STOCKHOLM)—
Durban, 13 c.
Hong Kong, 1 t. 8 c.
Mauritius, £27.
Valparaiso, 1 t. 6 c.

WAX (*otherwise undescribed*)—
Madras, 5 t.; Osaka, £51.

WHITE LEAD—
Accra, £27.; Auckland, £1,014.; Azores, £9.; Basra, £39.; Brisbane, £73.; Cape Town, £98.; Channel Islands, £120.; Christchurch, £356.; Durban, £9.; East London, £34.; Gisborne, £46.; Hong Kong, £52.; Jamaica, £39.; Lyttleton, £164.; Melbourne, £1184.; Perth, £104.; Pt. Elizabeth, £72.; Rangoon, £10.; Rotterdam, £44.; Sydney, £1,013; Timaru, £332.; Townsville, £4.; Trinidad, £43.; Wellington, £449.

ZINC ASHES—
Antwerp, 30 t.

MANCHESTER.

Week ending September 18.

AMMONIUM CARBONATE—
Antwerp, 10 cks.
Gothenburg, 15 cks.

CHEMICALS (*otherwise undescribed*)
France, 135 kgs.

COAL TAR PRODUCTS—
Creosote Oil
Galveston, 1,072,996 galls.
Unspecified
Czecho-Slovakia, 1 cs.
Holland, 5 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Melbourne, 20 drms.
Sydney, 10 drms.

FERRO MANGANESE—
Baltimore, 144 t.

SALT—
Montreal, 2,400 bgs.

SOAP—
Bushire, 6 cs.
Mohammerah, 70 bxs.

SODIUM BICARBONATE—
Basra, 10 bgs., 40 kgs.

NEWCASTLE-ON-TYNE

Week ending September 22.

AMMONIA—
Copenhagen, 5 brls., 71 cks.

ANTIMONY—
Genoa, 1 cs.

CARBON (RETORT)—
Leghorn, qnty. in bulk.

CAUSTIC SODA—
Bergen, 86 drms.
Copenhagen, 68 drms.
Gothenburg, 40 drms.

COPPER OXIDE—
Rotterdam, 1 ck.

COPPER PRECIPITATE—
Bergen, 4 cks.

LITHARGE—
Genoa, 3 cks.; Gothenburg, 80 pkgs.; Rotterdam, 29 cks.

RED LEAD—
Bergen, 10 kgs., 14 cks.
Copenhagen, 34 cks.
Gothenburg, 62 cks.
Rotterdam, 200 cks.

SOAP—
Bergen, 1 bx.
Gothenburg, 1 cs.

SODIUM SULPHATE—
Batavia, 20 cs.

SODIUM SULPHITE—
Gothenburg, 20 bgs., £124.

WHITE LEAD—
Copenhagen, 51 cks.
Gothenburg, 28 cks.
Rotterdam, 7 cks.

ZINC OXIDE—
Gothenburg, 5 drms.

N. & S. SHIELDS.

Week ending September 22.

NIL.

PRICES CURRENT.

WEDNESDAY, SEPT. 26, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	..*cwt.	23/6 & 47/-		
Acetic, (Glacial, B.P.) in carboys	..*ton	70	0	0
Arsenic, S.G. 2.000	.. ton	85	0	0
Boric (crystals)	..†ton	48	0	0
Citric	.. lb.	0	1	8½
Formic, 80/85%	..*ton	52	0	0
Hydrofluoric, 59/60%	..*lb.	0	0	7½
Lactic, 50%	.. ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	..*carboy	0	4	0
Nitric, 80° Tw.	..*ton	21	10	0
Oxalic	.. lb.	0	0	5¾
Phosphoric, 1,500° tech.	..*ton	33	0	0
Sulphuric (168°)	..*ton	7	10	0
Sulphuric (140°)	..*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	..*ton	4	10	0
Tannic (commercial)	.. lb.	0	1	6
Tartaric (crystals)	.. lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	..*lb.	0	0	9
Aniline Salt	..*lb.	0	0	9½
Anthracene, 40/45%, "A"	.. unit	0	0	4
Benzol, 90%	..*gallon	0	1	4
Carbolic Acid (crude 60%)	.. gallon	0	3	4
Carbolic Acid (crystals 40°)	.. lb.	0	1	2
Creosote	..*gallon	0	0	9½
Cresylic Acid, 95%	..*gallon	0	2	6
Naphtha, crude, 30%	..*gallon	0	0	9
Naphtha, solvent (90/160)	..*gallon	0	1	3
Naphthalene, refined	.. ton	18	10	0
Pitch (f.a.s. Liverpool)	.. ton	6	7	6
Pyridin	.. gallon	1	1	0
Tar, crude	.. ton	4	2	6
Tar, refined	.. barrel	2	2	6
Toluol	..*gallon	0	1	9
Xylol, (pure)	..*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	..*ton	127	0	0
Alum, loose lump (delivered)	..*ton	11	0	0
Aluminium Sulphate, 17/18%	.. ton	10	10	0
Aluminium Sulphocyanide	.. lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	.. ton	7	0	0
Ammonia, anhydrous	..*lb.	0	1	4
Ammonia, .880	..*ton	22	10	0
Ammonia, .920	..*ton	14	10	0
Ammonium Carbonate (lump)	.. lb.	0	0	4
Ammonium Muriate (grey)	..†ton	30	0	0
Ammonium Nitrate	.. ton	35	0	0
Ammonium Phosphate	.. ton	60	0	0
Ammonium Sulphate, 25¾% delivered	..†ton	14	10	0
Ammonium Sulphocyanide, 95%	.. lb.	0	1	3
Antimony (Golden Sulphide)	.. lb.	0	0	9
Arsenic (Cornish White)	.. ton	62	0	0
Barium Carbonate (native), 92/94%	.. ton	5	15	0
Barium Chlorate	.. lb.	0	0	8
Barium Chloride (in casks)	.. ton	14	10	0
Barium Sulphate	.. ton	£5	to	£7
Barium Sulphocyanide, 95%	.. lb.	0	0	9½
Bleaching Powder, 35%	..*†ton	11	5	0
Bleaching Liquor, 7%	..*ton	4	5	0
Calcium Chloride	..†ton	5	7	6
Carbon Bisulphide	..*ton	26	0	0
Casein (commercial)	.. ton	80	0	0
China Clay (at Runcorn), in bulk	.. ton	50/- to 90/-		
Chromium Acetate (crystals)	.. lb.	0	0	8
Copper Sulphate	.. ton	25	10	0
Formaldehyde, 40%	.. ton	76	0	0
Glycerine (chemically pure, S.G. 1,260)	..*ton	85	0	0
Glycerine (crude), 80%	..*ton	60	0	0
Iodine	..*oz.	0	1	0
Iron Nitrate, 80° Tw.	..*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	.. ton	6	0	0
Lead Acetate (white)	.. ton	41	0	0
Lead Acetate (brown)	.. ton	42	0	0
Lead Carbonate (White Lead)	.. ton	44	0	0
Lead Nitrate	.. ton	42	0	0
Lime Acetate (brown)	..*ton	11	10	0
Lime Acetate (grey), 80%	..*ton	21	10	0
Lime Bisulphite (S.G. 1,070)	..*ton	8	0	0
Lime Superphosphate, 30%,	.. ton	3	15	0
Litharge (British)	.. ton	41	0	0
Magnesite, Calcined (delivered)	.. ton	11	0	0
Magnesite, Raw	.. ton	3	0	0
Magnesium Carbonate (light)	.. cwt.	2	0	0
Magnesium Chloride (solid)	.. ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	.. ton	6	0	0
Manganese Borate, 85%	.. ton	112	0	0
Manganese Sulphate, 90%	.. ton	45	0	0
Methylated Alcohol, 64° (industrial)	.. gallon	0	2	1
Naphtha (Wood), Solvent	..*gallon	0	6	6
Naphtha (Wood), Miscible, 60° p.	.. gallon	0	6	6
Potassium Bichromate	.. lb.	0	0	5¾
Potassium Carbonate, 90%	.. ton	25	0	0
Potassium Chlorate	.. lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	.. ton	16	0	0
Potassium Chloride 80%	.. ton	8	10	0
Potassium Nitrate (refined)	.. ton	25	0	0
Potassium Permanganate (commercial)	.. lb.	0	0	9
Potassium Prussiate (yellow)	.. lb.	0	1	0½
Potassium Prussiate (red)	.. lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	.. ton	11	10	0
Potassium Sulphocyanide	.. lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/- & 57/-		
Sodium Acetate	.. ton	24	10	0
Sodium Arsenate, 45%	.. ton	50	0	0
Sodium Borate (Borax), Crystals	..†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	..†ton	10	10	0
Sodium Bichromate	.. lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	..†ton	7	12	6
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	.. lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d. to 8½d.		
Sodium Hydrate (76% C. Soda), f.o.r.	..†ton	19	7	6
Sodium Hydrate (70% C. Soda)	..†ton	17	17	6
Sodium Hydrate (60% C. Soda)	..†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	..†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	..†ton	9	10	0
Sodium Hyposulphite (photographic)	.. ton	14	10	0
Sodium Manganate (basis 25%)	.. ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	.. ton	13	5	0
Sodium Nitrite, 100% basis	.. ton	26	10	0
Sodium Perborate	.. lb.	0	0	11¼
Sodium Phosphate	.. ton	15	0	0
Sodium Prussiate	.. lb.	0	0	5½
Sodium Silicate (glass), Alkaline	..†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	..†ton	9	0	0
Sodium Sulphate (Saltcake)	..†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	.. ton	4	0	0
Sodium Sulphide (conc.), 60/65%	.. ton	14	0	0
Sodium Sulphide Crystals (casks)	..†ton	9	0	0
Sodium Sulphocyanide (liquid)	.. lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	.. ton	8	10	0
Sulphur (Roll Brimstone)	.. ton	8	10	0
Sulphur (Texas Gulf)	.. ton	5	7	6
Tartar Emetic, 43/44%	.. lb.	0	1	1
Tin Crystals	.. lb.	0	1	4
Tin Perchloride fused	.. lb.	0	1	10
Titanous Chloride	.. lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	..*ton	20	0	0
Zinc Sulphate, Crystals	.. ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	.. ton	115	0	0
Antimony	.. ton	35	0	0
Copper	.. ton	63	15	0
Lead (Chemical Sheet), delivered	.. cwt.	1	14	0
Lead (Foreign Pig)	.. ton	25	16	3
Nickel	.. ton	130	0	0
Silver	.. oz.	0	2	8
Tin, English Ingots	.. ton	204	0	0
Zinc (Spelter)	.. ton	33	17	6
Zinc Dust, 90/92%	.. ton	50	0	0
OILS.				
Cottonseed	..*ton	43	0	0
Linseed, Raw	..*ton	45	0	0
Stearine, 115-120° M.P.	.. ton	48	0	0
Tallow	.. ton	39	0	0
Turpentine	.. cwt	3	14	6

* *Packages extra or returnable*; otherwise prices usually include packages.

† Makers' prices for home consumption only.

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
Thoughts on the Imperial Conference	389
The Chemist as Administrator	390
Bleaching Liquors from Liquid Chlorine	390
Wood Preservatives	391
A New Glass-making Machine	393
The Month in Engineering	394
Recent Advances in Cotton Dyeing	395
Isopropyl Alcohol	395
The Outlook for Textile Chemicals	396
The Chilean Copper Industry	396
Notes on the Italian Chemical Industry	397
The Shipment of Rubber Latex	398
Our Bookshelf	398
Items of Interest	399
Coming Events	400
Gazette News	401
Trade Inquiries	401
Stock and Share List	401
Reports of Companies	402
New Companies	402
Imports of Chemicals and Allied Products in August	403
Fertiliser News	405
Cumberland Coking and By-product Industries	405
South Wales Notes	405
The Patent List:—	
Applications for British Letters Patent	406
Complete Specifications Accepted	406
Complete Specifications Open to Public Inspection before Acceptance	406
Abstracts of Latest Complete Specifications	406
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	407
Thirty-five Years Ago	407
Market Reports.	
London "Open Market" Report	408
Italian Chemical Market	409
London Metal Market	409
Manchester Chemical Market	410
Swansea Market Report	410
Liverpool Chemical Market	410
West of Scotland Chemicals	411
Imports of Chemical Products	411
Exports of Chemical Products	413
Prices Current	418

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CURRENT TOPICS.

THOUGHTS ON THE IMPERIAL CONFERENCE.

THE many thousands of people from this country who have visited France during the last few months either on business or on pleasure, cannot fail to have been impressed by one very significant fact, the complete absence of unemployment. Neither in the towns nor in the country districts can the spectacle of able-bodied workmen wasting their time in idleness be observed. Far from there being a surplus of labour indeed, there is actually a shortage, and additional labour has quite recently been imported into France from Portugal. In our own country, on the other hand, there are at present over one and a quarter million persons unemployed, and every indication that this number will expand very greatly during the coming winter. France is a debtor nation. Both her internal and external debts are enormous, and her prospects of obtaining relief by the extraction of any immediate large sum from Germany are by no means bright. Her franc, which prior to the war was worth tenpence, is now valued at rather less than threepence. Great Britain on her part is a creditor nation to all countries except the United States of America, and her pound sterling has but little depreciated in the international money market. Yet Great Britain is confronted with an industrial slump of a magnitude such as has never before been experienced, whereas France can maintain the whole of her population if not in affluence, yet in comparative comfort and freedom from all dread of destitution. In view of these facts, is it not logical to ask ourselves whether the fiscal policy of this country is fundamentally wrong from the standpoint of present-day needs, and whether our adherence to the shibboleths of Free Trade and the high international status of the pound sterling has worked us untold harm and contributed in no mean degree to the grave position in which we find ourselves to-day? For our own part we have no hesitation in returning an unconditional affirmative to both the above questions. France is prosperous because she has been compelled to become self-sustaining to the utmost of her capacity. Her markets are not flooded with cheap foreign manufactured goods and raw materials. The French manufacturer, unlike his British *confrère*, is not faced with the ever-present danger of being compelled to sell his goods

below cost under the pressure of foreign competition. In common with most countries of the world, France has adopted the policy of fostering first and foremost the welfare of her own inhabitants and workpeople by cutting down her imports of manufactured goods to a minimum and by erecting a tariff wall sufficiently high to ensure that foreign goods when they do enter into competition with the home products shall do so under equitable conditions. The depreciation of the franc has not inconvenienced France to any great extent, whilst on the other hand there is every reason for thinking that had she made a genuine attempt to maintain the franc at a figure approaching the pre-war parity, her economic position would have been far worse than it actually is. So far as manufactured goods are concerned, a great diminution or even a temporary total cessation of imports into the United Kingdom would result in an immediate revival of manufacturing activities and the reduction of unemployment to very small proportions. It is quite true, and we are not losing sight of the fact that the major portion of our foodstuffs and many of our raw materials must be imported. The opponents of the policy of Protection make the most of these facts, and we grant that were the United Kingdom alone to be considered, the ideal of a self-sustaining nation would be impracticable, although we are convinced that even the production of foodstuffs in this country could be at least doubled, if our agriculturists were afforded their much-needed protection. By extending our mental outlook from the United Kingdom to the British Empire as a whole, however, we find that this difficulty vanishes completely. There is no essential foodstuff and raw material that is not contained in some part of the British Empire in sufficient quantity to supply the whole of the Empire. The Empire can be made and should be made absolutely self-sustaining and independent. A general Imperial tariff or a United Kingdom tariff with ample preferential treatment of our Empire co-partners is no visionary's dream, but a piece of practical politics rendered essential by the needs of the time.

THE CHEMIST AS ADMINISTRATOR.

A striking refutation of the frequently expressed opinion that the mental capacity and outlook necessary to the successful business man on the one hand and to the successful chemist on the other, are mutually incompatible, is afforded by the career of Dr. Carl Duisberg, who is at present the greatest figure in the German chemical manufacturing industry. Just over forty years ago, at the age of twenty-two, Dr. Duisberg entered the services of the Bayer colour factory at Elberfeld in the capacity of a research chemist. His work both as an investigator himself and as the director of research in others proved so fruitful that the activities of his employers expanded by leaps and bounds. So rapidly did they expand indeed, that the Elberfeld site proved too cramped, and additional factory buildings were erected at Leverkusen. Dr. Duisberg's latent gifts for organisation and administration were recognised by his directors, and in 1895 he was given the opportunity of leaving his purely chemical work and devoting himself entirely to the organisation of the new Leverkusen factory. This opportunity Dr. Duisberg accepted, and such a success did he prove in his new capacity that in 1900 he was elected a director himself with full powers. To-day he is not only the managing director of the great Bayer works, but is president of the powerful "Verein zur Wahrung der Interessen der Chemischen Industrie Deutschlands." It was Dr. Duisberg's foresight that saw the necessity for co-operation between the German dyestuff manufacturing firms, and his driving power that brought into existence in 1916 that formidable combination, the Interessengemeinschaft. Dr. Duisberg's is not an isolated case, though an exceptionally distinguished one. All the large German chemical works contain in their directorates men who have worked their way up the ladder rung by rung and are familiar with all the details of the businesses they now control. Such careers as that of Dr. Duisberg afford a lesson that the present directorate of our largest British dyestuffs manufacturing concern cannot afford to disregard.

BLEACHING LIQUORS FROM LIQUID CHLORINE.

Sir Max Muspratt, addressing a meeting of the Society of Dyers and Colourists at Bradford last week, expressed the opinion that many large consumers of bleaching powder might be well advised on the grounds of economy to buy liquid chlorine and to make their own bleaching liquors on the spot. This idea has been gaining in favour for several years now, and we believe has already been given effect to in some quarters. In this connection also it is interesting to note that considerable progress has been made in the United States. The Mathieson Alkali Works (Inc.) of Niagara Falls especially have been energetic in this direction, and have elaborated a system of their own for preparing bleach liquors for the pulp and paper industries. Several plants have been installed and are working very satisfactorily, and at a recent meeting of the Technical Section of the American Pulp and Paper Association, held in connection with the National Exposition of Chemical Industries, Mr. J. H. MacMahon, of the Mathieson firm, gave a full explanation of such plants. In a future issue we shall give a detailed account of the Mathieson system, but it will suffice here to state that the essential principle consists in vapourising the liquid chlorine in a leaden coil which is immersed in the liquor in the tank where the bleaching solution is prepared. The tank itself is of concrete, and the operation is so regulated that the latent heat of vapourisation of the chlorine counteracts the heat of the reaction between the chlorine and the lime, and thus keeps the temperature of the liquor below the point at which the hypochlorite decomposes. The system is very ingenious, and the claims are made that the loss of chlorine does not exceed one per cent. and that the control is almost automatic.

WOOD PRESERVATIVES.

MODERN TECHNOLOGICAL PROGRESS.

By "Investigator."

THE art of wood preservation has been practised from very early times. The ancient Egyptians, for example, applied antiseptic oils to the woodwork of their mummy-coffins. In comparatively recent times, the availability of coal tar products led to the introduction of the creosoting process. Zinc chloride was introduced as a wood preservative in 1838 by Burnett. In 1906, Wolman patented the use of fluorides in conjunction with heavy metal salts, while during the last twenty years, hundreds of patents have been granted covering methods of wood preservation.

Wood preservatives now play an increasingly important part in the mechanical wood pulp industry, in connection with the stacking of the wood and the storage of the pulp. At the present time, the whole problem of the protection of marine timber structures, particularly in tropical waters, is being studied under the ægis of a special committee of the Institute of Civil Engineers.

The Destructive Organisms and Their Effects.

Four destructive types of organism have to be countered—namely, bacteria, fungoid growths, insect pests, such as the termite beetle, and marine organisms, such as *Teredo navalis*. The latter is particularly destructive, frequently boring into marine timbers to a depth of an inch or more. Among the more common wood-destroying fungi, may be mentioned *Lenzites trabia, Fomes roseus, Lentinus lepideus, Lenzites saepiaria, Merulius lacrymans*, and *Coniphora cerebella*. Of these, the latter three are the organisms causing dry rot. The activity of the bacteria and moulds is accompanied by the production of many cellulose-destroying enzymes. In the presence of air and nutrient salts, the cellulose is attacked with the formation, first, of hexose and then of carbon dioxide. Humus-like substances also make their appearance.

Very serious damage is done to stacks of unseasoned timber. Thus in a case of spruce reported, 75 per cent. of the wood substance was lost, the cellulose content falling from 58 to 13 per cent. in twelve months, while the content of matter soluble in hot water more than doubled. The yields of methyl alcohol, acetic acid, and pentosans also depreciated markedly, falling to the extent of 75, 80, and 70 per cent. respectively. Owing to the formation of readily-reducible substances, the copper number rose.

Preservatives exercise a two-fold function—they cut off air and moisture from the organisms by hermetically sealing the pores, and they poison the food supply or render it non-assimilable.

Wood preservatives can be divided into three classes, insoluble oils, water-soluble salts and insoluble precipitates formed in the fibres. Creosote and, to a minor extent, mineral oil are the only commercially-important members of the first group. Among the soluble salts, the most widely used are copper sulphate, zinc chloride, mercuric chloride and sodium fluoride, while copper and zinc resinates are examples of precipitated preservatives.

The Creosoting of Timber.

Before creosoting, the timber is usually dried by stacking or by keeping at 70° C. for 24 hours. Two methods of injection are in vogue, the "full cell" or Bethell process and the "empty cell" process due to Rueping and Lowry. In the former procedure, railway sleepers are run on iron frames into long steel boilers, the pressure is reduced to 1/8 atmosphere, and then creosote at about 70° C. is pumped in under a pressure of 160lb., the treatment lasting several hours. Sometimes the wood is steamed in the boiler before evacuation. There is a definite relation between the viscosity and hence the temperature of the creosote and the penetration. Other factors are the pressure, the time of treatment and the structure of the wood. Thus, soft woods will absorb about a gallon per cubic foot, hard woods somewhat less. As a rule the creosote is injected to a depth of from one to four inches, the more vulnerable sap-wood being readily penetrated.

In the "empty cell" treatment, the aim is to saturate only the cell walls and not the cavities. Instead of starting with a partial vacuum, the creosote at 200lb. is forced in against an initial pressure of 50lb. per square inch, until sufficient oil has been taken up. When the external pressure becomes normal, the compressed air inside the cells expels most of the creosote from the cell cavities, but leaves that which has soaked into the walls. In a modified process, the expulsion of the excess preservative is assisted by means of reduced pressure.

A special committee of the American Wood Preservers' Association (Report, 1915), recommends the "full-cell" process for impregnating piling and other marine structures, and for permanent timber-work where there is not much mechanical wear. The creosote concentration should vary between 20 and 10lb. per cubic foot, according as to whether or not the timber is to be protected from marine boring organisms. For railway sleepers and other structures subject to weathering and to superficial mechanical wear, impregnation with 5lb. per cubic foot by "empty-cell" processes is advised.

Creosote suitable for wood preservation should have a boiling-point range of 210-355° C. and a specific gravity of 1.09 at 20° C. For the sake of cleanliness, freedom from carbon particles is desirable. Low-boiling constituents, although very toxic, should be absent, as they are soon lost by volatilisation. Thirty per cent. of refined coal tar may be added to good quality creosote, without impairing its efficiency.

Special Methods of Impregnation.

In some processes the wood is treated with the vapour of the oil, or it is subjected under pressure to a spray of the oil, atomised with air or steam (*Ger. Pat.*, 347,632, of 1915). The wood may then be submerged in the liquid and hydraulic pressure applied. In order to impregnate the wood with paraffin, it is first immersed in boiling water to expel the air from the cells, then in a bath of molten paraffin at above 100° C. until no more steam bubbles are formed, after which it is allowed to cool *in situ*. In a closely similar method, the wood is immersed directly in a creosote bath at above 100° but below the fire point of the oil, until all moisture is expelled as steam (*U.S. Pat.*, 1,382,103, of 1921).

In the treatment of "green" or unseasoned timber, the creosote should be rendered miscible with water before application. For this purpose the creosote may be sulphonated or caustic soda may be added followed by "fixing" in the fibre with ferrous sulphate. Borates and phosphates are claimed to increase the miscibility of the higher phenols. With the same end in view, and in order to assist the absorption, the creosote may be emulsified. Thus creosote, rosin, and xylenol emulsions, stabilised with soap or sodium resinate, form the subjects of recent specifications. The preparation "Preservol" consists of creosote partially emulsified with pyroligneous acid.

Surface charring of creosoted and untreated timber is frequently used, the preservative action being due to the tarry products which result from charring. Another mode of operation is to heat the wood in coal-tar pitch to the charring temperature until all moisture is expelled. The surface may then be coated with a harder pitch.

The Use of Metallic Salts.

Creosoted timber is heavy, highly inflammable and has a pronounced odour. To overcome these disadvantages, the use of inorganic preservatives in smaller concentrations has been introduced. Many of these—*e.g.*, mercuric chloride and copper sulphate, are readily soluble and highly poisonous, drawbacks of particular importance in wet and cattle-frequented localities. However, owing to their colloidal condition in the wood, diffusion is not very marked, and consequently, the amount dissolved out is not so great as might be expected. Insoluble metallic compounds can be applied by first impregnating the wood with a soluble salt and then treating it with a precipitating bath. Thus, insoluble fluorides or resinates may be formed in the fibre; or the wood may be impregnated with a solution of basic copper carbonate in ammonium or sodium carbonate, and the copper compound precipitated by dilution or by volatilisation of the ammonium carbonate (*U.S. Pat.*, 1,388,513, of 1921). An interesting procedure is to treat the wood with a benzene solution of antimony trichloride. On hydrolysis, an insoluble basic compound results, which reduces the inflammability and renders the wood immune from fungoid growth (*U.S. Pat.*, 1,418,610, of 1922).

Zinc and Copper Compounds.

Wood is penetrated readily by aqueous salt solutions. Impregnation can usually be effected by soaking in open baths or by brushing. In order to save time, however, the solutions may be injected under pressure. The principle of electro-osmosis has also been applied to facilitate penetration.

Among zinc compounds may be mentioned zinc chloride, zinc sulphate, and the double zinc ammonium chloride and sulphate, the alkaline solution of the latter, as well as the corresponding compounds of copper and magnesium, being used to impart fire-resisting properties to the wood (*Brit. Pat.*, 151,661, of 1919). Zinc chloride, being deliquescent, is suitable only for dry situations, an effective concentration being ½ to ¾lb. of the dry salt per cubic foot. In applying the double chlorides and sulphates, the sap is first removed by reducing the pressure and the solutions injected under 170lb. Comparative toxicity experiments with the highly-destructive fungus *Fomes annosus* showed that zinc chloride, zinc sulphate and the mixture of the former with aluminium sulphate were about equally effective. Emulsions of zinc chloride with creosote alone or with copper powder in addition ("Holzhelfer") are also used, the latter being slightly less effective than zinc chloride alone (Fleming and Humphrey, *J. Ind. Eng. Chem.*, 1915).

Copper sulphate mixed with ferrous sulphate is sometimes used. Copper hydroxide dissolved in wood tar—that is substantially copper phenolates—has been suggested (*Brit. Pat.*, 7,275, of 1915). According to Falck (*Chem. Zeit.*, 1919, 43), copper hydroxide alone, although much used as a plant spray, is not an effective wood preservative. An ammoniacal solution of copper and zinc phenolates, containing 8 per cent. of metals and 8 per cent. of phenol, is claimed to be an effective protection against wood-destroying organisms. Applied to mine timbers, such a solution ("Viczsal") was fairly efficient, but during seven years' exposure did not confer complete immunity from rottenness (Nowotny, *Z. angew. Chem.*, 1922).

Arsenic and Chromium Compounds.

A process largely used in Australia to protect Kauri timber, in contact with earth, from the ravages of the termite beetle (white ant) is that of Powell (*Brit. Pat.*, 9,044, of 1915). The preservative medium consists of sugar solution (108°) to which is added dextrin (5 per cent.), gum tragacanth (½ per cent.), and an arsenic compound (3 per cent. arsenic). To impregnate the timber it is immersed in the boiling liquid and then dried. Sodium arsenite, combined with the colloidal matter in sulphite-pulp liquor, forms another preservative. Creosote is not wholly effective in its action against *Teredo* and other marine organisms. From experiments carried out by the Marine Biological Laboratories at Plymouth, certain organic compounds of arsenic, used in gas warfare, when applied in alcoholic solution, should give promising results. Experiments are now in progress at Lowestoft and Colombo, with timber impregnated with these compounds dissolved in commercial creosote.

Chromates and bichromates enter into the composition of many preservatives. A very recent proposal is that of Chavastelon (*Comptes. Rend.*, 1923, Vol. 176), according to which wood can be efficiently protected by painting or impregnating it with copper bichromate, made by mixing a cold 6 per cent. solution of copper sulphate with a slight excess of a solution of sodium or potassium bichromate of similar strength. On exposure, the copper compound gradually dissociates into basic chromates and chromic acid, the latter exercising a continuous fungicidal action.

According to a recent patent, a mixture of three substances having high osmotic pressure (easily diffusible), high antiseptic power and permanency, respectively, is injected into the wood. For instance, a paste consisting of saturated calcium-chloride solution (80 parts), potassium chromate (15) and copper powder (5 parts) together with a filling material, is used (*Brit. Pat.*, 159,479, of 1921).

Mercuric Chloride as a Wood Preservative.

Treatment with corrosive sublimate ("kyanising") is used mainly as a protection against insect pests such as termites, wood being treated with a 0.7 per cent. solution for this purpose. Absorption is rapid at first, but the maximum is only attained after some days. For equal absorption, fir and pine require immersion for 10 and 7 days respectively. Telegraph poles made of these woods will have a life of about 14 years after treatment. Impregnation may be effected by capillary action, only the portion to be embedded in the ground being treated with mercuric chloride, the rest of the pole being impregnated with fluorides, copper sulphate or zinc chloride. Another method is to bore holes at suitable intervals in the wood, into which is plugged a mixture of common salt (16 parts), arsenious oxide (6 parts) and mercuric chloride (1 part). On standing the wood becomes impregnated by diffusion (*U.S. Pat.*, 1,276,725, of 1918). In order to open the pores and so facilitate the absorption, hydrochloric acid may be added to the mercury salt. A mixture of arsenious oxide and mercuric chloride dissolved in strong hydrochloric acid has been proposed, beechwood tar being incorporated to prevent precipitation on dilution. Mercuric silicate has also been used.

The Use of Fluorine Compounds.

Sodium fluoride is a constituent of a large number of wood-preserving compositions. Owing to its solubility, it is not of much use for exposed timber such as sleepers. Even at a dilution of one per cent. it is effective against such fungi as *Penicilium glaucum* and *Helicomycelium fulginosum*, but dilute solutions have very little effect on the spores of both saprophitic and parasitic fungi. Sapstain, a discolouration, due to organic growths, very prevalent in lumber, can be prevented by treating with sodium fluoride, which is frequently used in conjunction with arsenious oxide and mercuric chloride for protecting mine timbers. In the latter case, the fluoride prevents the coagulation of the albumen and so increases the antiseptic power, probably by forming a double compound with the mercuric salt. A suitable impregnating solution would consist of 6.5 parts of a 0.6 per cent. solution of mercury salt and 9 parts of a similar solution of fluoride (*Brit. Pat.*, 148,137, of 1920).

Many phenols and nitro compounds have been used together with the fluoride. Very effective preservatives consist of sodium fluoride 85-95 parts, and 15-5 parts of 2.4-dinitro-phenol or dinitro-*o*-cresol. In the case of phenol-fluoride compositions, a chromium salt is added in order to fix the phenol on the wood. "Basilite," a mixture of sodium fluoride (89 per cent.) and the compound of aniline and dinitrophenol (11 per cent.) is a very effective preservative for mine timberwork. Trioxymethylene has also been used in admixture with soluble fluorides (*U.S. Pat.*, 1,274,171, of 1918).

According to an Austrian Government report, the sparingly soluble zinc fluoride has been used with good results for telegraph poles, for which purpose it compares very favourably with copper sulphate. Lead, sodium, and mercury silicofluorides have also been suggested as being less soluble and more toxic than the corresponding fluorides. For mine timber preservation, solutions of zinc and other fluor-sulphonates have been patented (The Chemical Foundation, Inc., *U.S. Pat.*, 1,448,276, of 1923). Fluorsulphonic acid alone or dissolved in creosote, as well as the salts of the acid with organic bases are also proposed for the same purpose (*Ger. Pat.*, 299,761, of 1916).

Modern Organic Wood Preservatives.

Besides creosote and the phenolic substances already mentioned, compounds of the higher phenols with such organic bases as pyridine, quinoline, aniline, and trimethylamine are suggested. Nitro-phenols and their salts comprise the chief remaining members of this group. When present to the extent of less than 0.02 per cent.: *o*- and *p*-nitrophenols and the sodium salt of 2.4 dinitrophenol will prevent the growth of the dry-rot organism, *Coniphora cerebella*. "Sporocide" consists essentially of potassium o-dinitrocresylate. Any danger from explosion may be reduced by incorporating aromatic sulphonates with the metallic compounds of polynitrophenols (*Brit. Pat.*, 147,608, of 1920). In order to prevent the dinitro-phenol salt from attacking the iron of the impregnating vessel, salts such as alkali chromates, borax or disodium phosphate may be added. Alkyl or acyl polynitrophenols have been proposed—*e.g.*, acetyl dinitrophenol. Other compositions consist of dichlorbenzene and its homologues, dissolved in paraffin wax or naphthalene, and the condensation products of these chloro-compounds with the phenols of tar oil (*Brit. Pat.*, 20,260, of 1914, and *Ger. Pat.*, 302,531, of 1917).

Green-heart wood is particularly resistant to marine boring organisms. In order to ascertain whether this property is due to the texture of the wood or the presence in it of toxic substances, Barger has extracted the material with solvents such as alcohol, chloroform, and ammonia. The alcohol extract yielded an alkaloid-like substance similar to berberine, and experiments are now in progress on the preservative action of this material.

The Efficiency of Wood Preservatives.

In order to determine the relative efficiencies of various methods of impregnating sleepers for Indian railway work, an extensive series of tests has been carried out by the Indian

Railway Board (Technical Paper, 231, Simla). 9,000 sleepers and five preservative media were employed, these being "Powellising," treatment with zinc chloride followed by sealing with green tar oil, impregnation with a low content of creosote, and treatment with a mixture of solignum with Rangoon mineral oil and with a green creosote oil-fuel oil medium. The weight of evidence was in favour of using the creosote-fuel oil mixture impregnated by the full-cell process, although "Powellising" gave good results, especially in dry situations.

Many methods are used for testing the toxicity and efficiency of wood preservatives. Sawdust impregnated with an alcoholic solution of the preservative may be used as culture medium, and the actual loss in weight, due to the organism, measured. Using this method with various fractions of coal-tar creosote (7.5 per cent. tar acids by volume), it was found that the most toxic fraction was that with a boiling-point range 270°-315° C., a concentration of one per cent. of this being effective. The residue boiling above 355° C. (8 per cent.) was of little value (Schmitz and Zeller, *J. Ind. Eng. Chem.*, 1921). Another method is to innoculate a nutrient agar medium containing the preservative with the fungus. In some experiments on the fungus *Fomes annosus* in this way, it was demonstrated that the toxic action of beechwood tar is due to its content of phenolic substances. Compared with coal-tar creosote, that from beechwood tar was between two and three times as active, those from hardwood tar and the tar from the Douglas fir were about half as active, while soft wood tar creosote ("Spirittine") had about one-third the activity.

Water-gas tar distillates were less toxic than coal-tar creosote. Petroleum distillates have little or no toxic action. Fifty per cent. of diluent may be added to good quality creosote without appreciably affecting its toxicity towards this fungus. A composition containing about 25 per cent. dinitrophenol, tested by this method, was found to be ten times more toxic than 95 per cent. cresol (Humphrey and others, *J. Ind. Eng. Chem.*, 1915 and 1921). Similar results were obtained with the wood-boring organism *Xylotria*. Towards this, α-naphthol is many times more poisonous than phenol, while naphthalene and anthracene are practically non-toxic.

According to Moll, the poisoning action of salts, as measured against *Penicilium glaucum*, is an additive property of the ions, the following being the order of diminishing toxicity:—mercury, silver, cadmium, cyanogen, copper, zinc, iron, cobalt, chromium and fluorine. Most acid ions, magnesium, aluminium, alkali metals and alkaline earth metals are inactive (*Z. angew. Chem.*, 1920). The efficiency of wood preservatives is closely parallel to their antiseptic power, as measured by the dose required to render a gelatine broth sterile to the mycelium of *Penicilium*. In some experiments on the protection of some mine timber during a period of seven years, Nowotny (*Z. angew Chem.*, 1922), found that tar oil and "basilite" gave complete protection in concentrations of 3.7 and 0.2lb. per cubic foot respectively. Nitrophenols were fairly efficient, but mercuric silicate was inferior to "basilite." Sodium silicate alone or in admixture with lime was of no value. For the protection of green lumber, before kiln-drying, the Forest Products Laboratory of the United States recommends mixtures of sodium carbonate and bicarbonate as suitable antiseptic dips.

The Preservation of Wood Pulp.

More than 70 organisms have been isolated in mechanical wood pulp. One result of their life-processes is the conversion of the cellulose into an unstable form, leading to an estimated loss of from 5 to 10 per cent. of the pulp. The activities of these organisms leads to the deterioration of the finished paper. Thus, there is a decrease in the length of the pulp fibre, more size and bleach are needed, while the strength and colour of the finished paper are impaired. Only borax, sodium fluoride, and sodium dinitrophenolate are of commercial value as preservatives, the yellow colour produced by the latter being easily removed by washing. According to the investigations of the U.S. Forest Products Laboratory, when added to wet pulp containing 30 per cent. dry substance, 1.0 per cent. borax, 0.8 per cent. sodium fluoride, and 0.25 per cent. dinitrophenolate kept the pulp free from mould growth for 8, 12, and 13 months respectively (*Paper*, July 20, 1921). Carbonate and bichromate of sodium, although good preservatives, discolour the pulp. According to Bates (*Pulp and Paper Mag.*, 1921), sodium fluoride is the most satisfactory preservative, the addition of a one per cent. solution, in quantity to correspond with about ½ per cent. of fluoride on the dried pulp, maintaining the pulp intact for 18 months under adverse conditions. The chlorides of zinc and mercury, although they protect the pulp from disintegration due to decay, appear to stimulate a fungus producing discolouration.

A NEW GLASS-MAKING MACHINE.

AUTOMATIC MANUFACTURE OF GLASS BOTTLES.

AT a meeting of the Society of Engineers at Burlington House, London, on Monday, October 1, Mr. Alexander Ferguson gave a description of the new automatic machine for mass production of glass bottles, for which he has prepared designs. The machine has been given the name of the Cyclone furnace, and the claim is made that it allows 540 tons of glass to be made in 168 hours per week, or 120 bottles per minute. Whereas ordinary tanks usually require 100 tons of coal to 100 tons of glass, and in the best practice to date a great achievement has been 60 per cent. coal to glass, it is possible, with the Cyclone furnace, to use only 30 per cent. coal to glass, with a safety margin of 13¾ tons in each 100 tons glass in a furnace occupying 600 sq. ft. instead of the present 8,800 sq. ft., and yet leaving the ground area clear for any other purpose. Another feature of the plant is that it is claimed to be entirely automatic throughout, no skilled labour—outside the machine repair shop—being required after the chemist or glass maker has settled the batches for the glass required.

It should be pointed out that these machines have not yet been made on a commercial scale, the author admitting his inability to find a firm to take up their manufacture or to work them.

Ground Batch Material Fed into Whirling Gases.

The principal feature of the furnace is that the burners are so set as to give a whirling motion to the gases, which travel about 175ft. per second. The walls of the furnace are inclined from top to bottom and the batch material is ground to a mesh of about 60. Into these whirling gases the batch material is fed, and the author's description of the operation is that the molecules of glass, once formed, are cast forth from the whirling gases and coalesce into a liquid homogeneous paste and flow down the walls of the furnace like glucose under the influence of radiant heat. The glass passes on to the forehearth, from which it is gathered and delivered to the bottle-forming plant. The design of furnace was evolved during attempts at an economical method for the manufacture of giant telescope lenses of perfect homogeneity.

The next portion of the apparatus is that in which the molten glass is sucked up automatically and transferred to the moulds, which are mounted on the periphery of a large wheel. These rotating gatherers are so arranged as to suck up the desired quantity for the particular size bottle. The Cyclone machines occupy only one-eighth the area of the Owen's gatherer with three times the capacity, although the times in the moulds are identical.

Capital and Working Costs.

The total outlay on the machines—*i.e.*, gatherers, parisons, blowers, shapers, conveyers and lehr charges can be refunded in 5 years by an amortisation charge of little more than 3d. per gross of bottles at 120 per minute. The total capital cost of such a plant is put at less than that for a plant of one-fourth the size of the ordinary type, and amortisable over 5 years at 4d. per gross of bottles. The author recommends, also, that for real economy cement and glass should be made at the same time in similar plant with duplicate funnels and a cooling rotary for cement clinker; first, because the materials are identical, although in different proportions; and second, because the amount of CO_2 got from the large percentage of lime in cement greatly reduces the coal bill. It is calculated that the coal consumption to make 700 tons of cement and 540 tons of glass would only be 16½ per cent. fuel to products.

Mr. Ferguson, replying to a long discussion, said he had not been able to provide the money in order to instal this plant, but he had had every single part of it tested individually. He had been unable to find a capitalist willing to embark his money in the glass tank at the present moment.

THE MONTH IN ENGINEERING.

(Specially Contributed.)

Mercury Boilers and Turbines.—Within recent years many attempts have been made to devise a mercury boiler and turbine; that is to say, to use mercury instead of water in the boiler, and to drive the turbine by means of the vapour of boiling mercury. Some of the great difficulties of such a principle of power generation have recently been made public. In the first place, it is necessary to design a boiler so that the mercury will boil quietly without "bumping," since otherwise a very severe strain is imposed upon the boiler and its foundations. Again, since the boiling point of mercury is very much higher than that of water, considerably more trouble with expansion and contraction is encountered. Mercury vapour being extremely poisonous, the whole of the boiler and turbine circuit throughout must be absolutely leak-proof, an object by no means easy to attain. In one experimental plant, the whole of the joints in the circuit through which leakage could occur—with the solitary exception of where the revolving shaft of the turbine passes through the casing—are made absolutely tight by welding, and even where riveted joints are employed, these are finished off with oxy-acetylene welding. In the case of joints that have to be opened from time to time, these are also electrically welded, and have to be cut open by means of special pneumatic tools. It is also found necessary to use a room in which the floor is absolutely smooth and on a continuous slope, so that no slight pool of mercury can collect and give rise to traces of vapour in the air, whilst the most powerful ventilation is installed, and the attendants examined at very frequent intervals for any incipient trace of mercurial poisoning. It has been discovered in this connection that one of the best preventitives is to wash with strong sulphur soap, which prevents any trace of mercury sticking to the skin. There is no doubt that the mercury turbine represents a very high advance in efficiency, as compared with the steam turbine, if only the practical difficulties can be overcome.

The De-aerating of Boiler Feed-water.—As discussed in previous Notes, one of the results of the continued increase in the size of water-tube boilers for power-station work is the absolute necessity of de-aerating or "degassing" the feed-water, since in the case of water-tube boilers of over about 100,000lb. of water evaporated per hour, the minute quantity of dissolved air begins to exert a very serious corrosive effect. A very important paper has just been read on this subject by Mr. J. Weir, of Messrs. G. and J. Weir, Ltd., before the Koninklije Institut van Ingenieurs, in Holland. In a boiler feed-water circuit air can be absorbed by the water in three ways: (1) Leaky condenser tubes; (2) excessive aeration of the make-up water; and (3) leakage of air into the feed-water reservoir.

Leaky condenser tubes constitute one of the most serious problems, especially in marine engineering, and in this connection it is interesting to note that Messrs. G. and J. Weir, Ltd., have under consideration the manufacture of these tubes in solid drawn Monel metal, which should certainly prevent the corrosion of the tubes, although the initial cost would seem to be a formidable matter. One method of eliminating air in power-station work is to have an entirely closed circuit between the boiler, feed pump, feed tank, air-extraction pump and the feed pump, in which the boiler level are, however, many practical difficulties in endeavouring to use an ideal circuit of this description. The insertion of a stand-pipe and closed tank in the circuit between the water-extracton pump and the feed pump, in which the boiler level is regulated by a control valve, is only a partial solution of the problem, and Mr. Weir sugests a better method is to use an entirely external feed tank coming into action automatically when required. There is, however, no question that the principle of de-aeration is much simpler.

In Mr. Weir's paper, methods of de-aeration which depend on the principle of boiling the feed-water, and so getting rid of the dissolved air, are considered at length. The simplest form of such apparatus is that used on steamships, in which the feed-water passes from an open feed tank through a spray nozzle into a chamber, where it mixes with the exhaust steam, the pressure in this chamber being kept at that of the boiling mixture by a small pipe connection to the condenser, which also withdraws the liberated air. For land work, however, the tendency to-day is probably more towards using de-aerating plant, depending on the principle of passing water at any convenient temperature through iron or oxides of iron in a finely divided or almost collodial condition.

The New Consett Coking Plant.—The new "Wilputte" coke-oven installation at the Consett Iron Co., Ltd., Durham, is now rapidly approaching completion, and will be one of the most up-to-date coking plants in the United Kingdom, particularly noteworthy as it is constructed throughout of silica brick on the latest American principle, the bricks having been made by the Consett Company themselves. The plant consists of 60 regenerative ovens, with a complete Coppé by-product plant for benzol, ammonia, and tar recovery, having a capacity of 6,000 tons of coal per week. The latest principles in handling have also been adopted. On arrival at the oven the coal will be crushed by a hammer mill plant, handling 90 tons per hour, to a fineness of 80 per cent. through ¼in. mesh, and will then be raised by a 160ft. elevator to an overhead ferro-concrete bunker capable of holding 2,000 tons, the ovens being charged from this by a vertical type of charging car with four eccentric conical compartments. The dimensions of the ovens are 39ft. 5in. long by 1ft. 5¾in. wide, by 10ft. 6in. high, with 2½in. taper, and are intended for a carbonising period of 16-17 hours. The electric-driven discharge rams are of the most powerful description, the rams themselves being of mild steel 2ft. 11in. deep, with cast-iron racks, and the total time of discharge being 30 seconds. As with most silica brick ovens, the quenching is done separately, the charge passing into an electric-driven car and being taken direct to the quenching station.

The cooling, condensing, and by-product plant is also of the latest description, whilst between the coke-oven gas discharge, used for heating the ovens, and the ovens themselves, is a gas holder of 15,000 cub. ft. capacity, which acts as a reservoir to hold the gas for about 50 seconds between cutting off the gas on one side of the ovens and opening out the gas-burner valves at the other. There is also included four ferro-concrete liquor storage tanks, each holding 200 tons, and the Coppé benzol rectification plant for motor spirit is particularly efficient. It is noteworthy that practically no progress has hitherto been made in Great Britain with the use of the highly refractory silica brick, and all British coke ovens, with one or two exceptions, are constructed either of fireclay or semi silica brick, working at comparatively low temperatures. It may be pointed out that the tendency in modern American coke-oven practice is not only towards very high temperatures, made possible by the use of silica bricks, but also still further to increase in the size of the ovens, and there is now talk of carbonising 16-17 tons of coal at one charge in a period of only twelve hours.

The Trade Position.—The position during the past month, although grave, is yet somewhat more promising. This seems to be largely due to expectations as a result of the earthquake in Japan, and a large number of inquiries have been received—for example, for steel and galvanised iron. The general feeling on the London Iron and Steel Exchange is a little better, and a number of iron and steel shares continue to advance very slowly. The political situation is also perhaps a little clearer. Buyers, however, continue to hold off as much as possible, although a number of miscellaneous orders of some magnitude have been received in general engineering. Matters are a shade better on th Clyde, and several orders for new steamers have now been placed, although, of course, the position in shipbuilding generally is really deplorable. Railway material continues to be one of the bright spots, and further orders are being received for locomotives, waggons, rails, sleepers, and other material, whilst the electrical industry is also fairly good.

In the coal trade matters are rather quiet, and the future is a little uncertain because of the Ruhr situation and the possibility of the German output of coal being considerably increased in the near future, whilst, in addition, the American coal strike seems to have been largely settled, and at the same time the trouble between Italy and Greece has resulted in a reduction of business from the Mediterranean area. However, a number of the European markets are still very good, and the home demand is slowly increasing.

Canadian Fuel Problem.—A report from Sydney, N.S., intimates that the British Empire Steel Corporation will put into operation a battery of coke ovens, which were installed two years ago at a cost of several million dollars, but have been idle since erection, and will endeavour to market coke in Quebec and possibly also in Ontario as a substitute for anthracite coal. Coke is generally regarded as the best substitute for "hard" coal, and this development promises to bring Canada one step nearer to independence in respect of fuel.

RECENT ADVANCES IN COTTON DYEING.

NAPHTHOL A.S. AND ITS CONGENERS.

THE dyeing and printing of cotton by means of the production of insoluble azo colours directly on the fabric has been an operation of very great technical importance for over thirty years. Among the various colours that can be obtained by this process, the most important is undoubtedly paranitraniline red or "para red" as it is most frequently termed. To produce this colour the cotton either as yarn or woven cloth is steeped in a solution of β naphthol in caustic soda, dried uniformly and then transferred into a solution of diazotised paranitraniline. Coupling takes place between the diazo compound and the naphthol and the cotton becomes coloured a vivid red. With the possible exception of primuline red (in which the yellow substantive dyestuff primuline dyed on cotton is diazotised and the cotton then passed through an alkaline solution of β naphthol), para red affords the cheapest means of obtaining a bright fast red on cotton.

Progress in the Insoluble Azo Colours Prior to 1912.

Until the few years immediately preceding the war, the technology of para red dyeing was not marked by any striking advances. Improvements in detail were made it is true, such as the introduction of the use of oil products like Turkey red oil in the naphthol bath for the purpose of obtaining a brighter shade, and the addition of antimony salts or glucose to the alkaline naphtholate to prevent the oxidation of the naphthol to undesirable dinaphthyl compounds. Search was directed to the production of other shades by the same process, and a bright green especially was sought. Little success attended these investigations, the only two colours adopted by the dyeing trade, although on a much smaller scale than para red, being dianisidine blue (made by coupling β naphthol-impregnated cotton with a solution of tetrazotised dianisidine and after-treatment with a soluble copper salt) and naphthylamine claret or bordeaux (obtained by coupling β-naphthol-impregnated cotton with diazotised α naphthylamine).

The Introduction of Naphthol AS

About the year 1912, however, the German firm Chemische Fabrik Griesheim Elektron placed on the market a product known as naphthol AS, as an improvement upon β naphthol in the para red dyeing process. This naphthol AS was the anilide of β oxy-naphthoic acid and aroused instant interest amongst cotton dyers and calico printers. The claims made for it, were that its alkaline solution unlike that of β naphthol possessed a distinct affinity for the cotton fibre and thus lent itself better to the purpose of machine dyeing (*i.e.*, dyeing in a jigger instead of in a padding machine), and that the red produced was both more brilliant and faster than the ordinary para red.

As already stated this naphthol AS met with a ready welcome from dyers, but the war intervened before its large scale adoption became an accomplished fact. It appears, however, that during the war and in the years following the war, the Griesheim Elektron Company has been improving and increasing the knowledge of the properties of naphthol AS and of similar allied products. Some indication of the extent to which present knowledge has grown was afforded on Friday night last when Dr. Julius Rath, of the Griesheim-Elektron firm, read a paper to a special meeting of the Manchester Section of the Society of Dyers and Colourists. (Incidentally this may be noted as the first occasion since 1914 on which a German scientist has delivered a paper to a chemical society in England).

The Colloidal Nature of the New Compounds.

Dr. Rath's paper was entitled "Colloid Chemical Researches in Connection with Naphthol AS." The speaker pointed out that whereas an alkaline solution of β naphthol is practically non-colloidal, the corresponding solutions of naphthol AS are all very markedly colloidal in nature. This fact was easily and directly ascertained by examination of the solutions for Brownian movement under the ultramicroscope. There seemed no doubt, said Dr. Rath, that the absorptive affinity of the cotton fibre for these newer products was bound up with the colloidal nature of the latter. A series of products analogous to naphthol AS have been prepared, and it has been found that as their molecular complexity increases, the size of particle constituting the disperse phase in the colloidal solution increases and that the tendency to aggregation and the formation of insoluble precipitates also increases. It has been found to be generally true that as one ascends the series of these substituted compounds of β oxy naphthoic anilide with regard to molecular complexity one finds that the compounds become increasingly difficult to dissolve in caustic soda, increasingly liable to give insoluble precipitates from their alkaline solutions and capable of giving increasingly faster dyeings on cotton. The insolubilisation of these compounds is a definite disadvantage and proceeds from chemical as well as physical causes, but it has been found that whereas it is impossible to do anything to delay the undesirable chemical action, yet by the addition of formaldehyde and of a protective colloid such as glue to obviate the physical aggregation process, the life of the solutions may be very appreciably extended.

Dr. Rath concluded by giving an account of the newer products placed on the market by the Griesheim Elektron Company. Some were used merely as shading colours for the naphthol AS, one gave a bordeaux shade with diazotised paranitraniline and one naphthol ASSW gave, when coupled with the diazo compound of a special base marketed by the Griesheim firm, a very dark purplish blue, which for all practical purposes could be considered a black.

The Importance of the Naphthol AS Colours.

An interesting discussion followed Dr. Rath's paper. Professor A. G. Green pointed out that this new work should throw considerable light on the theory of cotton dyeing. In reply to one question, Dr. Rath said that although these new products possess a distinct affinity for the cotton fibre yet they had proved unsuitable for the dyeing of acetate silk, their molecules being too large to enter the extremely minute filaments of the cellulose acetate fibre. Mr. Schofield, who moved the vote of thanks to the lecturer, pointed out that the use of naphthol AS and its congeners was spreading rapidly, and that it was not beyond the bounds of possibility that they would in time become serious rivals to the vat colours in cotton dyeing. The most recent colour in the series and one which had not been mentioned by Dr. Rath, was a beautiful yellow (of a quinoline yellow shade). Mr. J. R. Hannay, who seconded the motion, said that the Chemische-Fabrik Griesheim Elektron had catered more efficiently for the dyer than for the calico printer.

ISOPROPYL ALCOHOL.*

PROPERTIES AND COMMERCIAL USES.

AS the chief claim of isopropyl alcohol to recognition as a valuable commercial commodity lies in its solvent and preservative properties, it seemed desirable to determine to what extent these characteristics are comparable with those of ethyl alcohol. References to the physiological action of isopropyl alcohol have occurred in increasing number during the past 2 or 3 years. Grant and Johns (*Am. J. Pharm.*, 1922, vol. 94, p. 418) performed tests which satisfied them that isopropyl alcohol could be safely used for irrigating wounds, rubbing on to the skin and scalp, and for local applications generally to the body surface. They used it in lotions for chapped hands and after shaving, in liniments, liquid soap, and in antiseptic solutions for the throat; to cleanse small wounds and to dry and harden the skin of the hands when swollen by hot water and alkali. Sponge baths were taken in isopropyl alcohol of about 50 per cent. concentration. Specimens were distributed to nurses and hospitals, and used, under medical supervision, for alcohol rubs on a number of patients. In no case was any injurious effect noted. In an intensive experiment five volunteers wore bandages saturated with undiluted isopropyl alcohol covering an area of about sixty square inches on the forearm for from 3 to 7 hours daily for four successive days, a total of 21 hours for each man. No harmful effects, either local or systematic, were noted.

J. Pohl (*Biochem. Z.*, 1921, 127, 67-71) concluded from tests made on dogs and rabbits that small non-harmful doses of isopropyl alcohol are largely oxidised in the body, and that when given in small doses over a long period there is no inhibition of growth. Boruttau (*Deut. Med. Wochschr.*, 1921, 47, 747-8) found that it produced about the same effects on rabbits as ethyl alcohol. Small amounts could be given to animals per mouth or subcutaneously in proper dilutions for prolonged periods without harm.

* From account by H. C. Fuller, of the Institute of Industrial Research, Washington, in *Chemical and Metallurgical Engineering*, Sept. 17, 1923.

Physiological Action Similar to that of Acetone.

The general observations of those who have studied the effects of isopropyl alcohol warrant the conclusion that the animal economy is capable of absorbing reasonable amounts of this substance without the accompaniment of toxic results. It is, without doubt, sufficiently innocuous to be employed as a solvent and a preservative in the formulation of certain types of medicines, liniments, embrocations, rubbing compounds, dentifrices, antiseptic mouth washes, hair tonics, bay rums, perfumes and toilet waters.

A series of intensive experiments conducted by the writer on lower animals and human beings has demonstrated that isopropyl alcohol has no deleterious action on the optical system. Its physiological action on the internal animal economy may be considered in general comparable with that of acetone, to which substance isopropyl alcohol is oxidised by metabolic changes. Acetone has enjoyed an unrestricted use for a long period, it is not a toxic substance, and the ingestion of isopropyl alcohol in the quantities that might enter the system through the administration of medicines and such food products as flavouring extracts would occasion no other reaction than that which might normally occur when the same quantity of acetone is consumed.

Superior to Ethyl Alcohol as a Germicide.

In tests against bacteria, increasing quantities of isopropyl alcohol were mixed with standard extracts broth and inoculated with *Bacillus typhosus*. After incubation, sub cultures were made whereby the disinfectant effect was determined. In the fermentation tests only the inhibitory values were recorded. These tests demonstrated the superiority of isopropyl alcohol over ethyl alcohol as a preservative agent and as a disinfectant.

Uses as Solvent in Pharmaceuticals and Medicinals.

Isopropyl alcohol is a clear, colourless liquid which when pure has but a slight odour. It boils between 81 and 83° C. It is miscible with water in all proportions and dissolves volatile oils, resins, many inorganic bodies, and a large number of organic compounds, alkaloids and the like.

As a solvent for preparing medicines and holding the active principles in solution, isopropyl alcohol has an almost unlimited field. A series of standard pharmaceuticals has been prepared and kept under observation for a long period without showing any change either in appearance or therapeutic value. These products include soap, liniment, spirit of camphor, aromatic spirit of ammonia, tincture of iodine, antiseptic liquid, alkaline antiseptic liquid and many others for which there are prescribed standards in the U.S. Pharmacopœia and National Formulary.

Massage and rubbing mixtures combining the virtues of camphor, thymol, menthol, and eucalyptol in isopropyl alcohol have been found to be stimulating and cooling to the skin and muscles.

For preparing mouth washes, isopropyl alcohol furnishes a satisfactory medicine for combining the characteristic oils such as gaultheria, eucalyptus, pine and coriander with thymol, menthol, phenol, cresol, boric acid, ammonium chloride, sodium benzoate, borax and potassium carbonate. Tooth washes made with soap, myrrh, oils of cassia, clove and those above mentioned, and coloured characteristically with cudbear, cochineal, rosolic acid and methyl orange can be made with isopropyl alcohol.

For all types of hair tonics, isopropyl alcohol can be employed to advantage as a solvent for the medication commonly employed such as resorcin, salicylic acid and quinine, the extracts of pilocarpus and sage, and the characteristic perfuming oils such as lavender, rosemary and bergamot. Isopropyl alcohol is an excellent solvent for the delicate essential oils, concentrates and artificial esters that are used in the multitude of colognes, perfumes, toilet waters and other preparations. The employment of a specially refined form of isopropyl alcohol will yield products equalling those made with Cologne spirits and free from the objection that now obtains in the employment of alcohol denatured with a varied assortment of medicaments which often put decided limitations on the use of the solvent.

Isopropyl alcohol is a remarkable dehydrating and constricting agent, acting in this respect fully as strongly as does absolute ethyl alcohol. Its use in the pathological laboratory for dehydrating tissues, sterilising instruments, dissolving stains, preserving specimens, etc., has been subjected to practical test and found satisfactory.

THE OUTLOOK FOR TEXTILE CHEMICALS.

SIR MAX MUSPRATT'S VIEWS.

SIR MAX MUSPRATT (chairman of the United Alkali Company), in the course of an address upon "The Essential Partnership of the Chemical and Dyeing Industry," delivered last week before the West Riding section of the Society of Dyers and Colourists, at Bradford, made some interesting comments upon the present situation and future outlook of the chemical and dyeing trades in relation to their products and supplies.

The Direct Utilisation of Chlorine.

Dealing with the position of the various chemicals used in the textile industries, Sir Max said there were enormous possibilities in the better utilisation of chlorine. It was a very moot point whether the large consumers of bleaching powder were not paying to the railway companies, to the makers of wooden casks, etc., an unnecessary amount of money, because many held the view that the right method to be adopted by bleaching-powder users of any considerable size was to buy liquid chlorine and make the liquor themselves on the spot. Potash was the only national source of uneasiness. During the war, however, we got through, and there was never a real shortage of the chemical in Britain. It was worked entirely on uneconomic lines, though, and he thought the position of potash was one of the weak spots in our economic system which it would be wise for all concerned in the textile, chemical, and dyeing industries to watch from year to year, because if there were any means of remedying it that should be done. Tin and zinc need not cause us any anxiety except in the event of an almost complete blockade.

Acetic Acid and Sodium Chlorate.

With regard to acetates and acetic acid, England was almost entirely dependent upon other countries. Fortunately, the sources of supply were widely distributed, but it was one of the weak points. There was a solution in sight, although it was not yet on economic lines. Synthetic acetic acid had come to stay, and it was up to either the dyeing industry or chemical manufacturers to see that at any rate our nucleus of synthetic acid was made in this country. The dyeing industry need not be very anxious about sodium chlorate, and economically we might take it that Britain, on the heavy chemical side, was in a position to meet any competition in the world, and to supply the dyeing industry with what it required on reasonable terms.

Co-operation Between the Industries.

Reasonable terms constituted the real test of the partnership between the industries. The ordinary old-fashioned haggling was not good enough. Each must have sufficient knowledge and information concerning the other, and by coming together and finding what the real problems were, it would be possible, in 60 per cent. of the cases, to obtain economic advantage for both, without any friction or idea that one must be overcharged or the other underpaid. In regard to synthetic ammonia, Brunner, Mond and Co. had taken over works established during the war, and he felt certain that there would be a plant in the country capable of making synthetic ammonia in time of stress. Our real strength, however, lay in our gasworks and coke ovens. It was highly desirable, however, that there should be a synthetic ammonia works in Britain, and the firm of Brunner, Mond had shouldered the responsibility of seeing that such was established.

THE CHILEAN COPPER INDUSTRY.

EXPANSION OF OUTPUT IN 1922.

IN a report on the financial and industrial conditions in Chile, dated April, 1923, and published by the Department of Overseas Trade, Mr. J. M. Macleod, British Consul-General at Valparaiso, states that during 1922 there has been renewed activity in the copper industry, and the large mining concerns are arranging to increase their production very considerably. The Chile Exploration Co., who own the important deposits at Chuquicamata, province of Antofagasta, are at present treating daily about 14,000 tons of ore of 1.63 per cent. copper, and they are arranging to increase this to 21,000 tons, and ultimately, when the copper industry is more normal, they will be able to handle up to

35,000 tons daily. The Braden Copper Company, owning the Teniente Mine near Rancagua, are handling at the time of writing about 7,000 tons daily of 2.16 per cent. ore. The copper ore at Chuquicamata is treated with sulphuric acid, and then submitted to the process of electrolysis, after which the resultant copper, then containing from 80 to 90 per cent. of pure copper, is placed into a refiner and "poled," pure copper being obtained and poured into moulds, and exported in the form of bars or slabs. The copper ore at "Teniente," owing to its different character, cannot be treated by the electrolytic process. It is thrown into large furnaces, and smelted into matte containing approximately 50 per cent. copper. The matte is then placed in a convertor, and pure copper in bars and slabs is obtained ready for export. Both the Chile Exploration Co. and the Braden Copper Co. are controlled by the Guggenheim interests in New York.

Progress of the Anaconda Company.

The Anaconda Company, one of the Guggenheim's principal competitors in the copper market, are intensifying the preparatory work at their mine, which is situated inland of Chanaral, province of Atacama. It is reputed to be larger than Chuquicamata, but the difficulties of exploitation are far greater owing to the mine being situated at an altitude of something like 12,000 feet, and a considerable distance from the sea coast. The company has spent several millions of U.S. gold dollars on the preparatory work, including the construction of a special port, Barquitos, a little to the south of Chanaral, and also a railway from the mine to join up with the longitudinal railway at the Pueblo Hundido station, from whence there is a branch line belonging to the state, to the coast at Chanaral. The exploitation at Calera (Las Guias) has been entirely abandoned, it having been found to be unprofitable to go ahead with the scheme.

Export Statistics.

Chile occupies second place in the world for copper production, and probably when Chuquicamata, Braden and Potrerrillos are working at full capacity she will be the leading copper producing country in the world. According to Government statistics, exports of copper ingots amounted in 1920 to 85,165 tons, 53,425 tons in 1921, and 109,420 tons in 1922. Exports of copper ore rose from 24,769 tons in 1920 to 69,248 tons in 1921 and 116,645 tons in 1922.

NOTES ON THE ITALIAN CHEMICAL INDUSTRY.

[From Our Own Correspondent.]

Genoa, September 29.

General News.—5,480 workpeople were unemployed in the Italian chemical industry during the month of June, as compared with 5,394 in May, 4,750 in April, 4,790 in March, 4,886 in February, 4,881 in January, and 5,591 in December of the past year. By a recent arrangement an unloading tariff of 6 lire has been fixed at the port of Venice for lump pyrites, with a slight increase for friable or powdery material. At the port of Leghorn the unloading tariff for phosphates has been brought to 5.20 lire per ton, for sulphur to 5.60 lire, and for saltpetre to 4.20 lire. Data collected by the Associazione Bancaria Italiana regarding the activities of limited companies show that during August 171 concerns were founded with a total capital of 319,255,700 lire, and 93 increases of capital took place for 221,027,860 lire. During the same period there were 34 liquidations for 38,658,000 lire, and thirty reductions of capital for 104,440,360 lire. The net total increase in investments was 397,725,200 lire.

Italian Overseas Chemical Trade.—During the first three weeks of August imports into Genoa included 839 tons of kaolin, 20,645 tons of phosphate mineral, 375 tons of copra, 1,421 tons of unspecified chemicals, 85 tons of colours and varnishes, 280 tons of tallow, 2,670 tons of quebracho extract, 2,200 tons of naphtha, 800 tons of resin, 1,715 tons of lubricating oils and fats, 1,250 tons of paraffin, 3,587 tons of manganese, 2,600 tons of iron pyrites, 670 tons of nitrate of soda, and 4,063 tons of myrabolams. During the last week of August there were discharged in the port of Trieste 1,500 tons of benzine, from New York, and 3,800 tons of phosphates from Bona. During 1922 about 128,147 tons of fertiliser materials arrived at Venice, against 188,003 tons in 1913. The present trade of this port represents sixty per cent. of its pre-war extent. The imports of fertilisers and coal, however, have now nearly reached the amounts ruling at the beginning of 1914.

Italian Production Statistics. — Italian production of benzine reached 1,243 tons in 1921, against 1,563 tons in 1920, 1,657 tons in 1919, 2,233 tons in 1918, 2,150 tons in 1917, 3,060 tons in 1913, and 2,779 tons in 1910. The production of asphalt and bitumen in 1921 reached 33,601 tons, against 28,031 tons in 1920, 14,237 in 1919, 7,625 tons in 1918, 13,608 tons in 1917, 56,324 tons in 1913, and 41,033 tons in 1910. The Montecatini Combine produces 50,000 tons of the 75,000 tons of copper sulphate required by Italy, and 45,000 tons of sulphur against a total requirement of 80,000 tons.

The Position of the Calcium Citrate Industry. — In 1908 the Camera Agrumaria was established with the object of assisting the many small Italian citrate-of-lime producers, and protecting them against the large combines buying the product. Instead, however, of trying to ease matters by making the profit of the individual producers depend on their actual work, the Camera Agrumaria assumed from the beginning the main features of a State organisation, furnished with full powers. Their practice was to receive into stock all the citrate of lime of the producers, and to advance to the latter two-thirds of the ruling selling price. The product was thus delivered to the Camera Agrumaria, which had to look after its sale, and when this had taken place, the producer was paid the other third of the price, against withdrawal and cancellation of a credit note. During the war the producers were unwilling to continue under a similar arrangement, and exerted pressure upon the Government. The matter ended by a decree being issued in 1919 fixing a lower selling price, which had, however, to be paid in full at the time of the transference of stocks. The selling price was calculated on the cost of production plus a small margin of profit for the producers and manufacturers. In this way all the trading risks were transferred to the Camera Agrumaria, for while the latter body could not refuse payment for the citrate brought in by the producers, it could only sell a portion of it, while the warehouses remained overstocked. Since the Armistice matters have but little improved, and the Camera Agrumaria remains yet the exclusive seller of citrate of lime, the largest banks being obliged to finance it *bon gré mal gré*, through agreements made with the Government.

Improved Lignite Carbonisation Process. — Professor Mondello, after carying out numerous experiments in the works of Sesto Fiorentino on some Tuscan lignites, has come to the conclusion that these can be best utilised by effecting their carbonisation with superheated steam. The results obtained in this case, which will be exploited by a syndicate represented by the firm P. Zomer and Co., of Florence, are of great importance to the Italian mineral industry. The lignites and turf treated with superheated steam are decomposed into numerous by-products, leaving a residue composed entirely of desulphurised and dephosphorised coke, having a calorific value higher than 6,500 calories. The yield of coke reaches forty-five per cent. by weight, and the yields of paraffin-rich tar and of ammoniacal liquor are just double those obtained from lignite carbonised by a direct fire.

Crude Sicilian Sulphur for Agricultural Purposes. — The greater part of the Sicilian sulphur now produced is employed in agriculture, and here not only ground sulphur is demanded, but refined sulphur also. For this reason numerous refining plants have been established in Sicily, the number in 1921 reaching twenty-four, of which fifteen were in the province of Catania, eight in the province of Girgenti, and one in the province of Palermo, with a production of 36,523 tons per year, valued at 33,570,917 lire. The use of refined sulphur for agricultural purposes is, however, considered unnecessary, as from time immemorial the small vine cultivators of Sicily have used only the crude ground mineral, and this practice has now developed in all the vine regions of Southern Italy. In some sulphur mines in Southern Italy plant has been erected for grinding the crude sulphur mineral. Minerals with only twenty per cent. of sulphur have given good results for viticultural purposes.

Company News.—The Milan firm "Società Acetato di Calce Industrie Derivati" has decided to increase its capital from 150,000 to 300,000 lire. At Borgo S. Donnino the firm "Società Anonima Tito Campanini e C." has been founded with a capital of 450,000 lire in 4,500 shares of 100 lire; this is a limited company formed from an old-established chemical manufacturing firm. At Chiusa Pesio, near Cuneo, the "Società Anonima Prodotti Tannici Dott. Allassia Bartaloni e Compagni" has been formed with a capital of 100,000 lire, for the production of tanning extracts. At Turin,

the firm "Industria Chimica Subalpina," with a capital of 60,000 lire, has been established for trade in general chemicals. With the object of producing synthetic ammonia on a very large scale there has been founded at Milan the firm of Azogeno, with a capital of 10,000,000 lire. The firm of R. e G. Fratelli Incorpora has been formed at Palermo with a capital of 200,000 lire, for the production of and trade in citrate of magnesia.

The report of the Naples sugar works "Società Valsacco per la Fabbricazione dello Zucchero" to March last shows a net profit of 482,630 lire on a capital of three million lire. The "Unione Produttori e Consumatori di Materie Coloranti," of Milan, made during its past financial year a profit of 186,734 lire on a capital of two million lire. The fertiliser works "Società Veneta Concimi e Prodotti Chimici CITA," of Vicenza, is raising its capital from 2½ million to 5 million lire. The sugar works "Zuccherificio e Raffineria di Pontelongo" in conjunction with the "Distilleria di Cavarzere" has established the "Società Veneta per l'Industria degli Zuccheria" at Este. This latter factory will have a sugar works and refinery, with a potential daily consumption of one million kilos. of beetroots. The last balance-sheet of the Sicilian sulphur extracting and working concern "Sikelia-Società Anonima Esercizio Miniere ed Industria Zolfi of Catania" showed a loss of 185,766 lire on the capital of one million lire. At Genoa there was founded the firm of "Barum-già Cadenaccio Gianolio e C.," with a capital of 400,000 lire in 400 shares of 1,000 lire, for the production of and trade in barytes. At an extraordinary meeting of the "Oleificio Bergamasco," Bergamo, near Milan, it was decided to increase the capital from ten to fifteen million lire by the issue of further shares.

THE SHIPMENT OF RUBBER LATEX.

ATTITUDE OF BRITISH PLANTERS.

IN a paper before the Institution of the Rubber Industry on Monday, Mr. Cyril Baxendale, an old rubber planter, gave a fascinating account, illustrated by coloured lantern slides, of the conditions under which rubber and other planters had to live in the old days. There is no need for us to deal with the paper in detail, but there is a point of some technical interest which arose in the short discussion which followed the reading of the paper. Some information was asked for concerning the possible developments in the direct use of latex. Mr. Baxendale replied that this was a matter which must rest largely with the people in this country, and not with the planter. As a planter he would have no difficulty in keeping the rubber in the latex form, but there would be wastage in the matter of freight if it were shipped to this country. At the same time, it would not be a very serious matter for the planting company to abolish its present factory and get rid of its machinery if it were decided to send the rubber home in the form of latex. It would first be necessary, however, to ascertain that there would be a sufficient market in this country.

It was a simple matter for a great organisation like the United States General Rubber Company, which had some 50,000 acres all practically in bearing at the present time, in Sumatra, to say nothing of their interests elsewhere, to ship latex because they would be dealing with it in their own factories in America, and he had been told that shipments of 90,000 gallons were being made. British rubber planters, however, would be rather shy about sending home large shipments of latex to be sold in the open market.

OUR BOOKSHELF.

Radio-Activity. By Kasimir Fajans (Professor of Physical Chemistry in the University of Munich). Translated from the Fourth German Edition by T. S. Wheeler, B.Sc., A.R.C.Sc.I., A.I.C., and W. G. King. 1923: London: Methuen and Co., Ltd.; price 8s. 6d. net.

The first German edition of this work was published in 1919, and the fact that a fourth edition was called for by the beginning of 1922 is ample evidence of its inherent merit. Whilst the subject matter is presented in such a manner that those possessing but an elementary knowledge of physics and chemistry can follow the development of this important branch of modern scientific progress, the work should none the less be welcome by those physicists and chemists who have not opportunity to keep pace with the rapid development of the subject by reference to the original literature. Commencing with the study of the chemical elements previous to the discovery of radioactivity, the book deals successively with the radioactive transformations of the elements, the chemistry of the radio-elements, the displacement laws and their application, and the end products of the disintegration series. The subject of isotopy is dealt with at great length, special attention being given to the more important recent work. The final chapter, entitled "Retrospect and Prospects," is useful and suggestive. The section giving references and notes as a guide to further study of radioactivity and isotopy is comprehensive, and should be of very material aid to advanced students. In the present English translation, which has been revised by the author, the subject matter has been brought quite up to date—as far as the discovery of the new element hafnium. The volume is well produced and illustrated by diagrams. The translators are to be congratulated on a valuable piece of work, and if they have not quite succeeded in altogether avoiding the idiomatic construction peculiar to the original German, they have come very near to achieving this very difficult task.

Chemical Engineering Catalogue (1923). Published by the Chemical Catalog Company, Inc., 19, East 24th Street, New York (leased 3.50 dollars foreign countries).

The volume is published annually under the supervision of an official committee appointed by the American Institute of Chemical Engineers, the American Chemical Society, and the Society of Chemical Industry. A curious arrangement is that the volume is subject to recall being leased only. Its make-up consists of 207 pages of classified index of products, equipment and materials covering every conceivable product made in the industry and all plant, devices and material incidental to it. This is followed by 721 pages of illustrated catalogue matter, in which American chemical engineers and other manufacturers describe the uses and advantages and general details of plant for chemical purposes. It is indeed quite a unique publication, and probably the only one in existence which you could place on your desk and from it map out the whole of the equipment for quite a considerable chemical works without writing for and handling a hundred or two separate catalogues. The volume is completed with a large Technical Books Index and Catalogue, and the whole could only have been produced by the investment of a huge sum of money by American manufacturers for the advertisement it gives them.

Practical Chemistry for High Schools. By H. B. Dunnicliff, M.A. (Cantab.), B.Sc. (Lond.), F.I.C., Professor of Chemistry at the Government College, Lahore, India. 1923: London: Macmillan and Co., Ltd.; price 5s. net.

An eminently practical little volume. The student is familiarised from the outset with the fundamentals of chemical technique and of the fitting up of simple apparatus. In the second lesson, for example, the young student is taught to make a wash-bottle with the concomitant operations of glass-tube cutting, glass-tube bending, and cork boring, the instruction being given in great detail. The early introduction of the use of the burette and pipette is a matter in which we think the author has adopted a wise policy. The preparations, properties, and analytical reactions of the commoner non-metallic and metallic elements and compounds are fully described, and are followed by the systematic tests for the acids and metals. The fundamentals of quantitative analysis, both gravimetric and volumetric, are imparted in a series of well-chosen examples.

A First Course in Machine Construction and Drawing. T. M. Naylor, B.Sc., A.M.I.C.E., A.M.I.M.E., Eng.-Lt. R.N., and W. Tattersall, Assoc. M.C.T., A.M.I.M.E. London: H. F. and G. Witherby; 6s. net.

For the use of students and junior draughtsmen commencing the study of engineering. The authors lay stress upon the combination of an experienced teacher, models, and text-book, the latter up to now having been unavailable. The general arrangement—sketches on one page faced with reading matter relative to them on the other—is undoubtedly a great advantage. Ample space is provided for notes, and there can be no doubt about the more rapid progress which students will be able to make where this book is used. Such a book must implant sound mechanical foundation.

ITEMS OF INTEREST.

Broken Hill Mine to be Sold.—A Melbourne telegram states that the shareholders of the Broken Hill Block 10 Company have authorised the directors to sell the mine.

Higher Coal Output.—The coal output at the mines of Great Britain for the week ended September 22 was 5,504,300 tons, against 5,244,700 tons for the previous week, and 5,143,900 for the corresponding week last year.

Tariff Notes.—The Fijian export duty on copra has been abolished.—The export of gum copal is now permitted from Sierra Leone.—Anthraquinone can now be imported into Madagascar duty free.—The Polish excise duties on alcohol and acetic acid have been increased.

Rhodesia Mineral Output. — The British South Africa Company announces the following mineral output from Southern Rhodesia during August: Gold, 53,256oz.; silver, 14,114oz.; coal, 61,772 tons; chrome ore, 789 tons; copper, 224 tons; asbestos, 2,020 tons; arsenic, 65 tons.

Modern Sewage System for Japan.—The Acting British Consul at Osaka reports that the Municipality of that city propose to construct a modern sewage system at an estimated cost of £15,000,000. It should be understood, states the Board of Trade *Journal*, that this information was despatched from Japan before the recent catastrophe.

Standardisation of American Dyestuffs.—The colour laboratory of the United States Bureau of Standards under the leadership of Dr. Appel is trying to find a basis of standardisation for the more important colours, which are manufactured by more than one American firm. At present wide variations exist in strength and purity.

Cement Trade Development.—The Humber Portland Cement Company, Ltd., have issued a circular to the shareholders stating they have received an offer from G. and T. Earle, Ltd., Hull, to purchase the whole of their issued ordinary shares at 30s. 3d. per share. The directors, who either hold or directly represent some 200,000 ordinary shares, are in favour of accepting the offer.

Magnesium Perchlorate as a Dehydrating Agent.—Magnesium perchlorate trihydrate is so efficient a dehydrating agent that, according to G. F. Smith, M. Brown, and J. F. Ross, it may be used in the place of phosphorus pentoxide in the combustion method for determining carbon in steel and carbon and hydrogen in organic compounds. It will absorb 30 per cent. of its weight of water.

British Sugar Industry. — In connection with the proposal to inaugurate a sugar beet factory in Worcestershire, it was announced last week that arrangements for a factory to operate in 1924 were well in hand. Of the required sum of £320,000., promises for £205,000. had been received, and provisional arrangements for the supply of the factory machinery and expert assistance for manufacturing operations had been made.

The Institute of Metals. — The Institute of Metals has just issued its programme of meetings and lectures for the Session 1923-24. There are over thirty lectures and addresses to be given before the Institute's local sections in Birmingham, Glasgow, London, Newcastle-on-Tyne, Sheffield, and Swansea, as well as at meetings of the parent Institute, one of the latter including a lecture by Dr. F. W. Aston, F.R.S., which is to form part of the proceedings of next year's Empire Congress of Mining and Metallurgy.

Greek Soap Trade.—The production of soap is the third largest export manufacturing industry in Greece, ranking next to the olive-oil and wine industries. Practically all the soap normally exported from the country goes to Turkey, Jugoslavia, Bulgaria, North Africa, and other near-by countries. Statistics furnished by the American Commercial Attaché at Athens show that during last year soap was the sixth largest item of Greek export, totalling 7,659,660kilos. In 1921, however, shipments of soap totalled 9,420,781kilos. In general, Greek soap factories are located in districts producing the greatest quantities of olive oil. A large part of the soap produced contains no ingredients other than low-grade olive oil, olive stone oil, and caustic soda. Large quantities of the fancy grades are imported from England, France, and Italy, England furnishing the largest amount. Last year Greece imported 133,690kilos. of soap, as compared with 206,081kilos. in 1921.

Business Notice. — The British and Foreign Metal and Chemical Company, Ltd., of Newcastle-upon-Tyne, have been appointed the sole selling agents for Maastricht lithopones and zinc oxides for shipment to India, Japan, and China.

Huge Barytes Crystal.—In the Silver Band barytes mine, at Hilton, near Appleby, miners recently dug out a crystal weighing close upon 1cwt., composed of practically pure barium sulphate. It is intended to present it to a museum.

Czecho-Slovakia and Reparation Dyes.—It is reported that the Czech Government has applied to the French command in the Ruhr to confiscate a further quantity of German dyestuffs owing to Czecho-Slovakia as non-delivered reparations.

Death from Arseniuretted Hydrogen.—At the resumed inquest on E. G. Wright, employed at Fry's Metal Foundry, Blackfriars, it was shown that the man died as a result of inhaling arseniuretted hydrogen given off from certain residue metal which had come into contact with rain water. The Coroner found that death was due to misadventure.

Russia and German Dyestuffs.—The Interessengemeinschaft is evincing great reluctance to meet the demands of the Russian dye trust for intermediate products, but is willing to supply the finished colours to the best of its capacity. Before the war Germany owned factories in Russia which finished the dyestuffs from imported German intermediates.

Fire.—Three men were seriously burned in a fire which occurred on Wednesday at the Brierley Hill (Staffordshire) works of Messrs. Constable, Hart and Co., tarmac manufacturers. Tar leaking from a still caught fire, and while the injured men, with others, were trying to damp down the flames there was an explosion, and the men were enveloped in flames.

Canadian Trade Marks' Registration. — The Canadian High Commissioner states that since Canada has notified her adherence, as from September 1, to the International Convention of 1911 for the Protection of Industrial Property, Canadian trade marks can now be registered in Belgium either by application to Berne, or directly at Brussels, in the usual way.

Cheaper Coke in Midlands.—Midland blast-furnaces are to get cheaper coke during October. For some months Lancashire, Yorkshire, Derbyshire, Nottinghamshire, and Staffordshire cokeries have been charging 26s. at the ovens to home trade. A reduction of 2s. has been accepted by iron-trade representatives on the promise of an early review of the situation.

British Trade with India.—Mr. T. M. Ainscough, Senior Trade Commissioner in India, is at present in this country on an official visit, and will be in attendance at the Department of Overseas Trade during October for the purpose of interviewing manufacturers and merchants interested in trade with India. Such interviews will only be given by appointment, and all applications, quoting the reference 4814 T.G., should be addressed to the Comptroller-General, Department of Overseas Trade, 35, Old Queen Street, Westminster, S.W. 1.

Change of Address.—Whiffen and Sons, Ltd., announce that as from October 1 the factory and mills of George Atkinson and Co., known as the Aldersgate Chemical Works, at Southall, are removed to New Riverside premises at Carnwath Road, Fulham. The city offices and warehouse, formerly at 31-32, St. Andrew's Hill, London, E.C., are also transferred to Fulham. Telephone: Putney 3385, and telegrams "Camphor, London."—The new address of the British Carbide Factories is Bank Street, Clayton, Manchester.—The Lautaro Nitrate Co., Ltd., announce the removal of their offices to Furness House, 53-54, Leadenhall Street, London, E.C. 3. Telephone: Avenue 6104.

Obituary.—We regret to announce the death at the age of 82 of Professor Herbert McLeod, F.R.S., which occurred at his house in Richmond on Monday last. The late Professor McLeod was a student of Hoffmann and E. Frankland and was distinguished as a chemist, physicist and more particularly as a scientific bibliographer. He held the Professorship of Chemistry at Cooper's Hill for over thirty years. His great work however was in connection with the "Catalogue of Scientific Papers," published by the Royal Society. The task was gigantic and Professor McLeod undertook the labour of directing the staff of compilers and of arranging and editing their work.

Personal.—Upon his final retirement from the direction of the research laboratories of the British Dyestuffs Corporation, Professor A. G. Green was on Friday last presented by his staff of thirty chemists with a handsome library chair as a token of respect and their deep regard for him as a chemist and a leader. The presentation was made by Mr. G. H. Frank, supported by Mr. H. F. Oxley.—The Priestley Medal has been awarded to Dr. Ira Remsen, of John Hopkins University, during the meeting of the American Chemical Society at Milwaukee.

A New Zinc Chloride Antiseptic.—J. W. Howard and F. D. Stimpert described to the American Chemical Society at the recent annual meeting at Milwaukee the preparation, properties, and antiseptic efficiency of the zinc chloride salt of aniline. This salt was prepared by combining zinc chloride and aniline in molecular quantities and extracting the reaction mixture with boiling 95 per cent. alcohol. Studies on *Staphylococcus aureus* indicate that the salt in 0.6 per cent. solution retards growth up to 25mins. and will destroy in 30mins. Comparing with aniline and zinc chloride of the same concentration, it shows a stronger antiseptic action.

The Action of Acetylene on Phenols.—Acetylene in the presence of sulphuric acid and a mercury salt readily condenses with phenols to form ethylidene compounds. H. Wenzke and J. A. Nieuwland have worked on the subject, and in a communication of their results to the American Chemical Society, state that the position of linkage is usually para whenever that position is unoccupied. The tendency to form an aromatic acetal is slight, β-naphthol being the only compound that reacts in that way. The reaction with acetylene continues even after the theoretical quantity of 1 mol. of acetylene to 2 mols of phenol has been absorbed. A tarry, resinous body is formed when an excess of phenol is absorbed. The presence of negative groups in the benzene ring as NO_2, SO_2OH, COOH prevents the reaction with acetylene. The phenol ethers, anisol, and phenetol do not react with acetylene. Most of the condensation products polymerised on heating or on long standing to form insoluble bodies.

Power Alcohol in France.—The law which was passed six months ago requiring importers of petrol and other oils for fuel to purchase from the State a quantity of power alcohol equal to 10 per cent. of the quantity of oil imported the previous month has now come into operation. A licence has to be obtained to import oils, and its continuance depends upon the monthly purchase of alcohol. The law was passed to ensure the absorption of alcohol made from grain and beet-root, which is a monopoly of the State, with the idea of cheapening the spirit for industrial purposes and replacing, as far as possible, imported petrol; but until some really commercial process of dehydrating alcohol is introduced, it is doubtful whether the State can enforce a mixture which is generally recognised as inferior to petrol, although an equal mixture of alcohol and petrol gives quite satisfactory results. The future of alcohol lies more particularly in its cost, and at present it can only be sold cheaply at the expense of the ratepayers. The new law is an attempt to enforce the use of a home-distilled spirit with a view to the ultimate employment of a "national fuel," and the effort of the State to compel consumers to use a product of which it has a monopoly will be watched with interest.—*Engineer.*

Gravimetric Estimation of Nitric Acid. — Catalytic reduction of α-naphthonitril gives α-dinaphthodimethylamine $(C_{10}H_7.CH_2)_2NH$. The nitrate of this base is quite insoluble in water (100 c.c. dissolves 0.00004 gramme at 24° C.). According to H. Rupe and F. Becherer (*Helv. Chim Acta*, 1923, 6, 674), for the estimation of nitric acid or nitrate, the dilute, boiling solution containing a little free sulphuric acid is treated with a 10 per cent. solution of the base in 50 per cent. acetic acid. The precipitant is used after standing on the water bath till clear, because the acetate crystallises out in the cold at the above concentration. The nitrate solution remains clear at first, but, on cooling, the nitrate of the base deposits quantitatively in flaky crystals. The precipitate is collected on a Gooch crucible, washed with cold water, dried, and weighed. Sulphate and phosphate do not interfere, but the chloride is less soluble. The limit of sensitiveness for the detection of nitric acid by precipitation with the new reagent is given at about 1 : 1,000,000. The qualitative test is carried out in the cold; very dilute nitrate solutions give an opalescence, which on standing develops into a precipitate.—*The Analyst.*

Decomposition of Anthraquinone by Heat.—The action of dry heat and steam at atmospheric and elvated pressures has shown, state H. F. Lewis and S. Schaffer, that there is a definite point beyond which anthraquinone begins to decompose rather rapidly. These upper temperature limits of stability approach 450° C. with an air pressure of 35 pounds, 400° C. with a steam pressure of 35 pounds, and 375° C. with a pressure of 30 pounds of oxygen. A temperature of 500° C. decomposes anthraquinone at such a rate that at the end of eight hours approximately 80 per cent. of the original anthraquinone has been decomposed. A study has been made of the decomposition products which shows that there are at least two new substances produced—one extremely stable and the other very unstable; the stable substance being of the nature of hydroxy-anthraquinone and the unstable substance indicating the condensation of two or more molecules of anthraquinone.

COMING EVENTS.

Society of Chemical Industry (Manchester Section).—Meeting, **Friday, October 5,** at **7 p.m.,** at the Textile Institute, 16, St. Mary's Parsonage. Chairman's address: "Recent Progress in Chemistry," by Dr. H. Levinstein.

Manchester Literary and Philosophical Society.—Meeting, **Tuesday, October 9,** at **6 p.m.** Presidential address: "Coal-dust explosions at the Mines Department Experimental Station at Eskmeals," by Dr. H. B. Dixon.

Institute of Metals (N.-E. Coast Section).—Meeting, **Tuesday, October 9,** at **7.30 p.m.,** at Armstrong College, Newcastle-on-Tyne. Chairman's address by Professor H. Louis. —**(London Section):** Meeting, **Thursday, October 11,** at **8 p.m.,** at the Institute of Marine Engineers, The Minories, E. 1. Chairman's address by Dr. D. Hanson.—**(Sheffield Section):** Meeting, **Friday, October 12** at **7.30 p.m.,** at the University, St. George's Square. Paper: "Electric Resistance Furnaces," by A. G. Lobley.—**(Swansea Section):** Meeting, **Friday, October 12,** at **7.15 p.m.,** at University College, Singleton Park. Chairman's address by E. E. Dendy.—**(Birmingham Section):** Meeting, **Tuesday, October 16,** at **7 p.m.,** at the Chamber of Commerce, New Street. Chairman's address by Dr. F. Johnson —**(Scottish Section):** Meeting, **Friday, October 19,** at **7.30 p.m.,** at 39, Elmbank Crescent, Glasgow. Paper: "Large Metallic Crystals and Some of Their Properties," by Professor H. C. H. Carpenter.

Institution of Welding Engineers. — Meeting, **Wednesday, October 10,** at **8 p.m.,** at the Holborn Restaurant, London. Papers on Electric Welding and Gas Welding to be read.

Institute of Chemistry (Bristol Section).—Meeting, **Thursday, October 11,** at **5.30 p.m.,** at the University, Woodlands Road. Address: "Some of the More Important Factors Making for Success in Chemical Practice," by the President, A. Chaston Chapman.—**(Huddersfield Section):** Annual general meeting, **Thursday, October 11.**

Society of Dyers and Colourists (Manchester Junior Section).—Meeting, **Friday, October 12,** at **7.30 p.m.** Paper: "The British Colour Industry," by Dr. H. Levinstein.

Institution of the Rubber Industry (Manchester Section). —Meeting, **Monday, October 15,** at **7.30 p.m.,** at the Midland Hotel. Discussion: "Rubber Machinery," to be opened by H. C. Young.

Hull Chemical and Engineering Society.—Meeting, **Tuesday, October 16,** at **7.45 p.m.,** at the Photographic Society's Rooms, Grey Street. Paper: "Spinning Tops and Gyroscopic Motion," by L. C. Perkin.

Institute of Chemistry.—Conference, **Thursday** to **Saturday, October 18** to **20,** at Liverpool. Thursday, reception and dinner; Friday, presidential address by A. Chaston Chapman, at 10 a.m.—**(South Wales Section):** Meeting, **Friday, October 19.**

Textile Institute.—Autumn Conference, **October 18** and **19,** at Leicester. The chief papers will be: "Artificial Silks," by P. E. King; and "The Application of Dyes to Fibres and Fabrics," by Professor J. Thorpe.

Society of Dyers and Colourists (Manchester Section).—Meeting, **Friday, October 19,** at **7 p.m.,** at 36, George Street. Paper: "Some Aspects of the Theory of Quinones," by Professor R. Robinson.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

British Isinglass Company, Ltd., Grimsby.—Registered September 18, £6,000. debs.

Catalytic Chemical Company, Ltd., Southall.—Registered September 19, £500. debs., balance of £1,500.

Cooke's (W. R.) Finishing Company, Ltd., Nottingham.—Registered September 14, £3,000. mort., to Mrs. M. E. Tomlin, White House Inn, Ilkeston Road, Nottingham, and another.

Indestructible Paint Company, Ltd., London, E.C.—Registered September 13 (by order on terms), deed of agreement and charge securing certain moneys in respect of sewer rate, to Royal Agricultural Society of England.

SATISFACTIONS.

Barnstone Cement Company, Ltd. (late Barnstone Blue Lias Lime Company, Ltd).—Satisfaction registered September 17, £1,000., part of amount outstanding July 1, 1908.

Rolls and Co., Ltd., London, N., varnish manufacturers.—Satisfaction registered September 17, £600., part of amount registered October 13, 1902.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Park Green Dye Works, Ltd.—Resolved September 11: That the company be voluntarily wound up. J. A. Snape, 5, John Dalton Street, Manchester, liquidator.

Oilfields of England, Ltd. — J. H. Beare, of Worcester House, Walbrook, E.C. 4, appointed receiver September 25.

DISSOLUTION OF PARTNERSHIP.

(*Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.*)

Brooke and Farrand (Joseph Aspinall Linton Brooke and Jas. Blackburn Farrand), Amisfield-ho., Hipperholme, chemical manufacturers and merchants. September 11. Debts by J. A. L. Brooke. (September 21.)

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Bissell, S. S. J. (trading as Woodbrook Drug Company), Back 39, Vale Place, Wolverhampton; manufacturing druggist; £13. 11s. 10d. August 17.

Premier Colour Company, 106, Leeds Street, Liverpool; paint manufacturers; £14. 5s. July 30.

Watson, H. J., Welmondin, Goldhawk Road, Hammersmith; polish manufacturer; £19. 15s. 10d. August 23.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Italy.

An old-established and experienced firm of commission agents in Trieste are desirous of securing the representation, on a commission basis, for the Trieste district of British manufacturers and shippers of edible soya bean oil and oil seeds. (Ref. No. 336.)

Poland.

An agent in Warsaw desires to secure the representation for Poland of British exporters of fertilisers. (Ref. No. 342.)

Netherlands.

An agent in Amsterdam desires to secure the sole representation, on a commission basis, for the Netherlands, of British manufacturers of tinplates. (Ref. No. 338.)

Sweden

The following inquiry has been received from the Swedish Consulate General in London, Bank Chambers, 329, High Holborn, London W.C. 1, to whom all replies should be addressed:—A firm in Sweden desires agency for English manufacturers and exporters of soya bean oil, coconut oil, chemicals used in the cellulose and paper industries, essences and vegetable essential oils.

STOCK AND SHARE LIST.

LONDON QUOTATIONS DURING SEPTEMBER.

Div. or Int.	Paid	Name of Company.	Sh're Val.	Aug. 30—Sep. 26 Highest	Lowest
1/–	7/7/23	Allen Liversidge	£1	21/3	20/4½
7%†	17/6/22	Aluminium Corp., Pref. Stk. (7% Cum.)	100	67	67
1/–	16/4/23	Ass. Port. Cement	1	24/9	21/6
–/7½	1/10/23	Benzol and By-products, 6% Cum. Ptg. Pref.	1	§14/7½	14/–
3/–	23/6/23	Bleachers' Assn.	1	49/10½	47/–
5/–	2/7/23	Boake, Roberts, 5% Cum. Pf.	10	*6⅞	6
1/6	17/2/23	Borax Consolidated Def.	1	39/9	37/9
1/–	3/9/23	Bradford Dyers' Assn.	1	58/–	54/–
–/6	1/10/23	British Aluminium	1	20/–	18/6
—	—	British Cellulose, 7½% Cum. Ptg. Pref.	1	14/4½	12/–
–/9	31/5/23	British Cotton and Wool Dyers	5/–	9/–	8/3
1/–	16/12/20	British Cyanides	1	25/–	22/6
—	—	British Dyestuffs, Def.	1	2/10½	2/1½
—	—	British Glues and Chemicals	1	4/3	3/9
1/–	3/9/23	British Oil and Cake	1	28/3	26/3
1/9	12/7/23	British Oxygen	1	47/6	43/6
1/–	31/3/23	British Portland Cement	1	28/9	26/3
1/5⅝	12/6/23	Brunner, Mond	1	40/10½	39/1½
1/7½	15/5/23	Bryant and May	1	45/1½	43/6
2/6	1/10/23	Bush (W. J.) and Co., 5% Cum. Pref.	5	62/6	62/6
2/6	29/9/23	Calico Printers' Assn.	1	30/3	28/9
–/3	30/6/23	Cassel Cyanide**	5/–	16/9	16/–
4½%	1/8/23	Castner-Kellner, 4½% 1st Mt. Db. Sk. Rd.	100	*85	82½
2/–	22/3/23	Cerebos	1	30/9	30/9
1/6	11/1/22	Champion and Slee	1	11/4½	10/3
–/9⅜	2/7/23	Cory (Horace) and Co.	1	14/9	14/9
1/9	3/8/23	Courtalds	1	65/10½	61/9
–/7½	2/7/23	Crosfield (J.), Cum. 6% Pref.	1	20/3	20/–
3/6	8/1/23	Egypt. Salt and Soda (Bearer)	1	25/6	21/–
–/7½	18/8/23	English Velvet Dyers	1	28/–	26/6
1/–	10/7/20	Evans, Sons, Lescher and Webb	1	*8/9	5/–
1/3	3/7/23	Field (J. C. and J.)	10/–	13/6	12/6
–/7½	2/7/23	Gossage (Wm.), 6½% Cum. Pf.	1	20/3	19/7½
2/6	1/8/23	Knight (J.), 25% Cum. Pref. Ord.	1	60/7½	58/9
1/6	18/9/20	Lawes' Chem. Manure	1	*4/6	3/6
–/8⅜	2/7/23	Lever Bros., 7% Cum. Pref.	1	22/3	21/6
—	—	Magadi Soda	1	2/1½	1/6
1/6	3/8/23	Mond Nickel	1	40/–	38/9
–/9⅜	2/7/23	New Transvaal Chemi. A Pf. (8% Cum.)	1	21/10½	21/–
1/4⅘	2/7/23	Nobel Industries	1	21/9	19/9
5%	2/7/23	Pears (A. and F.), 5% Deb. Stk. Irred.	100	92½	92½
1/2⅜	8/9/23	Pinchin, Johnson	1	39/3	35/6
10.16d	23/10/23	Sadler (14⅜/– paid up)	1	*15/3	15/3
2/–	14/5/23	Salt Union	1	20/7½	19/4½
–/10⅜	1/6/23	"Sanitas," 9% Cum. Pref.	1	24/–	23/6
–/7½	2/7/23	Stevenson and Howell, 6¼% Cum. Pref.	1	*19/6	18/1½
–/9⅜	1/9/23	United Alkali	1	31/3	30/3
–/5	1/9/23	United Indigo and Chemi.	3/4	*6/7½	4/3
1/–	28/3/23	United Premier Oil and Cake	1	11/3	10/6
–/9⅜	30/6/23	Wall Paper Manfrs.	1	23/9	22/6
1/6	20/7/23	Welsbach Light	1	13/–	11/–
2/6	2/7/23	Wheen (R.), 5% Cum. Pref.	5	*55/–	51/3
2/–	27/6/23	White, Tomkins and Courage	1	23/10½	23/1½
3/4½	20/6/23	Yorkshire Dyeware and Chem.	15/–	*29/9	21/3
52/– p.c. †	1/9/23	Gas Light and Coke (4% Stand.)	100	97⅞	96½
5%	3/9/23	South Metropolitan Gas, Ord. Stk.	100	99	97½
2/6	2/5/23	Aguas Blancas Nitrate	5/–	34/6	28/3
1/–	21/6/23	London Nitrate	1	52/–	46/–
4/–	4/5/23	Salar del Carmen Nitrate	1	68/9	59/3
7/6	26/4/23	Mason and Barry (Bearer)	1	48/6	45/–
20/–	1/5/23	Rio Tinto (Bearer)	5	35⅞	33¾
5/–	10/5/23	Tharsis Sulphur	2	79/4½	68/1½

All ordinary shares except where otherwise specified.
*January 2 to August 29, 1923. † Actual.
§ From September 20 to September 26 only.
** Quoted at Glasgow.

Fuel Economy.—During September, orders have been received by Meldrums, Ltd., for 29 forced-draught furnaces, four destructors, and four gas washer-scrubbers.

REPORTS OF COMPANIES.

British Cellulose and Chemical Manufacturing Company, Ltd.

The annual general meeting was held in London on Thursday of last week, Sir Harry McGowan (chairman of the company) presiding.

The Chairman, in moving the adoption of the report and accounts, said: Since the date of our balance-sheet, as the report states, further money has been raised. Many discussions took place as to how best we should secure additional fresh capital. In these discussions we again placed all the facts of the company's position and prospects—as we saw them—before Messrs. Dunn Fisher and Co., with the final result that the Cellulose Holdings and Investment Company, Ltd., agreed to take up a further £400,000. of debentures. While H.M. Government have no responsibility in connection with the decisions or the policy approved by your board, they duly and readily granted their consent to the increased debenture issue and the terms upon which it was arranged.

To what has that money been devoted? Well, we have completed the extension of our numerous manufacturing departments so that to-day Dr. Henry Dreyfus assures us that we can produce 4½ to 8 tons per day according to the varieties of yarn required by the trade. Our working capital remaining, composed of raw materials, goods in process and finished goods, and our liquid cash resources are meantime sufficient to face the programme of production and sales we have set out to achieve, and given a return of demand in keeping with our new capacity to produce, we shall add to our working resources according as we make profits. The decision to carry our manufacture on a sufficient scale, beyond the stage of yarn and cord, was not suddenly adopted: it has been growing upon us as inevitable during the past two years. We had sufficient machinery of this class in our works to enable us to work out the various processes as well as to assist other manufacturers to produce the materials. Moreover, in order to get quicker development, we made arrangements with a specialist in the natural-silk trade who had already produced with our material a series of bulk samples of articles which had never been produced before. The result was that over 100 fabrics varied in kind, but all of great beauty, have been produced with our Celanese, and, particularly in the finer fabrics, these cannot be made with any of the existing artificial silks. They imitate natural silk with great exactness, and in certain instances are even more beautiful than articles made with natural silk; amongst them I may name different types of crêpe de chine, crêpe marocain, crêpe georgette, pongé japonaise, all of which have been produced by the specialist at Lyons, who will be manufacturing for us in bulk there while we are proceeding with the manufacture of such articles at our own works at Spondon as our machinery comes into operation. This fine-goods trade has perhaps the widest and most promising future, and has hardly any limit, although, in saying this, please do not forget that we are not neglecting the cord and yarn trade, in which there is a steadily growing demand.

At our last meeting you were told of the dyeing difficulties we had experienced, and the point that we had then reached. Since that time much has been done, and we have arrived at a stage when our technical advisers believe they are able to produce any colour, shade or standard degree of fastness, as required. In view of this you can take it that our dyeing methods are now just as simple as those for any other fibre, such as cotton, and are not likely to prove more costly. While upon the subject of dyeing I might mention that it is a peculiar property of the new dyestuffs in conjunction with Celanese, that if Celanese is mixed with cotton or other fibres, the latter will be unaffected by the dyes, and from this you will realise that when fibres are woven or knitted containing mixtures of Celanese with other fibres in various proportions, quite unique effects can be obtained. The other fibres can either be left white or simultaneously be dyed with other dyestuffs for the same or a totally different shade. The development is in its infancy, but the field of possibilities is a wide one.

The report and accounts were unanimously adopted.

The proposed alteration of the title of the company to "British Celanese, Ltd.," was also approved.

English Oilfields, Ltd.

An interim progress report issued by the company states:—Shareholders will recollect that the last balance-sheet contained a note: "There are claims in respect of uncompleted contracts, etc., which it is estimated will not exceed £25,000." The claims referred to were in respect of a liability on the contract made by the old board for the condensing plant, and a claim for £2,775. in respect of plant, etc., taken over from the vendors under the original purchase contract. The contract for the condensing plant has been settled by the payment of £17,500., and an arbitrator in the case of the latter claim has awarded the claimants £100. The liquid funds of the company are now round about £96,000. The company's action for the recovery of unpaid instalments on shares is expected to come on for hearing in the course of the next month or so.

British Cotton-Seed Products, Ltd.

The ordinary general meeting was held in London on Tuesday. Viscount Doneraile presided, and in moving the adoption of the report and accounts, said that they had to meet the shareholders for the third time with a balance-sheet showing a loss. There had been no serious attempt during the year under review to get any substantial output from the factory. Actually only about 1,000 tons of seed had been treated.

After some discussion the report and accounts were adopted, but by a further resolution a shareholders' committee of inquiry was appointed, consisting of Professor John A. Todd, Sir Arthur Roberts and Mr. Mackenzie.

DIVIDENDS.

Bell's United Asbestos Company, Ltd. — Directors have declared an interim dividend on ordinary shares of 5d. per share, less tax, on account of the profits of the current year, payable October 22. A year ago the interim payment was the same.

Taylor's Drug Company, Ltd. — Dividend on the preference shares at the rate of 6 per cent. per annum for the past half-year.

Boots Pure Drug Company, Ltd.—Interim dividend of 9 per cent., less tax, on new ordinary shares with respect to quarter ended September 30.

NEW COMPANIES.

Alfred Fairclough, Ltd.—Private company. Capital £1,000. Fertiliser manufacturers and merchants, bone crushers and dealers, etc. Office: Daisy Works, Daisy Walk, Sheffield.

Ashwood Dale Quarries, Ltd.—Private company. Capital £10,000. Producers of lime, limestone, etc. Office: Ashwood Dale Quarries, near Buxton, Derbyshire.

Ideal Requisites (1923), Ltd.—Private company. Capital £500. Manufacturers of disinfectants, soaps, polishes, etc. Office: 22, Victoria Chambers, South Parade, Leeds.

Northern Sabulite Explosives Company, Ltd.—Private company. Capital £50,000. Office: 129, Victoria Road, Darlington.

Pynol, Ltd.—Private company. Capital £50,000. Manufacturers of and dealers in a fuel for internal-combustion engines, etc. Solicitors: Simmons and Simmons, 18, Finch Lane, London, E.C. 3.

Swalcliffe Limestone Fertiliser Company, Ltd. — Private company. Capital £5,000., in £1. shares (4,000 8 per cent. cumulative preference). Office: Swalcliffe, near Banbury.

Towles, Ltd.—Private company. Capital £150,000., £1. shares (50,000 preference). Address: 26, Warren Street, Barrow-upon-Scar, near Loughborough.

Waen Silica Company (North Wales), Ltd.—Private company. Capital £1,000. To acquire any mines, mining rights, and metalliferous land in Mold or elsewhere, etc. Solicitor: F. W. Watson, 7, Brazennose Street, Manchester.

William Boby and Co., Ltd.—Private company. Capital £15,000., £1. shares (12,000 10 per cent. cumulative preference and 3,000 ordinary). Water purification and softening engineers, etc. Office: 62 and 64, Brook Street, Hanover Square, London, W.

Ralph W. Stewart and Co., Ltd.—Private company. Capital £100,000., £10. shares. Rubber manufacturers. Office: Elgin Works, Dunfermline.

Dy-O-La Dye Company.—Capital, two kinds—viz.: With nominal or par value 375,000 dollars, in 100 dollar shares, and without nominal or par value 50,000 shares in 25,000 shares of common class A. and 25,000 shares of common class B. Incorporated in New Hampshire, U.S.A., in July, 1920. British address: 95, St. James Street, Manchester.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN AUGUST.

(Concluded from page 374.)

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of August, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended August 31.			Value. Month ended August 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
GUMS and RESINS:						
Arabic and Tragacanth ..... cwts.	11,165	4,968	4,375	32,915	17,755	25,692
Kauri ..... ,,	6,243	3,820	3,639	23,902	12,893	15,828
Rosin..... ,,	119,652	105,459	123,624	91,743	78,523	80,716
Shellac, Seedlac, and Sticklac ... ,,	16,914	10,370	13,140	258,817	176,078	171,969
OILS, FATS and GREASES:						
Animal (except Marine Animal): Not Refined Tallow:						
From France .... tons	—	—	—	—	—	—
,, China ..... ,,	—	—	—	—	—	—
,, U.S.A. .... ,,	231	553	899	9,308	20,426	33,585
,, Uruguay... ,,	50	346	571	1,750	12,837	21,546
,, Argentine Republic ,,	1,702	1,402	1,106	68,562	51,447	42,469
,, Australia .. ,,	771	2,230	572	30,458	84,440	23,200
,, New Zealand ,,	2,510	2,444	1,843	85,812	88,515	70,519
,, Other Countries ,,	—	29	964	—	935	36,119
Total ..... ,,	5,264	7,004	5,955	195,890	258,600	227,438
Fish (and Marine Animal)..... ,,	16,195	2,814	4,027	442,939	103,917	156,035
Mineral, Crude Petroleum..... galls.	9,501,804	17927480	34310667	141,913	280,304	528,611
Vegetable, other than Essential:						
Castor Oil ..... tons	135	393	580	6,505	21,951	27,321
Coconut Oil, Unrefined ..... ,,	2,303	1,856	1,135	108,185	72,773	49,695
Cotton-seed Oil, Unrefined..... ,,	1,088	531	70	43,127	17,329	3,316
Linseed Oil ..... ,,	23	217	75	801	7,624	3,746
Olive Oil, Unrefined ..... ,,	112	206	242	11,058	11,802	13,144
Palm Oil, Unrefined ..... ,,	8,196	9,984	8,843	271,083	327,154	289,784
Palm Kernel Oil, Unrefined..... ,,	10	—	—	433	—	—
Rape-seed Oil ... ,,	82	143	30	4,471	6,239	1,176
Soya Bean Oil ... ,,	2,321	2,353	2,752	97,965	84,781	100,126
All other Sorts .. ,,	737	2,260	630	39,396	105,512	33,200
SOAP STOCK ..... ,,	7	128	116	185	3,310	3,201
STEARINE:						
From Belgium ... ,,	30	38	90	1,877	2,068	4,558
,, Other Countries ,,	489	445	186	23,810	22,967	8,963
Total ... ,,	519	483	276	25,687	25,035	13,521
BONES for Manure tons	1,753	640	548	18,369	5,323	3,664
TANNING SUBSTANCES, not elsewhere specified:						
Barks for Tanning cwts.	30,269	43,636	69,836	15,624	20,978	29,197
Sumach ..... ,,	5,920	7,073	5,811	4,470	4,461	5,521
Gambier ..... ,,	7,810	8,827	2,810	10,860	14,293	4,805
Myrobalans ..... ,,	41,527	40,888	22,882	12,936	13,847	10,942
Valonia ..... ,,	10,312	6,188	4,444	5,749	3,372	2,422
Other Sorts ..... ,,	2,700	4,859	1,024	4,650	2,705	750
BORON MINERALS (including Borate of Lime, Borate of Magnesium, and Boracite.... tons	688	1,242	3,561	14,397	26,997	55,095
FERTILISERS:						
Guano, Raw .... ,,	65	135	34	779	1,275	300
Phosphate of Lime and Rock Phosphate ..... ,,	15,697	17,569	31,584	69,940	32,823	63,976
SULPHUR, CRUDE.. ,,	—	3,615	10,065	—	15,366	35,244
FERTILISERS, not elsewhere specified:						
Basic Slag..... tons	5,826	8,726	2,978	31,589	30,576	8,688
GELATINE, GLUE, and SIZE..... cwts.	6,495	9,476	13,253	34,114	45,488	43,352

Articles.	Quantities. Month ended August 31.			Value. Month ended August 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
STARCH, DEXTRINE, FARINA, and POTATO FLOUR:						
Rice Starch ..... cwts.	4,749	6,644	7,400	8,586	10,294	10,581
Other kinds of Starch ..... ,,	146,984	204,877	137,956	115,845	135,738	99,938
Dextrine, and Farina or Potato Flour. cwts.	50,580	81,578	74,369	51,012	101,436	53,447
Total ..... ,,	202,313	293,099	219,725	175,443	247,468	163,966
IRON and STEEL, Old and Scrap, fit only for remanufacture (including Old Rails) ..... tons	7,725	3,890	6,842	37,624	21,034	29,326
COPPER ORE (including Regulus, Matte, Precipitate, Cement, Copper, and Scale):						
From Portugal .. tons	—	—	—	—	—	—
,, Spain ..... ,,	1,052	2,964	3,692	67,235	176,540	201,822
,, Mexico .... ,,	—	—	—	—	—	—
,, Peru ..... ,,	—	—	—	—	—	—
,, Chile ..... ,,	22	48	—	660	960	—
,, Cape of Good Hope ... ,,	—	—	—	—	—	—
,, Australia .. ,,	—	—	—	—	—	—
,, Other Countries ,,	—	1,187	600	—	46,972	23,180
Total ..... ,,	1,074	4,199	4,292	67,895	224,472	225,002
IRON PYRITES (including Cupreous Pyrites) tons	16,375	25,216	34,531	44,874	50,668	57,817
MANGANESE ORE . ,,	6,039	29,644	61,844	29,060	94,639	232,190
SILVER ORE, including the value of the Silver contained in Argentiferous Ores and Metals ..... val.	—	—	—	81,240	23,883	32,093
TIN ORE and CONCENTRATES:						
From S. America tons	758	2,994	4,051	57,430	231,950	392,570
,, Brit. South Africa ... ,,	—	9	41	—	630	4,650
,, Other Countries ,,	473	551	669	37,706	52,105	66,298
Total ..... ,,	1,231	3,554	4,761	95,136	284,685	463,518
LEAD, PIG and SHEET:						
From Spain ..... tons	5,988	3,166	2,623	132,591	79,986	64,761
,, U.S.A. .... ,,	540	2,492	4,878	11,869	63,057	124,802
,, Mexico .... ,,	—	—	—	—	—	—
,, Australia .. ,,	403	6,245	6,861	8,515	153,226	169,460
,, Other Countries ,,	3,914	2,742	3,841	89,059	67,976	93,377
Total ..... ,,	10,845	14,645	18,203	242,034	364,245	452,400
MERCURY ..... lbs.	112	61,290	93,711	31	9,518	12,400
TIN: Blocks, Ingots, Bars and Slabs:						
From Straits Settlements and Federated Malay States ... tons	1,080	1,055	480	168,690	167,176	89,446
From Australia .. ,,	40	20	100	6,440	3,000	18,250
,, Other Countries ,,	966	420	450	156,461	67,250	85,859
Total ..... ,,	2,086	1,495	1,030	331,591	237,426	193,555
ZINC, CRUDE (*i.e.*, Cakes Slabs, Blocks, etc.) tons	3,907	8,944	7,945	102,423	254,038	241,118
Manufactures, not elsewhere specified (including Rolled Sheets, Plates, and Discs) tons	686	1,069	1,268	26,752	38,385	42,779

LOW-TEMPERATURE CARBONISATION.—Increased demand for smokeless fuel, states Low-Temperature Carbonisation, Ltd., has necessitated the plant at Barugh, near Barnsley, being enlarged to produce 3,000 tons per week Arrangements are also being made to erect additional plant in other coal-producing centres.

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The best grade of Soda-lime to use depends on the particular application in view. Sofnol Soda-lime is graded to meet your exact requirements—each grade is the best there is for its own particular purpose.

Where extremely rapid absorption is required we suggest the use of Sofnol Soda-lime G, which contains a Manganese catalyst. With this grade the rate of Carbon dioxide absorption is approximately doubled, while there is the further advantage that the colour change during use indicates at a glance the degree of saturation of the granules. The photograph illustrates some of our grades of Soda-lime. The darker coloured granules above are Sofnol Soda-lime G, while the colour change is shown in the U-tube below.

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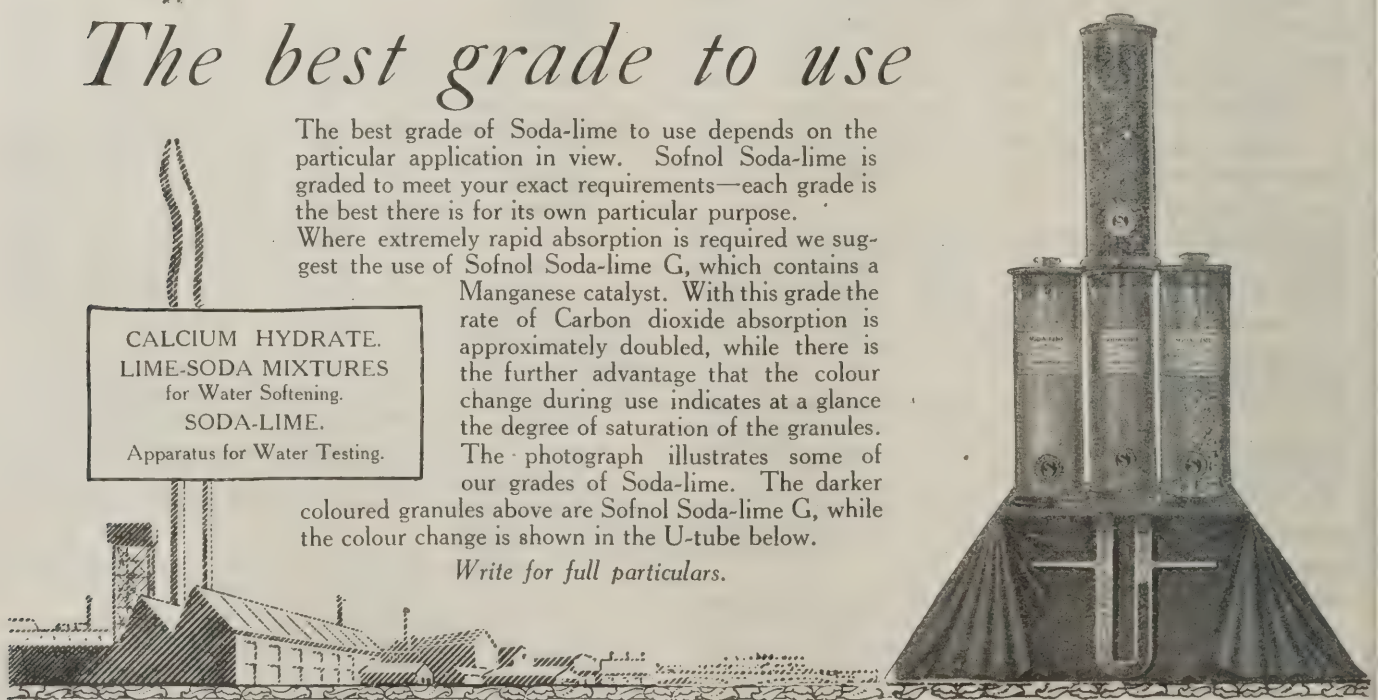

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FERTILISER NEWS.

Nitrate of Soda.—The outlook for the nitrate industry is very involved, and although the steady diminution of stocks on the West Coast of Chile is viewed with considerable satisfaction, it is essential that the curtailment of production be also taken into account. When it is remembered that output is based on approximately 60 per cent. of capacity, and that by reason of the system of selling "quotas," production costs are lower than if all the "oficinas" were working on short time, the question of increasing production is one which involves many issues. The chief obstacle to an extension of output is the difficulty of procuring suitable labour for work on the nitrate grounds. With the expansion in the Chilean copper industry, most of the available labour has been absorbed, while the difficulty is enhanced by the conditions of working. There is little doubt that the desire for improved conditions has led to the demand for a higher rate of wages which means increased costs. Further than this, it is no secret that the Chilean Government do not desire to repeat their experience of some two or three years ago when, owing to the great slump in nitrate following on the over production coupled with high prices, they were compelled to assist the nitrate industry by providing for large numbers of unemployed labourers, turned adrift as a result of the drastic curtailment of production. Thus there is little doubt that, paradoxical as it may seem, a larger output would almost certainly be followed by an increased range of prices, unless the companies decided to accept a less profit, meaning diminished dividends and falling share values. An alternative to this would be a reduction of the export tax levied by the Chilean Government, but this would almost certainly, only be resorted to in the last extremity. The action of the Government in agreeing to postpone receipt of the export tax for a certain period on shipments of nitrate has the natural effect of encouraging the shipping of material to foreign ports, where it can be warehoused and sold direct. It is safe to infer that were it not for this provision the West Coast stocks would not be diminishing at the rate they are, if at all, which means that the statistics are rather misleading. The result is that while exports from Chile have largely been exceeding those during the same period of 1913, deliveries from ports in Europe and the United States, which may be taken as indicating, to some extent, the consumption figure, are considerably less than before the war. Imports into Europe and Egypt during September were 63,500 tons, and deliveries 42,500 tons, leaving the balance of stocks at September 30 at about 165,500 tons. This quantity, added to heavy shipments now on their way to Europe, totals some 362,000 tons, which compares with 296,000 tons at same date last year, and 571,000 tons in 1913. A *Reuter* message from Antofagasta reports the destruction by fire of about 70,000 quintals of nitrate.

Sulphate of Ammonia.—Interest in this fertiliser has been aroused by the publication, by the Federation, of its official prices up to the end of November. As has been the custom hitherto, prices are being increased gradually, and the increases notified in the latest announcement are very moderate. For delivery over the present month, the September price has been raised by 2s. 6d. per ton to £14. 12s. 6d. for neutral quality in fine friable condition, free from lumps, basis 25¾ per cent. of ammonia. Delivery over November is increased by an equal amount to £14. 15s. per ton. With the evidence before them of the greater popularity of the neutral quality, the Federation state that it is expected that the bulk of the deliveries will be of that standard. There is available, however, in certain districts, a certain amount of ordinary quality, 25¼ per cent. ammonia, which will be sold at £1. 3s. per ton less than the above quoted prices. It is understood, of course, that these prices are for home agricultural purposes only, and the low price of the fertiliser when compared with other nitrogeneous products should ensure the interest and attention of farmers. With rumours of autumn reductions in prices finally disposed of, and the harvesting operations drawing to a close, it is probable that consumers will shortly be estimating their requirements for the coming season, and the demand, now only moderate, will become more brisk. In view of the Federation's success in placing contracts abroad at a figure higher than the home consumer has to pay, it is interesting to note that the penalty clause is retained in domestic contracts. It is important to note that these prices do not apply to orders for Ireland, and the above penalty clause holds good for exports to that country.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

With only thirteen furnaces in blast between Workington and Carnforth with some of those not using Cumberland coke, it is nevertheless possible to maintain the whole of the coking plants in operation. What will the position be when additional furnaces are lighted and when more of the furnaces are smelting the quality of iron in which the local coke is used? If, as is often stated, there are several years of good trade in store for the iron and steel industries, it may be taken for granted that it will require the production of at least twenty furnaces and even more to satisfy the demand for iron. Every colliery development, in the Cumberland coalfield, therefore, is of importance to the iron and steel industries. The progress that can be made at Whitehaven in increasing output will be watched then with keen interest. How hard up at the present time coke makers are for the supplies of smalls they want is shown by the fact that not a ton of nuts or small coal can be spared for shipment to Ireland. The Irish demand for this class of coal is exceedingly keen, but it cannot be even partially satisfied. Everything points, it will be seen, to a busy winter for the coal and coking trades. Best round for export to-day commands 26s. per ton. It is to be noted that though there is no increase of hematite pig-iron output in Cumberland and North Lancashire it is being marketed more readily, and it is anticipated that before long no stocks will be allowed to remain in the works yards. East Coast coke supplies are 8,200 tons a week, and the new contract prices that are being paid are lower. Cumberland coke to the smelters here is quoted at 29s. to 33s. per ton according to carbon content, and to Continental users at 33s. to 39s. per ton, f.o.b. Foreign shipments of late have decreased, but they are expected to be heavier in November and December.

SOUTH WALES NOTES.

[Specially Contributed.]

The state of the tinplate industry is very steady, though it seems as if the fixed minimum price will have to be discontinued if any large orders are to be booked. Nearly all the mills are working full time, but the order books are reported to be rather low for November and December delivery. Richard Thomas and Co., Ltd., have decided to lay down six additional tinplate mills at their Burry works, at an estimated expenditure of £50,000. It is also reported that the directors are considering the installation of mills for rolling larger sheets suitable for galvanising, etc. Two new mills are to be erected at Cilfrew works, while Baldwins, Ltd., are constructing two new mills at their Elba works, Gowerton. Gilbertson, Ltd., are erecting four new sheet mills at Pontardawe, while four new mills are to be installed at Gorseinon and one at Bryngwyn. Important orders are coming in from the Eastern markets. A fine strata of Tripoli stone has been discovered on Maesyfron Farm, Abercrave. It is of a very superior quality and will, it is said, make first-class polishing powder. If the engineers report favourably, the deposit will be mined. The market for galvanised and black sheets is maintained, and good business is being booked for forward deliveries. There is the usual activity at the coke ovens and the export business has revived, some large cargoes having been shipped during the week. Residuals are fairly easy in disposal, and with pitch values receding, the patent-fuel makers are now steadily operating. A new patent-fuel factory is to be erected at Llanelly.

The amalgamation is announced of the Grovesend Steel and Tinplate Company, Ltd., with Richard Thomas and Co., Ltd., who are the largest makers of tinplates in the world, owning 14 tinplate works with 111 mills. The amalgamation will result in a combined weekly output of 12,000 tons of steel and 7,000 tons of tinplates.

The imports to Swansea during the week included 3,149 tons of phosphate rock from Porto Tampa, 4,480 tons concentrates from Port Pirie, 557 tons copper ore from Tonnay; 3,176 tons precipitate of copper from Huelva to Port Talbot; 110cwt. white lead from Genoa, 48cwt. acetic acid from Rotterdam, 27 tons zinc ashes from New York, 21½ tons phosphorus from Montreal to Cardiff; 13 tons calcium carbide and 21 tons ferro silicon from Antwerp to Newport. Included in the exports were 500 tons sulphate of ammonia to Dunkirk from Cardiff, and 1,524 tons pitch from Cardiff to Ariles.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

September 17 to 22 (inclusive).

Maintaining Pressure on a Liquid During Withdrawal from Closed Vessel. Banks, W. 23,279.
Catalysts for Synthesis of Ammonia. Casale, L. 23,557.
Catalytic Production of Ammonia. Casale, L. 23,570.
Fuel Alcohol. Charpentier, M.; and Henneberg, G. 23,672.
Aliphatic Compounds. Dreyfus, H. 23,424.
Lacquers for Wood. Edbrook, F. G.; and Edwards, F. 23,529.
Vulcanising Articles in Fluids. Gray, C. H. 23,263.
Substances from Boron and Carbon. Hartstoff-Metall Akt.-Ges. 23,567.
Metallic Powders. Heskett, W. P. 23,564.
Soap. Hopol, Ltd.; Hovey, E. L.; and Hovey, R. B. 23,675.
Active Carbon. Johnson, J. Y. (*Badische Anilin-and Soda-Fabrik*). 23,251.
Vat Colouring-matters. Johnson, J. Y. (*Badische Anilin-and Soda-Fabrik*). 23,348 and 23,349.
Carbon Dioxide from Waste Gases. Ketterer, E. 23,250
Distilling Heavy Hydrocarbons. Lomax, E. L.; and V. L. Oil Processes, Ltd. 23,514.
Mixing-apparatus. Low Engineering Co., Ltd.; and Low, A. M. 23,747.
Bituminous Emulsions. Mackay, H. A. 23,453.
Degasifying Liquids Maclean, J. B. 23,365.
Insecticides. Plauson's (Parent Co.), Ltd. (*Plauson*) 23,394.
Lead Oxide. Price, G. B.; and Quirk, Barton and Co., Ltd. 23,229.
Benzole Products and Coke. Schaar, E. G. Björnsen-. 23,264.
Gas Calorimeters. Stewart, J. G. 23,201.
Working-up Copper-cellulose Sludge. Vereinigte Glanztoff Fabriken Akt.-Ges. 23,240.
Calcium Oxalate from Trees. Wade, H. (*Fraymouth and Bhopal Produce Trust, Ltd.*). 23,565.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. *in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.*

1922.

Colloidal Dispersions. Moseley, J. F. 3,647. **203,720**
Treatment of Metallurgical Gases Containing Sulphur Dioxide. White, A. E. (*American Smelting and Refining Co.*) 7,167. **203,722**
Chromates. Jouve, A. J. B.; Helbronner, A.; and Soc. Hydro-electrique and Metallurgique du Palais. 7,878. **177,174**
Distillation or Evaporation of Liquids. Major, J. L. 13,572. **203,743**
Dyeing of Alkyl Celluloses. Lilienfeld, Dr. L. 16,306. **181,391**
Cellulose Derivatives. Lilienfeld, Dr. L. 16,307. **181,392**
Cellulose Ethers. Lilienfeld, Dr. L. 16,310. **181,395**
Agitators and Mixing Devices. Prior, A. C. 16,552. **203,794**
Alumina from Sulphate of Aluminium. Hurter, A. 16,640. **203,798**
Formic Acid Derivatives. Johnson, J. Y. (*Badische Anilin and Soda Fabrik*). 17,032. **203,812**
Aryl Esters of Phosphoric Acid. Bloxam, A. G. (*Chemische Fabrik Griesheim Elektron*). 17,720. **203,820**
Aryloxynaphthylketones. Imray, O. Y. (*Society of Chemical Industry in Basle*). 18,074. **203,824**
Tungsten Powder. Naamlooze Vennootschap Philips' Gloeilampen-fabrieken. 19,430. **183,816**
Dopes, Varnishes, or Paints. Titanine, Ltd.; Ward, T. W. H.; and Fletcher, J. 20,142. **203,847**
Cylinders for Compressed or Liquefied Gas Impregnated with Emanations from Radio-active Substances. British Oxygen Co., Ltd.; and Barr, J. C. 20,210. **203,848**
Rendering Coats of Distemper and Mineral Colours Washable. Rosenbaum, M. 20,334. **203,853**
Artificial Fertilisers. Gradl, J. 22,888. **185,729**
New Insecticides. Carpmael, W. (*Chemische Fabriken vorm. Weiler-ter Meer*). 24,939. **203,904**
Recovering and Concentrating Acetic Acid from Pyroligneous Acid. Brewster, T. J. 28,093. **187,603**
Evaporating, Concentrating, or Distilling Apparatus. Soc. des Condenseurs Delas. 28,971. **201,123**
Drying Air and Gases. Heenan, J. N. D. 29,767. **203,946**
Indicating the Specific Heating Quality of Gas. Peebles, W. C. 30,182. **203,949**
Cement from Blast Furnace Slag. Cochrane, W. R. 32,002. **203,963**
Adhesive. Johnson, O. 33,787. **203,969**
Aluminium Base Alloys. Archer, R. S.; and Jefferies, Z 34,718. **191,024**

1923.

Filters. Fiechter, L. B. 7,294. **194,730**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

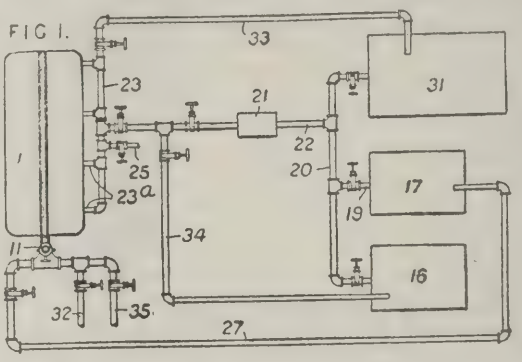
1923.

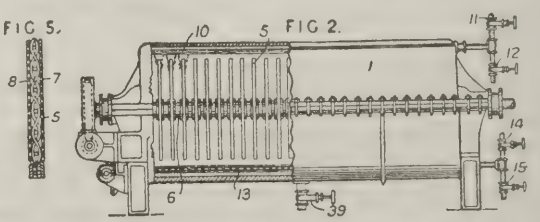
Foam for fire-extinguishing Purposes. Minimax Ges. 5,111. **204,007**
Centrifugal Separators. Aktiebolaget Separator. 22,703. **204,046** and **204,047**
Vulcanisation of Rubber. Soc. Ricard, Allenet, et Cie. 22,910. **204,052**
Carbon Dioxide from Waste Gases. Ketterer, E. 23,250. **204,063**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Coating Rotary-Filter Frames with Pulp. H. A. Vallez, Michigan, U.S.A. British Patent, **201,822**, of 1922.

In a process for coating rotary filtering-frames with a paper pulp mixture, the washed pulp is mixed with clear filtered or unfiltered liquids and is circulated through the filter under pressure until a coating of the desired thickness is obtained. After use, the coating is removed and returned to the wash tank. The pulp is boiled and soaked in a tank 16, and after draining is mixed with clear liquid in a tank 17. A pump 21 serves to force the mixture through the pipes 19, 20, 22 to a pipe 23, fitted with branches 23*a* which communicate with the filter 1. The mixture filters through the rotating frames 5, which comprise spaced screens 7, 8, Fig. 5. Pulp is deposited on the faces of the screens, and the liquid is returned by the hollow shaft 6 and pipe 27 to the tank 17. The pulp in the tank 17 may be mixed with clear water, in which case the water remaining in the frames





may be forced out by compressed air before filtration begins. The liquid to be filtered is pumped from the tank 31 through the pipes 22, 23, 23*a* into a filter, and the filtered liquid passes off through the pipe 32. To prevent caking of the deposit on the frames, a little pulp is added during the filtering process. When the filter requires cleansing, the supply from the tank 31 is cut off, and the liquid in the filter is returned through the pipe 33 to the tank 31. The filter is flushed with water from the pipe 25, and the water issues through the pipe 35. Finally the filter is half filled with water, compressed air and steam are supplied from the valves 14, 15 and a perforated pipe 13, and water and compressed air are supplied from the valves 11, 12 and the spray-pipe 10, whereby the pulp and sediment are disintegrated and held in suspension in the water. The mixture is now forced back to the tank 16 through the pipe 34, to be washed preparatory to further use. A pipe 39 is provided to withdraw water used to wash the filter.

Carbazol Condensation Products. W. L. Galbraith, W. Lewcock, and S. B. Tallantyre, London. British Patent, **201,624**, of 1922.

The condensation of carbazol with *p*-nitrosophenol or its homologues or derivatives in the presence of a condensing agent is effected by bringing the reacting bodies together at a temperature below –5° C. and maintaining the same below 0° C.; a temperature of about –20° C. is preferred and is maintained constant throughout the reaction; one component in a finely divided solid state may be added to a sulphuric acid solution of the other, or sulphuric acid solutions of the components may be mixed; the products are preferably isolated by pouring into dilute alkali. The products yield sulphide dyestuffs of greater purity than those from indophenols prepared at higher temperatures. Specification 2918/09 is referred to.

Perylene Dyestuffs. S. Sokal, London. (Kalle and Co., Akt.-Ges., Biebrich-on-Rhine, Germany.) British Patent, **201,786,** of 1922.

By treating perylene-3:4:9:10-tetracarboxylic acid, or a substitution product thereof, with ammonia or primary aromatic or aliphatic amines it is converted into difficultly soluble imides which dye animal and vegetable fibre in fast red to blue-violet shades from the vat. The perylene 3:4:9:10-tetracarboxylic acid may be prepared by oxidising with hypochlorite, chromic acid or other oxidising agent, the vat dyes made by alkali fusion of perinaphthindanone or perinaphthindandione.

Anthraquinone Acid Dyestuffs. British Dyestuffs Corporation, Ltd., London; J. Baddiley, Manchester; and W. W. Tatum, Huddersfield. British Patent. **201,610,** of 1922.

Salicylsulphonamidoanthraquinones are obtained by condensing salicylic sulphochloride ($OH:COOH:SO_2Cl$ = 1:2:4) with aminoanthraquinone compounds. The products dye wool blue shades in acid baths and may be chromed; or they may be printed on cotton with chrome mordants, or used for dyeing cellulose acetate silk. Specification 202,157 is referred to.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Formaldehyde-Urea Condensation Products. F. Pollak, Vienna. (Assignee of K. Ripper, Vienna.) British Patent, **201,906.** Convention date, August 2, 1922.

In the manufacture of condensation products from formaldehyde and urea, thiourea or their derivatives with or without a condensing agent, any acidity in the fluid intermediate product is reduced or eliminated by the addition of strong or weak bases or salts exercising a basic action before proceeding to the hardening treatment. The amount of added base is in excess of that required to fix any free formaldehyde present. Furthermore, the formation of cloudiness in the hardened material is controlled or prevented by the addition of "salt-like" electrolytes, the activity of which in this connection is stated to follow the sequence of Hofmeister's ion series.

Utilisation of Chromium Residues. Jucker and Co., Chemische Fabrik, Haltingen, Baden, Germany. British Patent, **201,942.** Convention date, August 7, 1922.

Residues containing chromium obtained in the production of organic dyes are dissolved in sulphuric acid in excess and treated with a bichromate, the acid used being sufficient to convert the total chromium into sulphate or basic sulphate. When potassium or ammonium bichromate is used, a chrome alum may be crystallised out by adding the necessary additional quantity of potassium or ammonium sulphate. The bichromate is preferably added in instalments.

Silicates of Basic Dyestuffs. W. Eberlein, Kochel, Upper Bavaria, Germany. British Patents, **201,940** and **201,941.** Convention date, August 6, 1922.

The formation of colour lakes from basic dyestuffs and colloidal silicates, such as colloidal aluminium silicates, is effected by mixing the silicate and dyestuff with a quantity of water insufficient to dissolve the dyestuff, and heating. Substances to promote sub-division of the silicates, such as alkalies or protective colloids, may also be added; higher temperatures may be employed by carrying out the reaction under pressure. The products may contain up to 80 per cent. of colouring matter. An example is given of the production of an auramine lake. Base-exchanging silicates, such as zeolite and permutite, may be employed as the substrata; it is not necessary that they should be colloidal. In an example, methylene blue is ground with a base-exchanging zeolite and the mixture boiled with a small amount of water until the dyestuff is completely fixed.

Chlorination of Rubber Latex. Naugatuck Chemical Company, Naugatuck, Connecticut, U.S.A. (Assignees of E. Hopkinson, New York, U.S.A.) British Patent, **201,898.** Convention date, August 3, 1922.

A substantially dry mixture containing distributed solid particles of rubber, gutta, etc., is subjected to the action of a halogen, or halogen acid. According to an example, 100 parts of kieselguhr is moistened with 150 parts of water to which 9 parts of ammonia have been added, 100 parts of latex containing 36 per cent. of solids are added, excess water is expressed, and the mixture is ground and dried at 200° F., and exposed to chlorine until the weight has increased by 20-24 per cent. The mixture is aerated, ground, and again exposed to chlorine. Concentrated ammonia is stirred in to remove traces of acid, and the product is washed free from ammonium chloride. The material is moulded under pressure at 225-240° F. Porous slabs may be formed by moulding the wet untreated mixture, drying at 200° F., and subsequently chlorinating.

Stannic Chloride. Buss Akt.-Ges., Basle, Switzerland. British Patent, **201,927.** Convention date, August 4, 1922.

Apparatus for the production of anhydrous stannic chloride comprises one or more reaction vessels similar to inclined jacketed retorts in which the tin ingots are closely packed so as to leave a small space around them for the chlorine. The inclination of the chambers is such as to allow stannic chloride but not molten tin (if any forms) to be run off into receptacles.

Phosphorescent Zinc Sulphide. Allchemin Allgemeine Chemische Industrie Ges., and R. Jahoda, Vienna. British Patent, **201,922.** Convention date, August 2, 1922.

Phosphorescent zinc sulphide is prepared by dissolving crude zinc or pure zinc together with crude zinc in an acid such as hydrochloric acid so as to leave excess of zinc, or treating a zinc salt solution with excess zinc, separating iron from the solution by treatment with an oxidising agent such as bromine or permanganate and a basic substance such as an alkali hydrate or carbonate or an alkaline earth, adding a very small quantity of a salt of a heavy metal such as a salt of copper, thallium, uranium, or manganese, and precipitating zinc sulphide by an alkali sulphide, sulphuretted hydrogen, ammonium sulphide, or, if the acid radicle does not form insoluble alkaline earth salts, with barium or strontium sulphide. An excess of zinc salt should be left in solution. The zinc sulphide is dried direct or after a single washing and calcined with exclusion of air, for instance in a tightly closed crucible or in an inert atmosphere or in a vacuum. The calcination may be carried to 1,000° C. To increase the luminosity the cooled product is examined in a darkened room, the least luminous portions being picked out and rejected. The remainder is levigated with hot water, a further quantity of less luminous coarse particles being thus rejected, and finally the product is filtered and dried at or above 100° C.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," October 6, 1888.)

From Charybdis to Scylla.—It cannot be gainsaid that enormous sums of public money have been spent and squandered in futile attempts to deal with the sewage question, chemical operations have been attempted on a vast scale by persons to whom even the elements of chemistry was a theme unknown, and after some good and practical scheme had been devised and put into action at great expense and under the supervision of men of undoubted ability, the cheese-paring proclivities of Alderman Skinflint or Councillor Graball have been quite enough to put the official watch out of gear, by their meddling with operations with which they were not familiar, and with reactions to which their lay mind could not be adapted. Many of our readers have, no doubt, served on deputations appointed to visit various sewage works, on behalf of the townships which they have been connected, and they have no doubt had an opportunity of observing the exact and scientific way in which some of the operations are carried on in those works, and how ingenuity and technical knowledge in the business has been rewarded. Perhaps not: but we have in our mind's eye the case of a sewage works opened with a great flourish of trumpets, specially looked after by a chemist and trained manager, and where are they to-day? The manager has been replaced by an individual whose only qualifications for the post were, that his previous occupation consisted in overlooking the carters, and that he had no prejudices, neither manipulative, social, political nor municipal.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals. — This market continues fairly steady, but business is still limited in volume, but has shown a little improvement in some directions. The crisis in Germany may have the effect of hardening prices here. **Acetic Acid,** 80% technical, £47.; 80% pure, about £49.; 98% glacial, £60. in casks, and £73. in glass demi-johns, ex wharf London; slightly easier rates are quoted for some grades, with the market rather quiet. **Acetone,** British Government specification, about £125 to £126. per ton, in drums; supplies continue to be limited, with prices quite steady. **Alum,** lump, in casks, £10. to £10. 10s. per ton; the demand from dealers offering Continental material remains slow. **Arsenic,** Cornish white powdered, on spot, £60. to £62. per ton; foreign material, about £60.; at these somewhat easier rates the market is much steadier, and is inclined to be firmer; America is inquiring but offering below these rates. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; dealers' quoted prices are kept up to this level; business slow. **Barium Chloride,** 98—100%, about £14. 10s. to £15. per ton; the lower prices mentioned last week hold good, but business remains slow. **Bleaching Powder,** 35—37%, about £10. to £10. 10s. per ton; importers' prices are steady, but inquiry remains poor. **Borax,** commercial, granulated £24. 10s., crystals £25., powdered £26., extra fine £27. per ton; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. Makers' prices, for home trade only, are unchanged at these rates; their prices for export vary according to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers continue to quote at these prices for home trade only, packages free, carriage paid to any station in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; dealers are offering some grades at competitive prices. **Cream of Tartar,** 99—100%, about 88s. per cwt., less 2½%, in one-ton lots; at this level the market keeps fairly steady, and some fair business has been booked. **Citric Acid,** B.P., crystals, about 1s. 5d. per lb., less 2½%; the spot position is very weak, with hardly any demand for the stocks on spot. **Epsom Salts,** commercial crystals, about £4. 10s. to £5. per ton, in bags; quoted rates from dealers are at these levels, but business is poor. **Formaldehyde,** 40%, about £70. per ton; this market is easier on the week, and supplies now on hand are moving off very slowly at the lower level. **Glauber's Salt,** commercial quality, about £3. 15s. to £4. per ton, in bags; dealers find business still very poor, and their prices are unchanged. **Lead Acetate,** brown, about £41.; white, about £42. per ton; imported material is available on spot, with the demand slow. **Litharge,** about £35. 10s. to £36. per ton; the demand from dealers has been slow, and prices are unaltered. **Lithopone,** 30% Continental red seal, about £22. to £22. 10s.; a very steady business continues in this product, with dealers' prices well held. **Ammonium Chloride,** grey galvanising, £30. 10s to £31. per ton; spot supplies are offering at these prices, with demand small; prices quoted are steady. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers' prices are unchanged. **Oxalic Acid,** about 6d. per lb.; this market remains dull, with the quoted price not very steady. **Carbonate of Potash,** 90—92%, £26. to £27.; 96—98%, about £29. per ton; the lower prices mentioned last week are steadily held by dealers, with business restricted. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; this market remains very dull. **Caustic Potash,** 88—92%, about £31. per ton, in drums; dealers' prices are fully maintained at about this figure, with some business on the market. **Permanganate of Potash,** commercial quality, about 9½d. per lb.; dealers' prices are steady near this figure, and a fair volume of business has been done. **Prussiate of Potash,** yellow, about 1s. per lb.; this price is quoted by dealers, but they seem to be doing but a few small orders. **Sulphate of Potash,** 90%, about £11. 10s. per ton, ex ship; the market shows no change on the week. **Mercury,** about £10. 5s. to £10. 10s. per bottle of 75—76lb.; this market has partly recovered from its recent weakness, and seems much steadier at the improved prices. **Red Lead,** imported, about £35. 10s. to £36. per ton; dealers offering steadily at these rates, with business fairly satisfactory. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £43.; fine white crystals, £25. to £26. per ton; spot supplies are available, and some business has been done; prices rather tend to advance, in view of the position in Germany. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; export, about £5. 5s. per ton, f.o.b.; the market is very steady at about these prices. **Acetate of Soda,** about £24. to £24. 10s. per ton; dealers are offering a few isolated lots at about these figures. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers' prices are steady at these levels, but little good business is reported. British makers' prices, for home consumers on contract, are unchanged at: 70—72%, £16. 17s. 6d.; 76—77%, £18. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers' prices, for home trade only, are unchanged, carriage paid. **Bichromate of Soda,** home trade, about 4½d. per lb.; British makers quote at this price for home users only. **Cyanide of Soda,** export, 8½d. to 9d. per lb.; British makers' prices given; home-trade price is slightly more. **Hyposulphite of Soda,** pea crystals, about £14. to £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £9. per ton, in casks; dealers' prices at these levels, with a fair business passing. **Nitrate of Soda,** 96%, about £13. 5s. per ton, f.o.r. or f.o.b.; prices quoted are level on the week, with the market quiet. **Nitrite of Soda,** about £26. 10s. per ton; this market keeps very steady, with inquiry quite good. **Prussiate of Soda,** about 6d. per lb.; dealers are offering on spot at this price, but the demand remains poor. **Sodium Sulphide,** 60—62% solid, about £14. per ton; ditto, broken, about £15. 5s. per ton, in drums; dealers offering Continental material at about these prices; 60—65% concentrated, in casks, about £14. per ton. **Sulphate of Copper,** about £25. 5s. to £25. 10s. per ton; the spot position remains quiet, with prices at about these levels. **Tin Crystals,** 1s. 4d. per lb.; there is no change on the week. **Tartaric Acid,** B.P. crystals, on spot, about 1s. 1½d. per lb., less 5%; spot material is freely offered, with hardly any demand; the position is certainly very weak. **White Lead,** imported, about £42. per ton; dealers are doing a limited business at about this price. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers report no change in their prices.

Pharmaceutical Chemicals.—In consequence of the critical position on the Continent, prices on spot are firmer this week, with many holders refusing to sell at cheap rates. Business has been moderate, and generally in small lots. **Acetanilid,** crystals and powder, 1s. 8d. to 1s. 9d. per lb.; spot holders are quoting these higher rates. **Acetyl-Salicylic Acid,** B.P., about 3s. 1d. per lb.; it is doubtful if there are any spot lots available under this figure; supplies seem short. **Benzoic Acid,** B.P., 2s. 3d. to 2s. 6d. per lb.; hardly any inquiry on the market. **Diethylbarbituric Acid,** B.P. (barbitone), 17s. per lb.; the market has been very quiet, and dealers' prices are unchanged. **Salicylic Acid,** B.P., 2s. 3d. to 2s. 6d. per lb.; prices for spot goods vary between these levels, with a fair demand about. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; this market keeps very steady, with business slow. **Amidopyrin,** about 14s. 3d. per lb.; there has been little doing here, with dealers' offers unchanged. **Ammonium Bromide,** about 7d. per lb.; this market seems a little steadier, but is still rather dull. **Benzonaphthol,** about 5s. per lb.; nominal; market remains idle. **Betanaphthol,**

resublimed, 1s. 10d. to 2s. per lb.; prices quoted are level on the week, with inquiry small. **Benzaldehyde 03,** about 3s. per lb.; dealers' prices show no change, with market dull. **Calcium Lactate,** 1s. 9d. per lb.; the market seems very steady at about this figure, with fair business passing. **Chloral Hydrate,** duty paid, about 4s. per lb.; some few spot lots are available, with no great demand. **Creosote,** B.P., about 2s. 6d. per lb.; the market keeps steady but quiet. **Creosote Carbonate,** about 8s. 6d. per lb.; no improvement in demand, and dealers' prices are unchanged. **Guaiacol Carbonate,** about 9s. 6d. per lb.; higher prices are being quoted here, but business is very quiet. **Hexamine,** about 3s. 7d. to 3s. 9d. per lb.; spot rates show a slight advance, and inquiry has been better. **Hydroquinone,** about 3s. 6d. per lb.; the market has again been dull; quoted rates are unchanged. **Methyl Salicylate,** 2s. 7½d. to 2s. 8d. per lb.; prices for spot material are much dearer, with supplies short. **Methyl Sulphonal,** about 15s. per lb.; quoted unchanged on a dull market. **Paraformaldehyde,** about 3s. 6d. per lb.; the spot position keeps fairly steady, but business is slow. **Paraldehyde,** about 1s. 5d. to 1s. 6d. per lb.; some little business has been done at about these figures. **Phenacetin,** 6s. 2d. to 6s. 3d. per lb.; dealers' prices are a shade firmer this week, with business occasional. **Phenazone,** 7s. 3d. to 7s. 6d. per lb.; this market keeps steady, but is still doing but little business. **Phenolphthalein,** 6s. 6d. to 6s. 9d. per lb.; prices appear very firm; business quiet. **Potassium Bromide,** B.P., crystals and granular, 6¼d. to 6½d. per lb.; the spot position seems inclined to harden just a little. **Potassium Permanganate,** B.P., about 9½d. per lb.; at this rate the market keeps very steady, with a fair business about. **Potassium Sulphoguaiacolate,** about 5s. 6d. per lb.; the market has shown no life during the past week. **Resorcin,** about 5s. 6d. per lb.; at this price the market is steady, but not at all active. **Salol,** about 2s. 9d. per lb.; the market has a steadier tone this week, with business improving. **Sodium Bromide,** B.P., crystals and granular, 7½d. to 8d. per lb.; dealers' prices are firming up a little on account of the uncertain position on the Continent. **Sodium Salicylate,** powder, about 2s. 5d. to 2s. 6d.; crystals, 2s. 7d. to 2s. 8d. per lb.; dealers holding spot stocks are holding at these prices, with inquiry fairly good. **Sulphonal,** about 14s. 6d. per lb.; no inquiry about; quoted rates unchanged. **Terpin Hydrate,** about 1s. 9d. per lb.; the market keeps steady at this level, with occasional business being done. **Thymol,** about 15s. per lb.; some spot stocks are available at about this figure.

Coal-tar Products, Intermediates, Etc.—Pitch has recovered a little, and has been in better demand. Other products show little or no change on the week, with business generally slow and small. **Aniline Oil,** about 9d. to 9¼d. per lb., drums free; the market is as last reported. **Aniline Salt,** 9¼d. to 10d. per lb., casks free; inquiry is very limited, with quoted rates unchanged. **Betanaphthol,** about 1s. 1d. to 1s. 2d. per lb.; dealers are doing little here, and prices are unaltered. **Benzol,** about 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; makers have not reduced their prices, and the market remains decidedly slow. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; quoted rates are steady, with the market dull. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; prices are level on the week, with the market quiet. **Naphtha,** about 1s. 4d. per gallon; this market remains very flat, and prices are far from firm. **Solvent Naphtha,** 90/160, 1s. 3d. per gallon, drums extra; the recent lower price is maintained on a dull market. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; no further reduction is likely yet awhile, although there is little doing. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; the market shows no change. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; the market remains quiet, with rates quoted unaltered. **Creosote Oil,** about 9½d. per gallon, f.o.b.; dealers' prices are steady, with demand rather limited. **Carbolic Acid,** crystals, about 1s. 2d. per lb., f.o.b.; at this rate the market stands firm, with business restricted. **Naphthalene,** about £19. 10s. to £20. per ton; inquiry has been small; the market is steady; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; quoted prices are level on the week, with the market dull. **Pyridine,** about 21s. per gallon; the higher price quoted last week is fully maintained, with supplies restricted. **Hexamethylene,** about 3s. 6d. per gallon; the market is a little steadier at last week's easier rates. **Pure Methyl Alcohol,** about £90. per ton, ex wharf London; this item is now very steady, and a fair inquiry has been dealt with. **Pitch,** about 130s. per ton.

ITALIAN CHEMICAL MARKET. Genoa, Sept. 29, 1923.

Quotations during the month were as follows, prices being per 100kilos. at Milan, unless otherwise stated:—**Caustic Soda,** 70—72%, Italian, 180 lire; American, 76—78%, 200 lire; English, 185 lire; French, 175 lire. **Carbonate of Soda,** 98—100%, Italian 86 lire (Genoa); English, 86 lire (Genoa); American, 87 lire (Genoa); demand very good. **Soda Crystals** fell from 50 to 40 lire, owing to absence of demand. **Alum,** crystals, 87 lire; in very fair request. **Bicarbonate of Soda,** powder, kegs, 180 lire (Genoa). **Bichromate of Soda,** 445 lire (Genoa). **Bichromate of Potash,** crystals, 590 lire. **Borax Crystals,** 99%, in kegs, steady at 400 lire. **Carbonate of Ammonia,** lump, 430 lire, powder, 370 lire; in little request. **Carbonate of Magnesia,** pure, 430 lire; in fair demand. **Chlorate of Potash,** crystals, in good demand at 310 lire. **Acetone,** pure, 98—99%, 1,250 lire. **Glacial Acetic Acid,** 99%, in fair request at 1,200 lire. **Boric Acid,** crystals, in fair demand at 800 lire. **Lactic Acid,** 80%, in little demand at 300 lire. **Bisulphite of Soda,** crystals, remained at 350 lire. **Formaldehyde,** 40%, fell from 880 to 725 lire; in short demand. **Phosphate of Soda,** 160 lire; a little better called for. **Hyposulphite of Soda,** crystals, 130 lire; very fair demand. **Metabisulphite of Potash,** steady at 400 lire. **Nitrite of Soda,** 96—98%, rose from 290 to 295 lire; better demand. **Permanganate of Potash,** crystals, in better demand at 800 lire. **Sulphate of Alumina,** crystals, 18%, remained at 100 lire; not much business. **Sulphate of Zinc,** in little request at 180 lire. **Citric Acid,** crystals, in fair demand at 1,900 lire. **Sulphate of Iron,** slow at 50 lire. **Hydrofluoric Acid,** 50%, in fair request at 600 lire. **Oxalic Acid,** crystals, moderate trade at 610 lire. **Tartaric Acid,** crystals, in good request at 1,350 lire. **Chloride of Ammonia,** lump, 98—100%, in fair demand at 600 lire (Milan); powder, 95—96%, in good call at 280 lire (Genoa). **Chloride of Calcium,** 75—80%, in good call at 70 lire. **Bleaching Powder,** in good demand; French, 110—115%, 90 lire; electrolytic, 100 lire. **Cream of Tartar,** 98—99%, powder, well treated at 930 lire. **Yellow Prussiate of Potash,** crystals, in little demand at 2,000 lire. **Yellow Prussiate of Soda,** crystals, 1,400 lire; little treated. **Silicate of Soda,** crystals, 85 lire; fairly well handled. **Silicate of Soda,** Italian, 38—45%, 65 lire; English, 140° Tw., 100 lire. **Sulphate of Soda,** crystals, 43 lire; powder remained at 65 lire. **Sulphate of Magnesia,** crystals, 50 lire. **Chloride of Magnesia,** solid, 70 lire; a slight revival in demand. **Hydrochloric Acid,** 20—21° Bé., 25 lire. **Sulphuric Acid,** 50° Bé., 20 lire; 66° Bé., 45 lire. **Nitric Acid,** 36° Bé., 155 lire; 42° Bé., 190 lire. **Benzaldehyde,** 3,500 lire. **Tannic Acid,** 80%, 2,000 lire. **Aluminium Acetate,** little handled at 160 lire. **Lead Acetate,** brown, 560 lire; white, 570 lire. **Betanaphthol,** 2,800 lire; in little demand. **Barium Peroxide,** 1,000 lire. **Sodium Peroxide,** in fair request at 1,800 lire. **Red Prussiate of Potash,** not much doing at 3,150 lire. **Caustic Potash,** 88—92%, 380 lire. **Tartar Emetic,** powder, 1,200 lire. **Mineral Superphosphate** remained at 27 lire. **Bone Superphosphate,** in slight demand at 52 lire. **Basic Slag,** 16—18%, in little call, fell from 37 to 35 lire. **Nitrate of Soda,** 15—16%, in fair call at 142 lire. **Nitrate of Ammonia,** in fair demand at 115 lire. **Nitrate of Lime,** 12—13%, in fair request at 110 lire. **Sulphate of Ammonia,** 20—21%, quotations increased from 162 to 170 lire through stronger demand. **Sulphate of Copper,** 98—99%, Italian, 225 lire; foreign, 226 lire. **Chloride of Potash,** quiet at 75 lire. **Sulphate of Potash,** little business at 85 lire. **Calcium Cyanamide,** 15—16%, in little call at 98 lire. **Sulphur,** refined, in blocks, 53 lire (Catania, Sicily), 70 lire (Milan). **Sulphur,** sublimed, 70 lire (Catania, Sicily); 77 lire (Genoa). **Crude Tartar,** 280 lire.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £61. 7s. 6d. to £61. 10s., cash; £61. 17s. 6d. to £62., three months; electrolytic, £65. 15s. to £66. 5s. **Tin:** Standard, £200. 17s. 6d. to £201. 2s. 6d., cash; £200. to £200. 5s., three months; Straits, £204.; English, £202. **Lead,** soft foreign, £26. 7s. 6d., prompt; English, £27. 10s.; chemical sheet, 36s. 6d. per cwt. for 2-ton lots, delivered, with a rising tendency. **Spelter,** prompt, £32. 15s.; hard, £27. **Antimony,** English regulus,

99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium**, 98—99%, £115.; foreign, £100., c.i.f. **Nickel**, £130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 5s. **Bismuth**, 10s. **Platinum**, 500s. per oz. **Wolfram**, spot, 12s. 3d. to 12s. 6d. per unit. c.i.f. U.K. or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

The recent small improvement in demand for heavy chemicals has been maintained, but there are no changes in values to record; prices generally continue in buyers' favour. For alkali products, quotations are unchanged at recent rates with the exception of **Ammonia Alkali 58%**, which has now been reduced to £7. 10s. per ton for odd parcels. There is not much inquiry for **Chlorates** or **Bichromates**, and quotations and quotations are unaltered. **Bleaching Powder**, dull at £11. 5s., on rails, for spot lots. Roasted **Saltcake** is firm at £4. 10s., carriage paid; and £4. 15s. to £5. f.o.b., with continued inquiry, for export. **Copper Sulphate** is quiet, and price remains nominal at £25. 15s. to £26., f.o.b. Imported American **Sulphur**, steady at £5. 5s. on rails, in bulk, with fair demand. **Phosphate** and **Commercial Hyposulphite of Soda** show no improvement, and there is little or no inquiry. **Nitrite of Soda** firmly maintained at £26. 10s., and stocks are low. Concentrated **Sodium Sulphide**, unchanged at £14. per ton, carriage paid. White powdered **Arsenic** is easy at £62., on rails cornish works, and only in small request. Yellow **Prussiates** are again lower, **Potash** at 1s. per lb., and **Soda** 5½d. per lb., both carriage paid. **Caustic Potash** is firm at recent rates, but **Carbonate** has a lower tendency, owing to accumulation of stocks. **Acetate of Soda** and **Acetic Acid** are in fair request, and prices are steady. **Acetone**, easier at £126. per ton. Miscible **Wood Naphtha**, 6s. 3d. per gallon. **Lead Salts** are moving off slowly, but prices are firm; white **Acetate** £41., brown £43.; and **Lead Nitrate**, £42., net, carriage paid. Grey and brown **Acetate of Lime** continue scarce, and values rule high. **Barium Chloride**, dull at £14. 10s. to £15. per ton, on rails makers' works. Green **Copperas** is moving off fairly well, and prices show no improvement. **Oxalic Acid**, easy at 6d. per lb. **Permanganate of Potash**, unchanged at 9d. to 9½d. per lb., according to quality.

SWANSEA MARKET REPORT. Wednesday.

Tinplates moved steadily on the basis of the fixed price of £1. 3s. 1½d. per standard box. **Galvanised Sheets**, more active at £18. 17s. 6d. per ton. **Copper**, easier at £62. 2s. 6d. per ton cash, and £62. 12s. 6d. three months. **Tin** irregular, and some business passed at fully £5. less per ton than last week; prices are £200. 12s. 6d. per ton prompt, and £200. 2s. 6d. forward. **Lead** steady at £26. 7s. 6d. per ton cash, and £26. 2s. 6d. three months for foreign soft, and for English £27. 10s. cash. **Spelter** fairly steady at £32. 12s. 6d. per ton prompt, and £32. 7s. 6d. forward. **Zinc Sheets** in fair demand at £39. 7s. 6d. per ton, on truck at makers' works. **Sulphate of Ammonia** firmer at fixed sales. **Sulphate of Copper**, dull at £26. 2s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda** steady, with prompt at £13. 5s. 6d., and forward £13. 10s. 6d. per ton. **Bone Meal** slow, with prompt Indian at £9. 2s. 6d. per ton, f.o.b. **Pitch** prices were again lower at £5. 18s. 6d. per ton. **Oxalic Acid**, in small demand at 6¼d. per lb., f.o.r. **Arsenic** in better call, with lower quotations at £62. 17s. 6d. per ton for white powdered. **Copperas**, rather quiet at £2. 2s. 6d. per ton, delivered, for 4-ton lots, London or equal. **Sulphuric Acid**, in good request at unchanged prices. **Benzol**, in good call at 1s. 4d. per gallon at works. **Turpentine** easier; American, prompt, £3. 15s. 9d. per cwt., ex ship. **Linseed Oil** firm, on small supplies; raw £2. 5s. 9d., and boiled £2. 7s. 9d. per cwt., net. **Cottonseed Oil** scarce; common edible £2. 3s. 3d., and deodorised £2. 6s. 3d., per cwt. **Coconut Oil** firm, with Ceylon at £2. 4s. 9d. per cwt. **Palm Oil** steady; Lagos, £36. 15s. 6d.; softs, £36. 17s. 6d.; mediums, £37.; and hards, £37. 12s. 6d. per ton. **Coal** prices were not so firm, with increased stocks Best Admiralty smokeless, £1. 7s. 6d.; seconds, £1. 6s. 6d.; ordinaries, £1. 5s. 6d.; Monmouthshire black vein, £1. 7s. 3d. per ton, all f.o.b. **Anthracite** less active, but prices maintained, with best large £2. 7s. 6d.; seconds, £1. 17s. 6d.; Paris and French nuts, £3. per ton, all f.o.b. **Patent Fuel**, fairly active from £1. 8s. 6d. to £1. 12s. 6d. per ton, f.o.b. **Cokes**, very little change at £2. to £2. 7s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Chemicals of the heavier class continue to meet with a steady inquiry for home-trade uses, but in the export branch shipments have been on a similar scale, though a very fair amount of tonnage is still being exported. **Bleaching Powder** has had a moderate inquiry, and is £10. 5s. to £10. 7s. 6d. per ton for the home trade, and £11. 5s. to £11. 7s. 6d. per ton for export. **Chloride of Calcium** has been rather more in demand, and is £5. 12s. 6d. per ton. **Caustic Soda** has been in good request for use in the United Kingdom, and has had a rather free shipment for foreign ports; it is £19. to £20. per ton for 76%, carriage paid, for the home trade. **Bicarbonate of Soda** has been in very fair demand for home-trade uses, but has been quieter in the export branch; the price is £10. 10s. per ton, carriage paid, for use in the U.K. **Soda Crystals** have had a steady sale on home-trade account, and are £5. 5s. per ton for the U.K., carriage paid. **Nitrate of Soda** has again had a moderate sale for home-trade consumption; a large movement of nitrate between producers and countries outside of the U.K. is reported; the price at Liverpool is still £13. 5s. to £13. 10s. per ton. **Borax** has had a steady sale on home-trade account; commercial crystals are £25. per ton, and powdered £26.; higher grade crystals are £29., and powdered £30., superfine being £31. per ton, in 2cwt. bags, carriage paid in the U.K. **Saltcake** continues to sell somewhat freely, and is £4. 10s. to £5. per ton for home-trade use, and £5. to £6. per ton for export. **Bichromate of Soda** has been steadily called for, and is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has been in good demand for use in the U.K., and has had a fairly heavy shipment for overseas ports; it is £7. 10s. per ton for the U.K., and £8. per ton for export, with some variation of this price according to destination. **Hyposulphite of Soda** continues to meet with a fair inquiry, and is £10. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £17. per ton for the photographic quality, in 1cwt. kegs. **Sulphide of Soda** has been in slightly freer request; solid is £14. 10s. to £15. per ton, and crystals £8. 15s. to £9. 10s. per ton. **Chlorate of Soda** has moved but slowly, and is 3d. to 3¼d. per lb. **Phosphate of Soda** has been but little inquired for, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has had a moderate sale, and is 6½d. per lb. **Yellow Prussiate of Potash** has been rather more in demand, and is 1s. 1d. per lb. **Red Prussiate** has had a fair inquiry, and is 3s. per lb. **Carbonate of Potash** has been quieter, and is £25. to £31. per ton, according to quality. **Nitrate of Potash** has been steadily called for, and is £29. to £30. per ton. **Chlorate of Potash** has had a very limited sale, and is 3½d. to 4d. per lb. **Caustic Potash** has been in very fair demand, and is £29. to £30. per ton. **Permanganate of Potash** has sold with some freedom, and is 9½d. to 9¾d. per lb. **Bichromate of Potash** has been more in request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has had a fair and steady demand; first quality is £60. per ton, and second quality £57. per ton. **Sulphate of Ammonia** continues quiet on home-trade account, and has had a small shipment to overseas ports; neutral of 25¾% is £14. 12s. 6d. per ton, and ordinary of 25¼% £13. 9s. 6d. per ton, for use in the United Kingdom. **Carbonate of Ammonia** has had a fairly free sale, and is 4d. per lb. **Muriate of Ammonia** has been rather more in request; grey is £32. per ton. **Magnesia** has been steadily called for; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been quiet; it is £12. per ton for the home trade, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** continues in fair demand; it is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been in good request; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s., and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has been quieter, and the price has shown weakness; it may be given as 1s. 2d. to 1s. 2½d. per lb. **Cream of Tartar** has been in rather good request, and the price has had an easier tendency; it may be given as £4. 10s. per cwt. **Boric Acid** has been in fair demand; commercial crystals are £48. per ton, and powdered £51. per ton, and £2. per ton more if in casks. **Citric Acid** has moved but

slowly, and is 1s. 6½d. to 1s. 7d. per lb. **Oxalic Acid** has been in slightly freer request, and is 6d. per lb. **White Acetate of Lead** has had a quietly steady sale, and is £42. to £42. 10s. per ton. **Sulphate of Copper** has been very quiet both for the home trade and on export account; it is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been quieter, and the price has again eased; it is £62. per ton for white powdered.

WEST OF SCOTLAND CHEMICALS. Wednesday.

The slight improvement in the demand for chemicals noted last week has continued, so far as the home market is concerned, and there has been some shading of prices in certain products. The export position is unchanged, however, and inquiry continues to be of a limited character. Quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, lower at £70. per ton on spot; a quiet market. **Barium Chloride,** £15. per ton; this figure is unchanged, and there is nothing of interest to record. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under these figures. **Boric Acid,** crystals, £48. per ton, makers' prices; demand rather poor. **Borax,** crystals, fairly steady at the recently reduced figure of £25. per ton, delivered; granulated, £24. 10s. per ton. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted at slightly below this reduced figure. **Citric Acid,** 1s. 6d. per lb., less 5%; little business about at last week's quotation. **Copper Sulphate,** £27. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar,** £4. 3s. 6d. per cwt. for 99% at Glasgow; quotation shaded, but inquiry small. **Lead Acetate,** white, £41. 10s. per ton on spot; brown, more inquiry at £42. 10s. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this lower figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** lower at 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. 2d. per lb.; this is a dull market, in spite of the further reduction of ½d. on the week. **Salammoniac,** first and second lump, £60. and £57. per ton respectively; crystals £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 12s. per cwt., net; a better market, with quotation still rising. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate,** £9. 15s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; rather easier in tone, and inclined to be dull. **Tartaric Acid,** 1s. 2d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls. or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending September 29.

BARYTES—
Antwerp, 100 bgs.; Bremen, 35 cks.; Hamburg, 600 bgs.

CARBON BLACK—
New Orleans, 25 cs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 1,586 pkgs.
Valparaiso, 28,442 pkgs.

COAL TAR PRODUCTS—
Naphthalene
Hamburg, 30 crts.

CREAM OF TARTAR—
Genoa, 60 brls.

GELATINE—
Hamburg, 5 cs.

GLUE—
Antwerp, 30 bls., 138 pkgs.

KIESELGUHR—
Antwerp, 400 bgs.

LACTIC ACID—
Hamburg, 6 cks.

MAGNESIUM CHLORIDE—
Hamburg, 36 drms.

PLUMBAGO—
Bremen, 28 bgs.

ROSIN—
Hamburg, 1 cs.
Lisbon, 72 brls.

SALT—
Hamburg, 2,200 bgs.

SOAP—
Antwerp, 2 cs.; Genoa, 341 cs.; Hamburg, 19 cs.; Marseilles, 130 cs.; Montreal, 50 crts.

SODA—
Marseilles, 80 cs.

SODIUM PHOSPHATE—
Antwerp, 9 cks.

SODIUM SULPHATE—
Hamburg, 250 bgs.

SULPHUR—
Catania, 324 pkgs.

TANNING MATERIALS—
Chestnut
Leghorn, 100 cks.
Myrabolans
Bombay, 2,000 pkts.
Sumac
Palermo, 300 bgs., 40 bls.

TARTARIC ACID—
Palermo, 80 cks.

TURPENTINE—
Gothenburg, 1 brl.

ZINC OXIDE—
Antwerp, 12 brls.

GOOLE.

Week ending September 29.

BARYTES—
Bremen, 33 cks.

GLUE—
Antwerp, 40 bgs.

KAINIT—
Bremen, 250 t.

MAGNESITE—
Amsterdam, 50 bgs.
Hamburg, 146 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 183 drms.

ZINC DUST—
Antwerp, 10 cks.

GRANGEMOUTH.

Week ending September 29.

CHEMICALS (*otherwise undescribed*)
Norway, 8 cks.
Rotterdam, 84 bgs., 1 cs.

LEAD ACETATE—
Rotterdan, 2 cks.

MAGNESITE—
Norway, 306 bgs.

MINERAL COLOURS (*otherwise undescribed*)—
Amsterdam, 7 cks.

RED LEAD—
Rotterdam, 4 cks.

SOAP—
Rotterdam, 1 ck.

TALLOW—
Norway, 392 brls.

ZINC OXIDE—
Antwerp, 20 brls.

GRIMSBY.

Week ending September 29.

MAGNESITE—
Hamburg, 104 cs.

HULL.

Week ending September 29.

CAUSTIC POTASH—
Bremen, 5 t. 2 c.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 22 t. 10 c.; Antwerp, 22 t.; Bremen, 10 t.; Brisbane, 7 t.; Ghent, 7 t. 1 c.; Gothenburg, 16 t.; Hamburg, 14 t. 18 c. Melbourne, 15 t.; Montreal, 14 t. 14 c.; Rotterdam, 11 t. 1 c., 930 lb.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 480 lb.

FERRO CHROME—
Christiania, 93 t.

FERRO SILICON—
Christiania, 26 t.

GLUE—
Antwerp, 5 t. 10 c.

NITRATE OF LIME—
Christiania, 6 t.

PHOSPHATE ROCK—
Bona, 1,800 t.
Tunis, 1,350 t.

ROSIN—
Bordeaux, 12 t.; Gefle, 22 t.; Jacksonville, 54 t.; Savannah, 129 t. 13 c.

SALTPETRE—
Rotterdam, 4 t. 15 c.

SOAP—
Amsterdam, 1 t. 3 c.

STEARINE—
Copenhagen, 3 t.

TALLOW—
Buenos Aires, 12 t. 11 c.

TAR (WOOD)—
Gefle, 7 t.

TURPENTINE—
Savannah, 41 t. 1 c.

WAX (*otherwise undescribed*)—
Hamburg, 3 t.

LEITH.

Week ending September 29.

CASEIN—
Dunkirk, 100 bgs.

CRYOLITE—
Copenhagen, 500 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Amsterdam, 10 cks.
Unspecified
Amsterdam, 44 cks.

DYESTUFFS (NATURAL)—
Cutch
Calcutta, 450 cs.

GLUE—
Antwerp, 40 bgs.
Dunkirk, 20 bgs.

LITHOPONE—
Antwerp, 84 cks.

POTASH—
Hamburg, 21 drms.

SALT—
Antwerp, 60 bgs.

SILICO MANGANESE—
Gothenburg, 38 brls.

SOAP—
Copenhagen, 9 cs.
Rotterdam, 2 cks.

SODA CRYSTALS—
Antwerp, 100 bgs.

SUPERPHOSPHATE—
Antwerp, 500 bgs.

TALLOW—
Dunkirk, 724 bgs.

ULTRAMARINE BLUE—
Antwerp, 4 cks.

WHITE LEAD—
Amsterdam, 34 cks.

LIVERPOOL.

Week ending September 29.

ACETIC ACID—
Holland, 8 cks.

ARGOLS—
Spain, 34 cks.

ARSENIOUS ACID—
Brazil, 400 cs.

BARYTES—
Germany, 41 cks.

BEESWAX—
Egypt, 117 bgs.
W.C. Africa, 106 pkgs.

BONE MEAL—
Burma, 1 bg.

CALCIUM CARBIDE—
Norway, 100 drms.

CARNAUBA WAX—
Brazil, 56 bgs.

CASEIN—
Brazil, 2 cs.

CAUSTIC POTASH—
Germany, 112 pkgs.

CREAM OF TARTAR—
France, 24 kgs., 154 cks., 206 bgs.
Spain, 20 kgs., 4 cks.

COAL TAR PRODUCTS—
Creosote
France, 2 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Canada, 2 crts.

DYESTUFFS (NATURAL)—
Cochineal
Canaries, 42 bgs.

FERRO PHOSPHORUS—
France, 48 cs.

FERTILISER (DRIED BLOOD)—
Egypt, 80 bgs.

GELATINE—
Belgium, 20 bls.

GLUE—
Belgium, 2 bls.
U.S., 5 brls.

GLYCERINE—
France, 5 drms.

KIESELGUHR—
Algeria, 208 bgs.
U.S., 1,077 bgs.

LITHOPONE—
Holland, 128 cks.

MAGNESITE (CALCINED)—
Holland, 50 bgs.

MANGANESE (POWDER)—
India, 10 t.

MANGANESE ORE—
India, 1,087 t. 15 c.

OCHRE—
France, 85 cks.
Spain, 47 cks.

PARAFFIN SCALE—
U.S., 2,233 brls.

PITCH (MINERAL)—
U.S., 505 brls., 41 drms.

PLUMBAGO—
France, 10 t.

POTASSIUM CARBONATE—
Germany, 38 cks.

POTASSIUM CHLORATE—
Sweden, 200 cs.

POTASSIUM SALTS (*otherwise undescribed*)—
Germany, 210 t.

ROSIN—
France, 36 cks.
U.S., 1,350 brls.

SHEEP DIP—
Uruguayo, 10 cs.

SOAP—
Austria, £37.; Canada, £160.; France, £459.; Germany, £18.; Holland, £90.; Hungary, £50.; U.S., £19.

SODIUM CHLORATE—
Germany, 160 cks.

STEARINE—
Argentine, 142 cks.; Belgium 51 bgs.; Holland, 43 bgs.

TALLOW—
U.S., 301 drms.

TANNING MATERIALS—
Chestnut
France, 1,741 cks., 100 cs.
Italy, 102 cs., 125 cks.
Divi Divi
India, 448 pkts.
Quebracho
Argentine, 215 bgs.
Valonia
Smyrna, 134 bgs.
Wattle
South Africa, 9,376 bgs.

TARTRATE OF LIME—
Greece, 200 bgs.

TIN ORE—
Bolivia, 1,132 t. 10 c.; Chile, 116 t. 11 c.; Portugal, 11 t.; S. Africa, 9 t.

URANIUM OXIDE—
Belgium, 1 cs.

WHITE LEAD—
Germany, 57 cks.
Italy, 39 cks.

WOLFRAM ORE—
Burma, 57 t.

ZINC DUST—
U.S., 45 t.

ZINC OXIDE—
Belgium, 110 cks.

LONDON.

OFFICIAL AMENDMENT.

In return for week ending August 26, 1923—

SALT—
Japan, 400 t. Wettem

should read—

SALT—
Spain, 400 t. Wettem

Week ending September 29.

ACETIC ACID—
Czecho-Slovakia, 206 pkgs. V. Blagden
Holland, 42 pkgs.

ACETONE—
Czecho-Slovakia, 10 t. 3 c. V. Blagden

ALBUMEN—
China, £5,155.
,, £1,960. Leach
,, £4,197. McDougall & Bouthron
,, £1,410. Fellows, Morton & Clayton
,, £315. R. Warner
,, £20,029. Baxter, Hoare
,, £850. A. Bellamy
,, £330. Matheson
,, £590. W. M. Smith
France, £145. Leach
Germany, £13. A. Foley

AMMONIUM CHLORIDE—
Germany, 54 pkgs. Bush, Beach, & Gent.

ARGOLS—
Algeria, 523 pkgs.
Belgium, 380
France, 1,374
Spain, 120

BARYTES—
Germany, 35 cks.
,, 34 W. Harrison
,, 20 Dexters
,, 23 Burrell
,, 76 Pallister,
30 t. Luck

BARYTES—
U.S.A., 75 cks. Taylor & Cox

BEESWAX—
French Somaliland, 139 pkgs.
Morocco, 20 bgs. W. H. Muller

BLEACHING POWDER—
Germany, 30 t. J. M. Steel

CALCIUM CHLORIDE—
Germany, 19 t. 12 c. W. Connell
,, 9 17 J. Bailey

CARBON BISULPHIDE—
Germany, £74.

CARBON BLACK—
Belgium, 40 cks.
Canada, 10 cs. Brownjohn & Howard
U.S.A., 300 Binney, Smith
,, 175 Hughes & Hughes
,, 330 Beck & Pollitzer
,, 200 Taylor & Cox

CARNAUBA WAX—
Brazil, 56 bgs. Weber, Smith & Hoare

CASEIN—
Arg. Rep. £3,600. Rennacia Cascin
France, £1,527.
,, £394. H. C. Puttick

CAUSTIC POTASH—
Czecho-Slovakia 40 pkgs. Brotherton, Ratcliffe
Germany, 40 Petri
Sweden, 10 C. S. Gobey

CHEMICALS (*otherwise undescribed*)
Belgium, £360. E. G. Boize
Brit. India, £10. Escombe McGrath
Egypt, £110. Wingate & Johnston
France, £28. Southall & Barclay
Germany, £7.
,, £500. Honeywill
,, £16. H. W. Winter
Holland, £69. Stancourt & Muir
Italy, £148. A. C. Young
,, £135.
Switzerl'd £181. J. Grossmith

CHEMICALS (*otherwise undes.*)—*
£1,064.

CITRATE OF LIME—
Italy, £2,965.

COBALT OXIDE—
Canada, £1,000. Chance & Hunt

COCAINE HYDROCHLORIDE—*
£259.

CREAM OF TARTAR—
Algeria, 50 brls. Greeff
Belgium, 200 pkgs.
France, 100 brls.
,, 40 pkgs.
Italy, 100

DEXTRINE—
Germany, 4 t. 12 c.
Holland, 4 R. Windmuller
,, 19 t. 15 c. B. E Burgoyne
U.S.A., 2 14

DISINFECTANTS (*otherwise undes.*)
U.S.A., £147. H. C. Hackney

DYESTUFFS (ARTIFICIAL)—
Unspecified
Brit. India, 204 bgs. Morgan & Young
,, £290.
Germany, 7 pkgs.

DYESTUFFS (NATURAL)—
Annatto
Denmark, 2 pkgs.
U.S.A., 15 J. A. L. Stallman

FERTILISERS (*otherwise undes.*)—
Germany, 545 t. Anglo-Contl. Guano

FORMALDEHYDE—
Germany, 49 pkgs. C. Zimmermann

FORMIC ACID—*
£136.

FUSEL OIL—
Germany, 1 drm. E. W. Taylor

GELATINE—
France, £7.
Belgium, £1,330. Duche
France, £46. G. T. Symons
Germany, £50. Stancourt & Muir
,, £53. T. Cook
,, £376. Crowe
,, £22.
,, £14. C. W. Hartrodt

GLUE—
Belgium, £80. O. Murray
,, £112. Paul, Ingenlath
,, £18.
France, £19. R. & J. Park
,, £40. Mory
,, £15.
,, £783. G. T. Symons
Hungary, £750.
Holland, £113. Stancourt & Muir
U.S.A., £155. Knight & Morris

ISINGLASS—
Brazil Smith & Hoare
,, 3 W. M. Smith
Brit. India, 25
Frencho Indo-China, 10 H. W. Winter
Japan, 15 bls. W. M. Smith
Straits Setts. 13 cs. E. Benstead
,, 5 W. M. Smith
Turkey, 15 Nunzi

KIESELGUHR—
Algeria, 11 t. Macdermott & McLaren
,, 64 Taylor, Miller
Morocco, 115 ,,

LITHOPONE—
Belgium, 120 cks.
Holland, 180 F. T. H. Nye
,, 50 M. Ashby
Spain, 100 brls., Jones, Moore

MAGNESITE—
Greece, £1,050. Robinson, Roberts
Holland, £115. Ray
,, £134.

MAGNESIUM CARBONATE—*
£141.

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 100 bgs. Taylor & Cox
,, 23 cks. Brit. Fibro-Cement
,, 50 bgs. H. Smart
Spain, 20 brls. E. Dehcaine
,, 7 Leach
,, 40 cks. Lavington

MINERAL WAX—
Holland, 38 bgs.

OCHRE—
France, 33 cks. W. Harrison
U.S.A., 28 brls. J. Johnson

PARAFFIN WAX—
Germany, 10 t. 4 c. Holroyds Oil & Cer.
U.S.A., 3 1 Vacuum Oil
,, 165 Anglo. Amer.
,, 70

PHENOLPHTHALEIN—*
£202.

PITCH (*otherwise undescribed*)—
France, 20 brls. G. Elliott

PLUMBAGO—
Norway, 1 cs. H. Johnson
U.S.A., 30 cks. ,,
France, 144 bgs. G. T. Symons

POTASSIUM NITRATE—
Germany, 1,541 pkgs. Nobel Industries

POTASSIUM PRUSSIATE—
Holland, 4 cks.

PRUSSIAN BLUE—
France, 10 cks. H. H. Poole
1 Rosenberg,
,, 5 cs. Loewe

RED LEAD—
Belgium, 4 cks. F. & W. Farmiloe

* Entered under the Safeguarding of Industries Act.

ROSIN—
Portugal, 85 cks. H. J. Hughes
U.S.A., 550 brls.

SALT—
Spain, 400 t. Wettern

SHELLAC—
Brit. India, 14 c. Litchfield & Saundy
Straits Setts. 6 t. 17 c. J. W. Cook
U.S.A., 7 10 ,,

SOAP—
Austria, £16. Gerhard & Hey
Belgium, £75.
,, £70. S. Kalisky
Denmark, £13.
France, £51. G. T. Symons
,, £4.
,, £150. P. Le Brun
,, £30. Cini
,, £4. J. D. Amoy
,, £70. Pronk, Davis & Rushby
,, £24. G. B. Kent
,, £34. E. E. Mayer
,, £7. Mory
,, £75. J. S. Papazoglie
,, £199. S. Kalisky
Germany, £42.
,, £12. H. Potter
U.S.A., £52. Butler & Crispe
,, £266.
,, £3,275. Gerhard & Hey
,, £799. Knight & Morris
,, £50. Wingate & Johnston
Victoria, £3,900. L. F. Smith

SODA CRYSTALS—
Belgium, 10 t. P. Winn

STEARINE—
Belgium, 13 bgs. Rubeck & Thew
,, 127 H. Hill
Holland, 7

SULPHUR—
Italy, £121. J. Ferguson
,, £420. Norderjeldske
,, £56. Typke & King
,, £32. Morison, Pollexfen

SULPHUR (FLOWERS)—
Spain, £173. Jessop

SUPERPHOSPHATE—
Belgium, 100 t. Lawes Chem. Manure
France, 10 Cheeswright & Ford

TALLOW—
Arg. Rep. 50 t. H. C. Everett
Norway, 118 J. Knight
N.S.W., 19 6 c. Anning & Cobb
Queensland, 16 5 Anning & Cobb
Victoria, 46

TALLOW—
N.Z., 85 t. 19 c.
,, 5 Weber, Smith & Hoare
,, 24 H. C. Everett
,, 10 Fairclough, Dodd & Jones
,, 32 F. W. Renaut
,, 7 9 c. Goad, Rigg

TANNING MATERIALS—
Chestnut Extract
France, 200 pkgs.
Italy, 120 H. G. Harper
U.S.A., 75 Simpson, Spence & Young
Myrabolans
Brit. India, 616 pkgs.
,, 1,000 Wills
Sumac
Belgium, 10 pkgs.
Italy, 100 Gough, Kidstone
Valonia
A. Turkey, 28 t.
Unspecified
Canary Is. 7 bgs.
Holland, 1 t.

TAR—
Sweden, 20 brls.

THORIUM NITRATE—
£238.

TURPENTINE—
France, 50 brls. Fairclough Dodd & Jones
,, 50
Poland, 30 Bergenske
U.S.A., 250
Russia, 26 drms. White Sea & Baltic

ULTRAMARINE—
Belgium, 1 ck.
Germany, 5

WHITE LEAD—
Italy, 24 cks. A. W. Page
U.S.A., 56 Greeff
Belgium, 53 T. & W. Farmilow

ZINC OXIDE—
Belgium, 40 cks. M. Ashby
Germany, 125 Stephens
Holland, 605 F. T. H. Nye
,, 50 M. Ashby

MANCHESTER.

Week ending September 29.

ACETIC ACID—
Hamburg, 308 crbys.
Montreal, 575 brls.

BARIUM SULPHATE—
Valencia, 40 bgs.

BARYTES—
Bremen, 42 cks.

CALCIUM CARBIDE—
Hamburg, 150 drms.

CARBORUNDUM—
Montreal, 244 brls.

CAUSTIC POTASH—
Hamburg, 140 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 250 bgs.

COAL TAR PRODUCTS—
Naphthol
Hamburg, 32 brls.

CREAM OF TARTAR—
Hamburg, 60 cks.

DEXTRINE—
Amsterdam, 250 bgs.; Bremen, 5 cs., 20 bgs., 18 cks.; Hamburg, 150 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Amsterdam, 1 ck., 1 pkg.

DYESTUFFS (NATURAL)—
Indigo
Calcutta, 25 chts.
Quercitron
Baltimore, 55 brls.

FERRO PHOSPHORUS—
Hamburg, 25 cks.

FORMALDEHYDE—
Bremen, 99 cks.
Copenhagen, 48 cks.

GELATINE—
Bremen, 5 cs.

GLUE—
Antwerp, 79 bls.

GLYCERINE—
Rotterdam, 1 drm.

LEAD ACETATE—
Bremen, 9 cks.

LITHARGE—
Genoa, 13 cks.

MAGNESITE—
Madras, 228 bgs.
Rotterdam, 250 bgs.

MAGNESIUM CHLORIDE—
Amsterdam, 46 drms.

MAGNESIUM SULPHATE—
Hamburg, 350 bgs.
Rotterdam, 100 bgs.

MANGANESE ORE—
Abu Zenima, 5,950 t.
Calcutta, 3,500 t.

MINERAL COLOURS (*otherwise undescribed*)—
Hamburg, 100 bgs.

OXALIC ACID—
Rotterdam, 6 cks.

PHOSPHORUS—
Montreal, 282 drms.

POTASSIUM CHLORIDE—
Hamburg, 100 cks.

SALTPETRE—
Hamburg, 80 pkgs.

SOAP—
Catania, 56 cs.
Rotterdam, 90 brls.

SODA—
Antwerp, 32 kgs.

SODIUM ACETATE—
Rouen, 93 cks.

SODIUM BICHROMATE—
Baltimore, 33 cks.

SODIUM CHLORATE—
Valencia, 300 bgs.

SODIUM NITRITE—
Rotterdam, 36 cks.

SODIUM SALTS (*otherwise undes.*)
Bremen, 5 cs.

SODIUM SULPHATE—
Hamburg, 200 bgs.

STEARINE—
Antwerp, 39 bgs.

SULPHUR—
Catania, 1,200 bgs., 68 brls.

TAR (WOOD)—
Geffle, 15 brls.

TARTAR EMETIC—
Antwerp, 1 ck.

TARTARIC ACID—
Amsterdam, 16 cks.
Genoa, 20 brls.

WAX (*otherwise undescribed*)—
Baltimore, 374 brls.
Newport, 408 brls.

ZINC OXIDE—
Antwerp, 80 cks.
Rotterdam, 10 cks.

NEWCASTLE-ON-TYNE

Week ending September 29.

BARYTES—
Bremen, 30 cks., 150 bgs.
Hamburg, 111 brls.

CALCIUM CARBIDE—
Christiania, 410 drms.

CARBON BLACK—
New Orleans, 10 cs.

FERRO PHOSPHORUS—
Hamburg, 2 cks.

GLUE—
Antwerp, 10 bgs.

IRON OXIDE—
Antwerp, 12 cks.

KIESELGUHR—
Antwerp, 200 bgs.

LITHOPONE—
Rotterdam, 20 cks.

ROSIN—
Mobile, 1,170 brls.

SALT—
Hamburg, 200 bgs.

SALTPETRE—
Hamburg, 40 kgs.

SODIUM NITRATE—
Christiania, 51 bgs.

TURPENTINE—
Mobile, 100 brls.

N. & S. SHIELDS.

Week ending September 29.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending September 29.

CARBON BLACK—
Calcutta, £109.

CAUSTIC SODA—
Trinidad, 1 drm.

CHEMICALS (*otherwise undescribed*)
Adelaide, 1 pkg.; Auckland, 10 pkgs.; Barbados, 1,530 pkgs.; Calcutta, 80 pkgs.; Delagoa Bay, 767 pkgs.; Durban, 4 pkgs.; Gothenburg, 13 pkgs.; Kobe, 120 pkgs.; Madras, 100 pkgs.; New York, 913 pkgs.; Pasages, 100 pkgs.; Trinidad, 464 pkgs.; Tuticorin, 9 pkgs.; Vancouver, 100 pkgs.; Victoria, 30 pkgs.

COAL TAR PRODUCTS—
Pitch
Algiers, £3,178.
Tar
Calcutta, £193.; Colombo, £206. Durban, 2 t.; Delagoa Bay, 2 t.

COAL TAR PRODUCTS—
Tar
Penang, £250.
Unspecified
Madras, £881.

DYESTUFFS (NATURAL)—
Logwood
Lyttleton, £29.

GLYCERINE—
Delagoa Bay, 9 t. 15 c.

LEAD ASHES—
Antwerp, £152.

PARAFFIN WAX—
Alicante, £55.; Bilbao, £92.; Cadiz, £37.; Pasages, £37.

SALT—
Trinidad, 9 t.

SHEEP DIP—
Auckland, £50.; Blenheim, £127.; Hawkes Bay, £276.; Nelson, £175.; New Plymouth, £96.; Tunis, £620.; Wanganui, £10. Wellington, N.Z., £725.

SOAP—
Colombo, 1 t.; Trinidad, 4 t. 2 c.

SODIUM BICARBONATE—
Pt. Chalmers, 1 t.

WAX (*otherwise undescribed*)—
Trinidad, 2 c.

WOOD PRESERVATIVE—
Calcutta, £25.

ZINC ASHES—
Antwerp, £148.

GRANGEMOUTH.

Week ending September 29.

CHEMICALS (*otherwise undescribed*)
Antwerp, 10 cks.

COAL TAR PRODUCTS—
Creosote
Christiania, 200 galls.

PARAFFIN WAX—
Rouen, 96 bgs.

PITCH (*otherwise undescribed*)—
Christiania, 65 bgs.

POTASSIUM BICHROMATE—
Rouen, 6 cks.

WAX (*otherwise undescribed*)—
Stockholm, 32 bgs.

HULL.

Week ending September 25.

CASEIN—
Helsingfors, 64 bgs.

CHEMICALS (*otherwise undescribed*)
Aalesund, 20 kgs., 10 cks.; Antwerp, 10 cks.; Abo, 50 drms.; Bergen, 4 kgs.; Barcelona, 2 cks.; Copenhagen, 5 cs., 8 pkgs., 58 drms., 4 cks.; Fiume, 100 bgs.; Gothenburg, 2 cs., 200 bgs., 10 drms., 21 brls., 13 cks.; Hamburg, 365 cs., 4 cks.; Helsingfors, 1 cs., 45 cks., 395 drms.; Kotka, 160 drms.; Helsingborg, 12 kgs., Rotterdam, 40 kgs.; Stockholm, 100 cs., 275 drms.; Wiborg, 60 drms.

* Entered under the Safeguarding of Industries Act.

COAL TAR PRODUCTS—
Benzol
Hango, 2 drms.
Creosote
Christiania, 20 brls.
Jacksonville, 1,251,083 galls.
Naphtha
Christiania, 2 drms.
Pitch
Copenhagen, 1 cs.
Tar
Abo, 3 drms.; Bombay, 120 drms.; Stockholm, 2 cks.

DEXTRINE—
Bilbao, 10 bgs.

DISINFECTANTS (*otherwise undes.*)
Christiania, 100 drms.; Karachi, 1,050 drms.; Salonika, 2 cs.; Stockholm, 50 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Aalesund, 3 kgs.; Christiania, 4 cs., 6 kgs.; Drontheim, 1 cs., 1 kg.; Gothenburg, 4 cks., 9 kgs.

FERTILISERS (*otherwise undes.*)—
Baltimore, 2,287 bgs.

GLUE—
Antwerp, 20 cs.; Copenhagen, 4 cs., 4 bgs.; Gothenburg, 40 bgs.; Hamburg, 16 bgs.; Helsingfors, 160 bgs.; Riga, 10 bgs.

GLYCERINE—
Amsterdam, 100 drms.

RED LEAD—
Kalmar, 4 cks.

SALT—
Bergen, 50 sks.; Copenhagen, 82 cs.; Drontheim, 15 cs.; Norrkoping, 20 cs.

SOAP—
Christiania, 1,023 cs.; Copenhagen, 5 cks., 5 cs.; Gothenburg, 583 cs.; Helsingfors, 1 cs.; Stockholm, 1 bx., 8 cs.

STEARINE—
Bourgas, 11 brls.

TALLOW—
Rotterdam, 90 cks.

WAX (*otherwise undescribed*)—
Rotterdam, 17 cks.

WOOD PRESERVATIVE—
Christiania, 165 drms.
Stockholm, 82 drms.

ZINC OXIDE—
Hotka, 20 cks.
Wiborg, 20 cks.

LEITH.

Week ending September 29.

COAL TAR PRODUCTS—
Creosote
Copenhagen, 50 cks.
Tar
Thorshavn, 2 cks.

GLUE—
Gothenburg, 100 bgs., 20 tins

PARAFFIN WAX—
Amsterdam, 96 bgs.; Copenhagen, 16 bgs.; Gothenburg, 16 bgs.

SALT—
Fuglefjord, 6 cs.
Thorshavn, 9 pkgs.

SHEEP DIP—
Blonduos, 184 drms., 5 cs.; Breiddalsvik, 7 cs.; Hvammstangi, 100 drms.; Nopnasjord, 9 cs., 1 drms.; Svalbardseyri, 51 drms., 4 cs.

SOAP—
Blonduos, 4 cs.; Bordeyri, 2 cs.; Breiddalsvik, 1 cs.; Fuglefjord, 3 cs.; Hvammslangi, 11 cs.; Klaksvig, 2 cs.; Isafjord, 10 cs.; Kopasker, 4 cs.; Nopnasjord, 2 cs.; Reykjavik, 40 cs.; Thorshavn, 23 cs.

SODIUM CARBONATE—
Husavik, 3 cks.

TALLOW—
Rotterdam, 30 cks.

TALLOW OIL—
Copenhagen, 100 tcs.

LIVERPOOL.

Week ending September 27.

ALUM—
Adelaide, 1 t., £11.; Bombay, 4 t. 5 c., £110.; Sydney, 3 t. 10 c. £40.

ALUMINOFERRIC—
Calcutta, 5 t., £36.
Monte Video, 49 t. 8 c., £343.

ALUMINIUM SULPHATE—
Gefle, 10 t. 3 c., £53.; Gothenburg, 50 t., £460.; Kotka, 80 t., £594.; Wiborg, 40 t., £209.

AMMONIA (ANHYDROUS)—
Cape Town, 1 t. 12 c., £207.

AMMONIUM CARBONATE—
Adelaide, 10 c., £18.; Auckland, 1 t., £46.; Bombay, 1 t., £38.; Batavia, 9 c., £20.; Bordeaux, 2 t. 2 c., £66.; Bourgas, 19 c., £28.; Bluff Harbour, 1 t., £35.; Cartagena, Spain, 1 t., £36.; Constantinople, 19 c., £25.; Galatz, 2 t., £52.; Hamburg, 1 t., £23.; Melbourne, 1 t., £33.; Marseilles, 1 t. 19 c., £48.; Nantes, 10 c., £15.; Pernambuco, 18 c., £40.; Piraeus, 10 c., £14.; Para, 19 c., £42.; Pt. Alegre, 2 t. 18 c., £113.; Rotterdam, 1 t., £27.; Rangoon, 1 t., £44.; Sydney, 10 c., £14.; Sourabaya, 9 c., £20.; Santander, 10 c., £14.; Valparaiso, 1 t. 9 c., £64.

AMMONIUM CHLORIDE—
Alexandria, 2 t. 19 c., £122.; Bahia, 19 c., £33.; Bombay, 7 t., £284.; Buenos Aires, 2 t., £70.; Brisbane, 1 t. 2 c., £36.; Bourgas, 1 t. 10 c., £63.; Calcutta, 3 t., £113.; Constantinople, 9 c., £21.; Durban, 2 t., £88.; Dunkirk, 9 t. 17 c., £299.; Galatz, 1 t., £31.; Kobe, 29 t. 19 c., £878.; Melbourne, 5 c., £12.; Madras, 10 c., £20.; New York, 1 t., £48.; Patras, 1 t., £32.; Salonika, 2 t., £83.; Varna, 19 c., £41.; Volo, 19 c., £30.

AMMONIUM PHOSPHATE—
Cape Town, 1 t. 3 c., £66.

AMMONIUM SULPHATE—
Alicante, 173 t. 8 c., £2,361.; Bilbao, 197 t. 4 c., £2,722.; Calcutta, 12 t., £177.; Cartagena (Sp.), 148 t. 14 c., £2,028.; Hong Kong, 100 t., £1,688.; Kingston, 35 t., £517.; Las Palmas, 134 t. 10 c., £2,090.; Mauritius, 100 t., £1,550.; Orotava, 15 t., £217.; Sourabaya, 200 t. 9 c., £2,957.; Tarragona, 295 t. 19 c., £4,072.; Teneriffe, 100 t., £1,443.

ANTIFOULING PAINT—
Piraeus, 1 t., £45.
Trinidad, 10 c., £48.

ARSENIC—
Valencia, 1 t. 3 c., £104.

BITUMEN (TRINIDAD)—
Natal Brazil, 1 t. 14 c., £23.

BLEACHING POWDER—
Auckland, 21 t. 7 c., £144.; Bombay, 50 t., £636.; Brisbane, 7 t. 14 c., £148.; Baltimore, 18 t. 19 c., £530.; Calcutta, 50 t. 3 c., £490.; Copenhagen, 3 t. 11 c., £31.; Durban, 2 t., £26.; Iquique, 4 t. 8 c., £52.; Montreal, 11 t. 1 c., £133.; Melbourne, 3 t. 1 c., £43.; Maceio, 1 t., £11.; New York, 6 t. 13 c., £166.; Pernambuco, 3 t., £35.; Philadelphia, 2 t. 13 c., £70.; Rotterdam, 5 t. 5 c., £47.; Rio de Janeiro, 5 t. 2 c., £56.; Sydney, 2 t., £28.; Singapore, 4 5 t., £59. t., £47.; Wellington,

BORAX—
Bombay, 1 t. 10 c., £40.; Durban, 2 c., £5.; Kilindini, 1 c., £1 10s.; New York, 3 c., £17.; Rio de Janeiro, 11 c., £17.; Rosario, 2 c., £3.; Sekondi, 1 c., £2, Thames, 1 c., £1 5s.

BORIC ACID—
Colombo, 1 c. 1 qr., £5. 10s.; Durban, 1 c., £1.; Nassau, 2 qrs., £2 10s.

CALCIUM CARBIDE—
Lagos, 1 t. 11 c., £68.

CALCIUM CHLORIDE—
Adelaide, 5 t., £30.; Alexandria, 2 t. 10 c., £17.; Bombay, 20 t. 7 c., £110.; Brisbane, 4 t. 19 c., £29.; Bluff Harbour, 10 t. 3 c., £61.; Fremantle, 9 t. 19 c., £57.; Lagos, 1 t. 10 c., £10.; Montreal, 25 t. 5 c., £112.; Nantes, 10 t. 5 c., £51.; Sydney, 15 t. 17 c., £129.; Wellington, 12 t. 3 c., £75.

CARBONATE OF LIME—
Sydney, 4 t. 1 c., £50.

CARBORUNDUM—
Colombo, 5 c., £17.

CAUSTIC POTASH—
Buenos Aires, 3 c., £19.

CHEMICALS (*otherwise undescribed*)
Adelaide, 4 t., £99.; Amsterdam, 5 t., £50.; Algoa Bay, 10 c., £13.; Barcelona, 2 t. 14 c., £44.; Brisbane, 4 t., £107.; Cape Town, 2 t. 12 c., £34.; Calcutta, 32 t. 13 c., £489.; Cuba, 1 t. 1 c., £31.; Christchurch, 1 t., £27.; Durban, 76 t. 16 c., £554.; Dunedin, 1 t., £32.; Fremantle, 1 t., £26.; Lisbon, 1 t., £26.; Montreal, 235 t. 9 c., £1,136.; Melbourne, 10 t. 18 c., £1,299.; Mossel Bay, 2 t. 2 c., £22.; New York, 1 t., £52.; Napier, N.Z., 2 t. 5 c., £93.; Pernambuco, 70 t. 9 c., £336.; Perth, 1 t. 5 c., £34.; Rangoon, 9 c., £13.; Samarang, 39 t. 18 c., £99.; Switzerland, 10 c., £146.; Sydney, 6 t. 1 c., £136.; Timaru, 10 c., £15.

CHROME ALUM—
Gothenburg, 18 c., £19.

CITRIC ACID—
Barcelona, 1 t., £170.

COAL TAR PRODUCTS—
Aniline Oil
Hamburg, 9 t. 17 c., £830.
Carbolic Acid
Antwerp, 10 c., £64.; Amsterdam, 8 c., £69.; Delagoa Bay, 2 c. 1 qr., £15.; Dunedin, 3 c., £27.; Hamburg, 30 t. 8 c., £3,777.; Karachi, 2 c., £21.; Sydney, 18 c., £32.; Stockholm, 5 c., £40.
Creosote
Adelaide, 1 t. 13 c., £87.; Antwerp, 1 t. 19 c., £70.; Durban, 4 t., £54.; New York, 79 t. 14 c., £3,126.; Rouen, 26 t. 18 c., £700.; Sydney, 2 t. 6 c., £131.; Vera Cruz, 1 t. 5 c., £54.
Dinitrochlorbenzol
Piraeus, 2 t. 1 c., £174.
Monochlorbenzol
Switzerland, 24 t. 8 c., £1,557.
Naphthalene
Burutu, 1 t. 2 c., £18.; Iddo, 3 t. 2 c., £49.; New York, 60 t., £750.
Pitch
Lagos, 1 t. 7 c., £13.
Pyridine
Calcutta, 4 c., £10.
Hamburg, 1 t. 7 c., £456.
Tar
Lome, 2 t., £20.; Para, 1 t. 4 c., £12.; Pt. Swettenham, 1 t. 11 c., £173.; Savanilla, 2 t. 16 c., £33.
Unspecified
Kobe, 7 t. 6 c., £1,108.
Manaos, 5 c., £17.

COBALT OXIDE—
Buenos Aires, 6 c., £291.
Tientsin, 18 c., £825.

COPPER SULPHATE—
Buenos Aires, 1 t. 9 c., £38.
Melbourne, 1 t., £27.

CREAM OF TARTAR—
Dunedin, 2 t., £176.; Invercargill, 10 c., £46.; Launceston, 10 c., £46.; Singapore, 2 c., £11.; Suva, Fiji, 3 c., £15.

DISINFECTANTS (*otherwise undes.*)
Amsterdam, 5 c., £128.; Accra, 1 c. 1 q., £17.; Bombay, 5 t. 5 c., £163.; Barranquilla, 1 c., £15.; Cape Town, 3 t. 5 c., £63.; Champerico, 1 t. 5 c., £69.; East London, 12 c., £33.; Havre, 19 c., £226.; Hamburg, 5 t. 1 c., £280.; Hong Kong, 6 t. 17 c., £332.; Lome, 1 c. 2 qrs., £12.

DISINFECTANTS (*otherwise undes.*)
Lagos, 10 c., £30.; Malaga, 15 c., £10.; New York, 46 t. 10 c., £2,075.; Napier, N.Z., 3 t., £141.; Pto. Barrios, 13 c., £23.; Rio Gallegos, 4 t. 11 c., £350.; Rangoon, 1 t. 9 c., £95.; Sydney, 15 c., £38.; Sekondi, 4 c., 2 qrs., £14.; St. John's, N.F., 17 c., £24.

DYESTUFFS (ARTIFICIAL)—
Indigo
Chefoo, 5 t. 19 c., £830.; Hankow, 23 t. 16 c., £3,320.; Shanghai, 57 t. 15 c., £8,051.; Tsingtao, 11 t. 18 c., £1,660.
Unspecified
Auckland, 2 c., £32.; Bombay, 1 t. 3 c., £661.; Calicut, 4 c., £41.; Lyttleton, 14 c., £172.; Montreal, 1 t. 7 c., £346.; Melbourne, 1 t. 1 c., £270.; Madras, 1 c. 2 qrs., £148.; Oporto, 12 c., £205.; Para, 3 qrs., £19.; Penang, 2 qrs., £25.; Sydney, 1 t. 1 c. 2 qrs., £275.; Trinidad, 6 c., £28.; Wellington, 1 c., £98.

DYESTUFFS (NATURAL)—
Orchil
New York, 16 c., £42.

FERTILISERS (*otherwise undes.*)—
Amsterdam, 5 t., £70.; Charleston, 250 t., £1,500.; Melbourne, 6 c., £47.; Savannah, 260 t., £1,560.

GLYCERINE—
Antwerp, 18 c., £79.; Alleppey, 5 c., £25.; Cape Town, 17 t., £1,526.; Calcutta, 18 t., £1,078.; Durban, 4 c., £61.; Galatz, 2 t. 19 c., £264.; Kobe, 9 t. 16 c., £831.; Monte Video, 1 t., £95.; Madras, 4 t. 17 c., £332.; Pt. Said, 1 t. 9 c., £130.; Stockholm, 1 t. 9 c., £100.; V. Cruz, 10 c., £40.

HYDROCHLORIC ACID—
Rangoon, 13 c., £46.

IODOFORM—
Sapele, 1 qr., £30.

LACTIC ACID—
Sydney, 1 t. 3 c., £43.

MAGNESIUM CARBONATE—
Boston, 25 t., £825.; Colombo, 1 t., £33.; Santos, 4 c., £14.

MAGNESIUM OXIDE—
Santos, 10 c., £49.

MAGNESIUM SALTS (*otherwise undescribed*)—
Pernambuco, 3 t., £101.

MAGNESIUM SULPHATE—
Accra, 4 c., £7.; Assinee, 2 qrs., £1.; Cape Coast, 3 c., £1. 5s.; Colombo, 1 c., £1.; Calabar, 10 c., £15.; Grand Bassam, 2 c., £4. 15 s.; Lome, 1 c. 2 qrs., £2.; Lagos, 3 c., £4.; Marmagoa, 7 c., £8. 15s.; Nakualofa, 1 c., £4.; Nassau, 1 c., £1 10s.; Pt. Harcourt, 2 c., £2. 10s.

NICKEL OXIDE—
Buenos Aires, 6 c., £54.

PHOSPHORUS—
Christchurch, 4 c. 2 qrs., £44.

PHOSPHORUS (AMORPHOUS)—
Calcutta, 4 c., £44.
Tampico, 5 c., £63.

PHOSPHORUS SESQUISULPHIDE
Alcoy, 19 c., £202.; Corunna, 1 t., £202.; Gijon, 15 c., £152.; Monte Video, 12 c., £130.; Pasages, 3 t. 13 c., £758.; Palma, B.I., 19 c., £202.; Valencia, 1 t. 9 c., £304.

PITCH (*otherwise undescribed*)—
Calcutta, 7 t. 2 c., £149.
Nantes, 252 t. 4 c., £1,879.

PLATING SALTS (*otherwise undes.*)
Shanghai, 4 c. 1 qr., £46.

POTASSIUM BICHROMATE—
Bourgas, 1 t., £49.
Pernambuco, 3 t., £161.

POTASSIUM CHLORATE—
Manaos, 13 c., £26.

POTASSIUM CHLORIDE—
Melbourne, 10 t., £397.

POTASSIUM CYANIDE—
Melbourne, 10 c., £60.

POTASSIUM IODIDE—
Sapele, 2 qrs., £63.
Winnebah, 45 lb., £14.

POTASSIUM PRUSSIATE—
New York, 2 t. 10 c., £275.

SALTCAKE—
Christiania, 700 t. 3 c., £2,916.

SALTPETRE—
Manaos, 6 c., £13.

SHEEP DIP—
Buenaventura, 12 c., £62.; Buenos Aires, 50 t. 1 c., £1,578.; Blenheim, 1 t. 10 c., £52.; Bluff Harbour, 4 c., £13.; Barranquilla, 18 c., £44.; Dunedin, 21 t. 8 c., £787.; East London, 2 c., £13.; Geraldine, 1 t. 8 c., £52.; Lyttleton, 10 t., £350.; Oamaru, 1 t. 19 c., £131.; Panama, 9 c., £31.; Santa Cruz, 4 t. 9 c., £375.; San Julian, 11 t. 3 c., £437.; Timaru, 8 t. 12 c., £360.; Waimate, 1 t. 19 c., £70.

SODIUM PERBORATE—
Sydney, 5 c., £30.

SULPHUR MONOCHLORIDE—
Rio de Janeiro, 9 t. 19 c., £249.

SULPHURIC ACID—
Pernambuco, 10 c., £30.
Rangoon, 10 c., £30.

TANNING MATERIALS—
Unspecified
Antwerp, 4 t. 4 c., £17.; Brisbane, 5 t., £97.; Genoa, 2 t. 3 c., £50.; Melbourne, 8 t. 9 c., £59.

TARTARIC ACID—
Callao, 9 c., £66.; Launceston, 2 c., £12.; Para, 1 c., £10.

TIN OXIDE—
Melbourne, 5 c., £60.; Sydney, 4 c., £58.; Santos, 10 c., £116.

VANILLIN—
Antwerp, 1 c., £180.
Sydney, 3 qrs., £30.

WOOD PRESERVATIVE—
Algoa Bay, 7 c., £18.; Buenos Aires, 12 c., £22.; Belize, 13 c., £19.; Barranquiila, 1 t., £63.; Karachi, 12 c., 2 qrs., £14.

ZINC CHLORIDE—
Bombay, 11 t. 1 c., £273.; Calcutta, 4 t. 6 c., £86.; Mannila, 1 t., £28.; Pernambuco, 9 c., £13.; Sourabaya, 8 t., £220.; Tjilatjap, 1 t., £27.

ZINC OXIDE—
East London, 10 c., £22.
Montreal, 2 t., £86.

ZINC SULPHATE—
Antwerp, 5 t., £58.

Week ending September 28.

ALBUMEN—
Boston, 2 cks.

CAUSTIC POTASH—
Maracaibo, 40 drms.

CAUSTIC SODA—
Adelaide, 20 drms.; Amsterdam, 51 drms.; Algoa Bay, 285 drms.; Auckland, 11 drms.; Batavia, 70 drms.; Bluff, 106 pkgs.; Bourgas, 400 drms.; Buenos Aires, 428 pkgs.; Brisbane, 63 cs.; Cape Town, 248 drms.; Cheribon, 50 pkgs., 40 drms.; Dunedin, 10 drms., 15 cs.; Constantinople, 63 drms.; Corral, 80 cs.; Durban, 346 drms.; Delagoa Bay, 38 drms.; East London, 193 drms.; Fremantle, 15 drms.; Gothenburg, 10 pkgs.; Hamburg, 442 drms.; Hawkes Bay, 27 pkgs.; Limon, 10 drms.; Maceio, 10 drms.; Malmo, 20 drms.; Moji, 41 drms. Manaos, 12 pkgs.; Melbourne, 145 pkgs.; Monte Video, 100 drms.; Mossel Bay, 16 cs.; Napier, 90 drms.; Oporto, 35 drms.; Para, 30 drms.; Patras, 200 drms.; Piraeus, 61 drms.; Pt. Elizabeth, 40 cs.; Pt. Alma, 60 cs.; Pto. Cabello, 24 drms.; Reval, 700 drms.; Rockhampton, 18 cs.; Rotterdam, 34 drms.; Salonika, 27 drms.; Samarang, 70 drms.; Sarawak, 10 drms.; Sourabaya, 50 drms.; Sydney, 387 pkgs., 127 drms.; Suva, 30 drms.; Tampico, 675 drms.; Varna, 1,200 drms.; Vera Cruz, 692 drms.

CAUSTIC SODA—
Wellington, 14 cs.
Yokohama, 10 cs.

CUPRO MANGANESE—
Seville, 2 t.

FERRO CHROME—
Rouen, 1 cs.

FERRO MANGANESE—
Antwerp, 5 t.
Baltimore, 560 t.
Barcelona, 10 t.
Boston, 500 t. Durban, 10 t.
N. Orleans, 750 t. and 100 pkgs.
Philadelphia, 100 t.

GLUE, SIZE, AND GELATINE—
Antilla, 20 pkgs.; Barcelona, 14 pkgs.; Bombay, 11 cks., 15 pkgs.; Boston, 607 bgs.; Buenos Aires, 22 pkgs.; Boston, 20 bgs.; Calcutta, 22 pkgs.; Ceuta, 10 bgs.; Kingston, Ja., 10 pkgs.; Madras, 31 cks.; New York, 100 pkgs.; Rotterdam, 400 tins; Santiago, 22 bgs.; Shanghai, 24 cks., 100 bgs., 40 tins; Vancouver, 80 pkgs.

NITROGEN—
Haiffa, 4 cylds.

PARAFFIN WAX—
Puerto Colombia, 80 bgs.

SALT—
Antwerp, 170 t.; Baltimore, 25 t.; Bombay, 2 t. 10 c.; Buenos Aires, 4 t.; Bluff, 266 t.; Calabar, 172 t.; Calcutta, 3,977 t.; Cape Town, 2 t.; Durban, 25 t.; Duala, 101 t.; Halifax, N.S., 67 t.; Hawkes Bay, 250 t.; Jersey, 19 t.; Kingston, Ja., 95 t.; Lagos, 70 t.; Matadi, 40 t.; Montreal, 189 t.; Napier, 27 t.; New Orleans, 125 t.; Saltpond, 2 t.; Sekondi, 11 t.; Sierra Leone, 255 t.; Suva, 58 t.; Sydney, 125 t.

SILICO MANGANESE—
New Orleans, 29 t.

SOAP—
Aboisso Assinee, 42 pkgs.; Accra, 750 bxs.; Alexandria, 20 drms.; Amoerang, 200 pkgs.; Amboina, 950 pkgs.; Ampenam, 200 pkgs.; Balik Papan, 100 bxs.; Bangkok, 90 pkgs.; Barranquilla, 50 cs.; Banda Neira, 25 bxs.; Bandjermassin, 1,200 bxs.; Barbados, 250 cs.; Batavia, 2,050 bxs.; Batjan, 80 bxs.; Belawan, 2,195 bxs.; Belize, 15 pkgs.; Bilbao, 1 cs.; Bissao, 10 bxs.; Boela, 70 bxs.; Bombay, 1,404 pkgs.; Buenos Aires, 502 pkgs.; Calabar, 600 bxs.; Calcutta, 725 pkgs.; Cape Town, 270 bxs.; Cape Coast, 350 bxs.; Colombo, 250 bxs.; Constantinople, 25 pkgs.; Copenhagen, 561 pkgs.; Danzig, 11 pkgs.; Djambi, 345 pkgs.; Delagoa Bay, 10 bxs.; Demerara, 12 bxs.; Dobo, 50 pkgs.; Dominica, 40 pkgs.; Durban, 5 bxs.; Dunedin, 10 bxs.; Duala, 870 bxs.; Gorontalo, 450 pkgs.; Gibraltar, 123 pkgs.; Grand Lahou, 10 pkgs.; Hamburg, 47 pkgs.; Hong Kong, 162 pkgs.; Karachi, 185 pkgs.; Kobe, 100 pkgs.; Kota Baroe, 25 pkgs.; Kingston (Ja.), 1,035 pkgs.; Laboean Hadji, 10 pkgs.; Langsa, 20 pkgs.; Larache, 260 pkgs.; Las Palmas, 297 pkgs.; Livingston, W.I., 100 pkgs.; Liroeng, 15 pkgs.; Limassol, 5 pkgs.; Lyttleton, 10 bxs.; Matadi, 21 bxs.; Mauritius, 207 bxs.; Melbourne, 1 cs.; Menado, 1,550 bxs.; Monte Video, 20 bxs.; Montserrat, 60 cs.; Okopedi, 125 bxs.; Orotava, 28 bxs.; Panamz, 675 cs.; Paramaribo, 50 cs.; Penang, 1,901 bxs., 7 cs.; Petta, 40 bxs.; Piracus, 15 bxs.; Pontianak, 660 bxs.; Pt. Harcourt, 266 pkgs.; Pt. Howard, 10 cs.; Puerto Montt, 12 cs.; Pt. Said, 195 bxs.; Pt. Stanley, 22 cs.; Pt. Stephens, 11 cs.; Pt. Swettenham, 1,910 pkgs.; Punta Arenas, 537 bxs., 40 cs.; Rangoon, 413 pkgs.; Rio Gallegos, 4 cs.; Rotterdam, 48 cs.; Saltpond, 70 bxs.; Samarang, 350 bxs.; San Fernando, 150 cs.

SOAP—
Saparoea, 100 bxs.; Sav-la-Mar, 99 bxs.; Sekondi, 166 pkgs.; Shanghai, 23 pkgs.; Singapore, 1,573 pkgs.; Siauw, 60 bxs.; Soembawa, 35 bxs.; Sourabaya, 325 bxs.; St. John's, N.F., 932 pkgs.; Sydney, 1 cs.; St. Kitts, 100 cs.; Suez, 142 cs.; Tagoelandang, 20 bxs.; Tandjong Balei, 150 bxs.; Tangiers, 50 bxs.; Taroena, 80 bxs.; Teneriffe, 264 bxs.; Ternate, 110 bxs.; Timor Dilly, 50 bxs.; Trinidad, 101 cs.; Ushicaja, 10 cs.; Valparaiso, 14 pkgs.; Victoria, W.C.A., 21 cs.; Wanganui, 13 pkgs.; Wellington, 63 pkgs.; Winnebah, 126 bxs.

SODA ASH—
Batavia, 100 pkgs., 100 bgs.; Bourgas, 20 bgs.; Calcutta, 3,000 pkgs.; Constantinople, 200 pkgs.; Dalny, 8,815 pkgs.; Durban, 75 pkgs.; Fremantle, 1,227 pkgs.; Hong Kong, 840 pkgs.; Kobe, 3,699 pkgs.; Manaos, 9 pkgs.; Melbourne, 417 pkgs.; Moji, 9,341 bgs.; Para, 114 pkgs.; Rotterdam, 700 bgs.; Samarang, 586 pkgs.; Santos, 45 cks.; Sekondi, 60 kgs.; Sourabaya, 300 bgs.; Sydney, 35 brls., 280 bgs., 41 cks.; Suva, 140 bgs.; Tampico, 20 bgs.; Varna, 20 bgs.; Vera Cruz, 550 bgs.; Yokkaichi, 3,624 bgs.; Yokohama 271 bgs.

SODA CRYSTALS—
Algoa Bay, 50 pkgs.; Cape Town, 40 pkgs.; Corfu, 201 pkgs.; Gibraltar, 10 kgs.; Patras, 10 pkgs.; Pt. Stanley, 6 pkgs.

SODIUM BICARBONATE—
Adelaide, 72 pkgs.; Alexandria, 250 kgs.; Barcelona, 7 cks.; Bombay, 1,000 bxs.; Buenos Aires, 150 pkgs., 50 cks.; Calcutta, 1,000 pkgs.; Cape Town, 90 pkgs.; Catania, 40 pkgs.; Fremantle, 124 pkgs.; Funchal, 10 pkgs.; Malta, 7 kgs.; Moji, 108 bgs.; Monte Video, 50 kgs.; Mossel Bay, 20 bgs.; Naples, 100 kgs.; Palermo, 20 kgs.; Pt. Said, 40 pkgs.; St. John's, N.F., 50 kgs.; Rotterdam, 100 kgs.; Santos, 200 kgs.; Sydney, 403 pkgs.; Tampico, 90 kgs.; Yokkaichi, 538 bgs.

SODIUM BICHROMATE—
Adelaide, 3 pkgs.; Antwerp, 3 cks.; Danzig, 7 cks.

SODIUM CYANIDE—
Cape Town, 10 pkgs.

SODIUM HYDROSULPHITE—
Durban, 1 t.; Hamburg, 160 pkgs.; Rotterdam, 200 kgs.

SODIUM SILICATE—
Alexandria, 200 bgs.; Algoa Bay, 30 pkgs.; Brisbane, 3 drms.; Cape Town, 4 pkgs.; Durban, 53 pkgs.; East London, 30 pkgs.; Funchal, 7 pkgs.; Maceio, 100 bgs.; Oporto, 16 pkgs.; Para, 46 pkgs.; Pt. Said, 23 pkgs.; Shanghai, 158 cks.; Singapore, 3 pkgs.; Tampico, 55 cks.; Vera Cruz, 80 cks.

SODIUM SULPHATE—
Puerto Barrios, 75 pkgs.

SODIUM SULPHIDE—
Algoa Bay, 5 pkgs.
Pt. Elizabeth, 3 drms.

STEARINE—
Danzig, 170 brls.

SUPERPHOSPHATE—
Las Palmas, 10 t.
Orotava, 50 pkgs.

TALLOW—
Danzig, 29 pkgs.

LONDON.

Week ending September 26.

ACETIC ACID—
Adelaide, 2 cs., £7.; Auckland, 4 cs., £10.; Dunedin, 6 cs., £21.; Santos, 6 cs., £11.; Sapele, 1 cs., £6.; Toronto, 2 cs., £10.; Wellington, 3 cs., £11.; Wellington (F.), 1 cs., £8.

ACETYL SALICYLIC ACID—
Bangkok (F.), 7 cs. (pt.), £10.; Buenos Aires, 1 cs. (pt.), £7.; Calcutta, 1 cs. (pt.), £7.; Cape Town, 1 cs. (pt.), £9.; Melbourne, 3 cs., £52.; Montreal, 2 cs. (pt.), £47.; Selangor, 1 cs. (pt.), £9.

ALUM—
Pt. Dickson, 1 cs., £10.

ALUMINIUM HYDRATE—
Sydney, 5 cks., £96.

ALUMINIUM SULPHATE—
Singapore, 7 cs., £11.

AMMONIA—
Bangkok, 4 cs., £7.; Basra, 10 cs., £17.; Beira, 5 cs., £13.; Belize, 4 cs., £7.; Calcutta, 43 cs. (pt.), £25.; Canton, 3 cs., £5.; Colombo, 8 cs., £14.; Delagoa Bay, 13 cs., £23.; Durban, 53 cs., £97.; Hong Kong, 8 cs., £17.; Lisbon, 12 cs., £19.; Pt. Elizabeth, 5 cs., £9.; Pt. Harcourt, 5 cs., £9.; Rangoon, 3 cs., £5.; Shanghai, 5 cs., £9.; Singapore, 10 cs., £18.

AMMONIA (ANHYDROUS)—
Antofagasta, 4 cylds., £31.; Durban, 40 cylds., £300.; Hong Kong, 2 cylds., £42.; Pt. Sudan, 22 cylds., £177.; Rotterdam, 10 cylds., £78.

AMMONIUM BROMIDE—
Calcutta, 1 cs., £5.

AMMONIUM CARBONATE—
Antwerp, 2 t., £53.; Berbice, 2 c., £10.; Calcutta, 15 c., £105.; Copenhagen, 1 t., £32.; Demerara, 1 t. 15 c., £94.; Hong Kong, 16 c., £50.; Karachi, 9 c., £39.; Penang, 1 t. 7 c., £74.; Pt. Elizabeth, 4 c., £8.; Pto. Alegre, 7 c., £27.; Shanghai, 1 t. 10 c., £26.; Trinidad, 2 c., £7.

AMMONIUM CHLORIDE—
Kilindini, 40 kgs., £20.

AMMONIUM CITRATE—
Calcutta, 1 cs., £18.

AMMONIUM NITRATE—
Antwerp, 115 t., £3,155.
Lisbon, 5 c., £16.

AMMONIUM SULPHATE—
Belewan Deli, 830 t., £12,242.; Demerara, 40 t., £590.; Hong Kong, 200 t., £3,105.; Kobe, 50 t., £790.; Las Palmas, 88 t., £1,213.; Teneriffe, 25 t., £325.

ANTIMONY SULPHIDE—
Bahia, 10 kgs., £14.; Copenhagen, 10 cks., £90.; Hamburg, 7 cks., £131.; Porto Alegre, 10 kgs., £17.

ARSENIC—
Calcutta (F.), 11 cs., £35.
Wellington, 10 drms., £40.

ARSENIC IODIDE—
Calcutta, 1 ck. (pt.), £6.

BARIUM PEROXIDE—
Melbourne, 46 drms., £299.

BARIUM SULPHATE (Blanc Fixe)—
Melbourne, 12 cks., £78.

BISMUTH CARBONATE—
Bangkok, 23 pkgs. (pt.), £55.; Brisbane, 2 cs., £105.; Dunedin, 1 cs., £36.; Melbourne, 2 cs., £72.; Perth, 6 pkgs. (pt.), £32.; Wellington, 1 cs., £79.

BISMUTH SALTS (*otherwise undes.*)
Calcutta, 1 cs. (pt.), £5.; Christchurch, 1 cs. (pt.), £25.; Melbourne, 1 cs. (pt.), £8.; Montreal, 3 cs., £176.; Shanghai, 1 cs. (pt.), £13.

BISMUTH SUBNITRATE—
Perth, 1 pkg. (pt.), £5.; Piraeus, 1 cs. (pt.), £31.; Puerto Madryn, 1 ck. (pt.), £8.; Petrograd, 1 cs., £100.

BITUMEN—
Karachi, 6 cks., £8.
Penang, 3 pkgs., £68.

BONE MEAL—
Antwerp, 2 t., £19.
Channel Islands, 14 t. 3 c., £115.

BORAX—
Calcutta, 1 t. 17 c., £56.; Durban, 1 t. (F.), £27.; Durban, 11 c., £23.; Irish Free State, 2 c., £10.

BORAX—
Petrograd, 21 t. 16 c., £556.; Porto Alegre, 10 c., £16.

BORIC ACID—
Alleppey, 8 c., £53.; Bombay, 5 c., £15.; Calcutta, 7 c., £27.; Cape Town, 3 c., £13.; East London, 13 c., £60.; Foochow, 1 c., £5.; Hong Kong, 4 c., £12.; Perth, 5 c., £20.; Petrograd, 5 t. 12 c., £295.; Pt. Madryn, 3 c., £17.; Pt. Sudan, 3 c., £9.; Shanghai, 2 c., £8.; Trinidad, 2 c., £6.

CALCIUM CARBIDE—
Beira, 20 cs., £9.; Singapore, 3 c., £5.; Walvis Bay, 4 c., £8.

CALCIUM CHLORIDE—
Adelaide, 8 c., £11.; Colombo, 2 c., £8.; Kobe, 60 drms., £136.

CALCIUM LACTATE—
Adelaide (F.), 1 cs. (pt.), £5.

CARBON TETRACHLORIDE—
Sydney, 2 cs., £6.

CAUSTIC POTASH—
Adelaide, 2 cs., £7.
Madras, 4 drns., £20.

CAUSTIC SODA—
Pt. Said, 2 c., £6.
Portland (Ore.), 2 t. 14 c., £113.

CHEMICALS (*otherwise undescribed*)
Addis Abeba, 3 cs., £7.; Aden, 10 kgs., £6.; Adelaide, 18 cs. (pt.), £84.; Alexandria, 3 cs. (pt.), £32.; Switzerland, via Antwerp, 100 pkgs., £266.; Auckland, 7 cs., £71.; Barbados, 24 pkgs., £13.; Barcelona, 70 pkgs., £176.; Beira, 12 pkgs., £67.; Belize, 2 cs. (F.), £6.; Bombay, 30 pkgs. (pt.), £109.; Brisbane, 27 cs., £295.; Buenos Aires, 3 cs. (pt.), £37.; Calcutta, 32 pkgs. (pt.), £169.; Canton, 2 cs. (pt.), £9.; Cape Town, 12 cs. (pt.), £42.; Carnarvon, 4 cs., £6.; Channel Isles, 2 cs., £5.; Colombo, 15 cs., £63.; Delagoa Bay, 19 pkgs., £7.; Demerara, 19 pkgs., £30.; Dunedin, 5 cs. (pt.), £16.; Durban, 3 cs., £10.; East London, 8 pkgs., £15.; Famagusta, 6 cs., £10.; Gothenburg, 11 pkgs., £54.; Gothenburg, 11 pkgs., £54.; Hamburg, 150 pkgs., £362.; Hankow, 14 pkgs., £9.; Hong Kong, 16 cs., (pt.), £58.; Kilindini, 2 cs., £5.; Madras, 8 cs., £105.; Malacca, 8 kgs., £6.; Malta, 6 pkgs., £5.; Matanzas, 10 pkgs., £25.; Mauritius, 4 pkgs., £48.; Melbourne, 23 pkgs. (pt.), £124.; Montreal, 2 cs. (pt.), £51.; New York, 2 cs. (pt.), £163.; Otago, 1 cs., £5.; Penang, 1 cs. (pt.), £6.; Perth, 5 pkgs. (pt.), £8.; Petrograd, 4 cs., £97.; Pisco, 11 pkgs., (pt.), £21.; Pt. Dickson, 7 pkgs., £12.; Pt. Sudan, 8 pkgs., £15.; Rotterdam, 1 cs., £56.; Selangor, 1 cs. (pt.), £7.; Shanghai, 15 pkgs. (pt.), £71.; Singapore, 14 pkgs. (pt.), £24.; Sydney, 2 cs. (pt.), (F.), £29.; Sydney, 29 cs. (pt.), £359.; Tarragona, 50 pkgs., £125.; Tangiers, 5 pkgs., £11.; Toronto, 4 cs., £11.; Trinidad, 2 cs., £5.; Vancouver, 4 cs., £12.; Wellington, 12 pkgs. (pt.), £161.; Yokohama, 8 cs. (pt.), £99.

CHROMIUM OXIDE—
Melbourne, 2 cks., £35.

CITRIC ACID—
Addis Abeba, 2 cs. (F.), £6.; Adelaide, 15 c., £125.; Amsterdam, 6 c., £50.; Auckland, 3 c., £25.; Bluff, 3 c., £25.; Bombay, 1 c., £10.; Cape Town, 1 c., £10.; Concepcion, 3 c., £33.; East London, 1 c., £11.; Fremantle, 3 c., £25.; Gothenburg, 4 c., £33.; Hankow, 2 c., £11.; Hong Kong, 10 c., £104.; Melbourne, 2 t. 5 c., £374.; Mormugao, 1 cs., £7.; Petrograd, 5 t., £1,027.; Pt. Alma, 5 c., £42.; Pt. Madryn, 1 c., £17.; Reval, 2 c. (F.), £18.; Rotterdam 15 c., £125.; Singapore, 1 c., £11.; Sydney, 2 t. 10 c., £415.; Wanganui, 1 c., £7.; Wellington, 2 c., £20.

COAL TAR PRODUCTS—
Anthracene
Rotterdam, 269 cks., £1,100.
Benzol
Cape Town, 44 drms., £170.
Carbolic Acid
Alleppey, 2 cs., £35.; Auckland, 24 pkgs., £50.; Bombay, 10 cs., £47.; Kilindini, 2 cs., £10.; Seremban, 2 cs. (pt.), £7.; Singapore, 55 drms., £76.
Creosote
Grenada, 10 drms., £9.; Hong Kong, 3 cs., £7.; Hamburg, 24 drms., £175.; Pt. Swettenham, 140 drms., £79.
Naphthalene
Durban, 5 cks., £14.; Lagos, 2 cs., £7.; Pt. Sudan, 2 cks., £8.; Rotterdam, 400 bgs., £399.; Singapore, 7 cks., £16.
Pitch
Antwerp, bulk, 720 t., 50 brls., £4,769.; Durban, 8 cks., £29.; Pt. Sudan, 9 brls., £17.; Rio de Janeiro, 12 kgs., £23.
Pyridine
Durban, 20 drms., £94.; Hamburg, 3 drms., £180.; Rotterdam, 3 drms., £180.
Tar
Beira, 37 pkgs., £16.; Cape Town, 100 drms., £9.; Channel Isles, 100 cks., £227.; Colombo, 15 drms., £7.; Delagoa Bay (F.), 45 pkgs., £10.; Delagoa Bay, 180 pkgs., £34.; Durban, 640 drms., £103.; East London, 25 drms., £11.; Loanda, 10 brls., £24.; Pt. Sudan, 36 drms., £32.; Singapore, 40 cks., £174.
Tar Oil
Pt. Sudan, 20 drms., £14.
Xylol
Bombay, 2 cs., £5.

COBALT ACETATE—
Rotterdam, 1 kg., £25.
Sydney, 1 cs., £26.

COBALT SULPHATE—
Harlingen, 2 cs., £32.

COPPER ACETO ARSENITE—
Beira, 1 drm., £11.

COPPER SUBOXIDE—
Trieste (F.), 10 drms., £100.

CREAM OF TARTAR—
Barbados, 1 c. (F.), £5.; Brisbane, 3 t. 8 c., £295.; Cairns, 10 c., £43.; Cape Town, 1 c. (F.), £12.; Channel Isles, 1 c., £5.; Colombo, 1 c. (F.), £7.; Darwin, 5 c., £33.; Durban, 6 c. (F.), £41.; Durban, 3 c., £16.; Fremantle, 4 t., £348.; Demerara, 1 c. (F.), £5.; Hamburg, 10 c., £43.; Hobart, 3 t. 10 c., £303.; Invercargill, 2 t., £174.; Irish Free State, 1 cs., £5.; Kobe, 5 t., £434.; Launceston, 1 t., £87.; Melbourne, 6 t., £521.; New Plymouth, 4 c. (F.), £27.; Pt. Elizabeth, 4 c. (F.), £27.; Rangoon, 1 c. (F.), £10.; Sydney, 35 t. 10 c., £3,161.; Townsville, 1 t., £87.

DISINFECTANTS (*otherwise undes.*)
Antigua, 10 c., £24.; Antofagasta, 2 c., £7.; Bangkok, 4 c., £12.; Barranquilla, 18 c., £45.; Basra, 1 t. 12 c., £75.; Beira, 7 c., £27.; Belewan, 2 t. 6 c., £70.; Bergen, 2 c., £10.; Calcutta, 4 t. 5 c., £114.; Canton, 4 c., £30.; Cape Town, 3 t. 10 c., £88.; Colombo, 9 t. 6 c., £268.; Dar-es-Salaam, 9 c., £34.; Delagoa Bay, 1 t. 3 c., £26.; Durban, 5 t. 5 c., £121.; East London, 16 c., £30.; Grenada, 15 c., £54.; Haifa, 5 c., £13.; Hong Kong, 6 t. 4 c., £345.; Iddo, 4 c., £15.; Jamaica, 4 t. 5 c., £133.; Kilindini, 7 t. 7 c., £349.; Lagos, 5 c., £16.; Las Palmas, 4 c., £5.; Lourenco Marques, 1 t. 1 c., £55.; Madras, 3 t. 18 c., £295.; Mormugao, 1 c., £6.; Mombasa, 12 c., £32.; Montreal, 2 c., £22.; Newcastle, 1 c., £10.; Paris, 9 t. 3 c., £150.; Penang, 4 c., £6.; Pt. Elizabeth, 2 t. 6 c., £88.; Pt. Sudan, 9 t. 1 c., £384.; Pt. Swettenham, 5 t. 1 c., £138.; Rio de Janeiro, 1 t. 10 c., £87.

DISINFECTANTS (*otherwise undes.*)
Rodriguez, 3 c., £5.; Sekondi, 6 c., £11.; Shanghai, 6 t. 14 c., £305.; Singapore, 4 t. 2 c., £228.; Sydney, 19 c., £80.; Tanga, 7 c., £24.; Teneriffe, 7 c., £16.; Tientsin, 1 t. 1 c., £28.; Timaru, 1 t. 9 c., £84.; Trinidad, 6 c., £23.; Vancouver (B.C.), 2 t. 14 c., £114.; Wellington, 10 c., £31.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Wellington, 1 ck., £51.
Unspecified
Adelaide, 1 cs. (pt.), £7.; Bombay, 5 cs. (pt.), £36.; Calcutta, 2 cs., £11.; Cape Town, 1 cs. (pt.), £12.; Cochin, 8 pkgs., £185.; Colombo, 1 cs., £15.; Dunedin (F.), 5 kgs., £105.; Hong Kong, 4 cs., £40.; Madras, 2 cs., £39.; Melbourne, 1 cs. (pt.), £12.; Montreal, 2 cs. (pt.), £17.; New York, 1 cs. (pt.), £17.; Pt. Elizabeth, 1 kg., £15.; Rio Grande do Sul, 1 cs. (pt.), £16.; Selangor, 1 cs. (pt.), £5.; Shanghai, 1 cs. (pt.), £41.; Sydney, (F.), 7 kgs., £182.; Sydney, 1 cs. (pt.), 5 pkgs., £123.; Valencia, 2 cs. (pt.), £28.

ETHYL CHLORIDE—
Durban, 1 cs., £6.
Vancouver, 4 cs., £102.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 2 t. 15 c., £52.; Calcutta, 7 c., £9.; Odense, 1 t. 5 c., £31.

GLYCERINE—
Amsterdam, 6 c., £29.; Arequipa, 4 c., £23.; Basra, 1 c., £5.; Beira, 1 c., £5.; Bombay, 1 c., £12.; Buenos Aires, 1 c., £14.; Cape Town, 90 t. 7 c., £4,335.; Delagoa Bay, 1 c., £5.; Las Palmas, 1 c., £5.; Pt. Madryn, 1 c., £8.; Shanghai, 10 c., £45.; Tientsin, 1 c., £5.; Tocopilla, 1 c., £7.

GUANO—
Channel Isles, 1 t. 1 c., £14.

GUIGNETS GREEN—
Havre, 1 ck., £63.

HYDROCHLORIC ACID—
Bombay, 1 cs., £7.
Hong Kong, 4 cs., £7.

HYDROFLUORIC ACID—
Hong Kong, 2 cs., £8.; Melbourne, 1 cs., £7.; Sydney, 2 cs., £27.

HYDROGEN PEROXIDE—
Bangkok, 22 pkgs. (pt.), £21.; Kilindini, 2 cs., £10.; Kobe (F.), 1 crby., £8.

IODIDES (*otherwise undescribed*)—
Calcutta, 2 cs., £165.; Melbourne, 1 cs. (pt.), £10.; Shanghai, 1 cs. (pt.), £7.

IODINE—
Calcutta, 1 cs., 3 cs. (pt.), £132.; Paris (F.), 20 kgs., £1,89·.; Puerto Madryn, 1 cs. (pt.), £11.; Sydney, 1 cs., £104.; Wellington, 2 cs., £310.

IODINE (RESUBLIMED)—
Auckland, 1 cs., £53.
Dunedin, 2 cs. (pt.), £7.

IRON AMMONIUM CITRATE—
Montreal, 5 cs., £67.
Shanghai, 1 cs., £7.

KIESELGUHR—
Rotterdam (F.), 10 c., £8.

LEAD ACETATE—
Bangkok, 2 cs., £9.; Calcutta, 4 cs., £10.; Melbourne, 5 kgs., 2 cks., £34.; Madras, 20 kgs., £43.

LEAD ARSENATE—
Beira, 4 drms., £27.; Hobart, 56 pkgs., £120.; Kilindini, 6 kgs., £20.; Las Palmas, 2 kgs., £7.

LEAD HYPOSULPHITE—
Melbourne, 4 cks., £82.

LEAD SUBACETATE—
Colombo, 2 cs., £9.

LITHIUM BENZOATE—
Paris, 2 cs., £78.

LITHIUM CITRATE—
Bombay, 1 cs. (pt.), £8.

MAGNESIA—
Auckland, 26 cs., £62.; Christchurch, 10 cs., £24.; Shanghai, 2 cs., £11.; Sydney, 60 cs., £144.

MAGNESIA (CALCINED)—
Alexandria, 2 cs., £13.; Bushire, 2 cs., £8.; Jamaica, 1 cs., £6.; Mormugao, 1 cs., £8.; Santos, 2 cs., £16.; Vancouver, 1 cs., £5

MAGNESIUM CARBONATE—
Adelaide, 2 cs., £12.; Auckland, 3 cs., £7.; Bahia, 2 cs., £6.; Bushire, 8 cs., £14.; Calcutta, 1 cs., £5.; Puerto Madryn, 1 cs., £6.; Sydney, 2 cks., £11.; Wellington, 2 cs., £5.

MAGNESIUM CITRATE—
Bombay, 1 cs., £7.
Teneriffe, 2 cs., £15.

MAGNESIUM SULPHATE—
Auckland, 2 t. 18 c., £67.; Belize, 5 c., £10.; Bombay, 5 c., £6.; Durban, 2 t. 16 c., £74.; Jeddah, 5 c., £6.; Karachi, 5 c., £6.; Limon, 4 c., £5.; Matadi, 5 c., £7.; Melbourne, 10 c., £25.; Mombasa, 7 c., £9.; Porto Alegre, 7 c., £11.; Pt. Madryn, 5 c., £6.; Pt. Sudan, 2 t., £38.; Rangoon, 8 c., £22.; Toronto, 2 t. 10 c., £33.; Trinidad, 1 t., £19.; Wellington, 2 t., £47.

MANGANESE SULPHATE—
Wellington, 1 ck., £14.

MERCURIALS (*otherwise undes.*)—
Jamaica, 1 cs. (pt.), £5.

MERCURY AMMONIUM CHLORIDE—
Sydney, 1 cs. (pt.), £14.

MERCURY BICHLORIDE—
Beira, 1 cs., £25.; Brisbane, 1 cs., £6.; Sydney, 1 cs. (pt.), 2 cs., £22.

METHYL ACETATE—
Paris, 5 drms., £60.

MOLYBDIC ACID—
Adelaide, 1 cs. (pt.), £6.

NITRATE OF LIME—
Beira (F.), 1 t., £16.

NITRIC ACID—
Hankow, 4 c., £6.
Sekondi, 5 c., £8.

PARALDEHYDE—
Melbourne, 1 cs., £5.
Sydney, 3 cs., £21.

PHOSPHORIC ACID—
Barbados, 4 cks., £44.; Durban, 4 cs., £8.; Melbourne, 8 cs., £25.

PHOSPHORUS—
Melbourne, 2 cs., £20.

PICRIC ACID—
Kilindini, 2 cs., £5.

POTASH (*otherwise undescribed*)
Adelaide (F.), 5 c., £8.

POTASSIUM ACETATE—
Calcutta, 2 cs., £5.
Shanghai, 2 cs., £5.

POTASSIUM BICHROMATE—
Colombo, 1 brl., £16.

POTASSIUM BISULPHITE—
Adelaide, 1 kg., £5.

POTASSIUM BROMIDE—
Adelaide, 2 cs. (pt.), £8.; Bangkok (F.), 7 cs. (pt.), £7.; Calcutta, 1 cs., £5.; Paris, 5 cks., £37.; Perth, 5 pkgs. (pt.), £6.

POTASSIUM CARBONATE—
Hong Kong, 5 cs., £18.

POTASSIUM CHLORATE—
Auckland (F.), 3 kgs., £9.

POTASSIUM CITRATE—
Adelaide, 1 cs., £13.; Bombay, 1 cs., £15.; Calcutta, 1 cs., £13.; Christchurch, 1 cs. (pt.), £6.; Dunedin, 1 cs., £7.; Melbourne, 2 cs., £23.; Perth, 5 pkgs. (pt.), £14.; Sydney, 2 cs., £27.; Wellington, 2 cs., £27.

POTASSIUM CYANIDE—
Aden, 1 cs., £10.
Auckland, 1 cs. £8.
Madras, 1 cs., £28.

POTASSIUM CYANIDE—
Singapore, 3 cs. (pt.), £17.
Wellington, 1 cs., £7.

POTASSIUM FERROCYANIDE—
Bangkok, 2 kgs., £19.

POTASSIUM IODIDE—
Accra, 1 cs., £8.; Alexandria, 1 cs., £86.; Auckland, 1 cs., £88.; Bangkok, 1 cs., £104.; Bombay, 1 cs., £90.; Calcutta, 2 cs., £175.; Christchurch, 1 cs. (pt.), £22.; Dunedin, 3 cs. (pt.), £33.; East London, 5 cs., £372.; Melbourne, 1 cs., £90.; Mombasa, 1 cs. (pt.), £9.; Perth, 6 pkgs. (pt.), £32.; Puerto Madryn, 1 ck., £10.; Pt. Swettenham, 1 cs., £53.; Santos, 1 cs. (pt.), £40.; Sekondi, 8 cs., £10.; Shanghai, 1 cs., £88.; Sydney, 3 cs., £348.; Wellington, 5 cs., £428.

POTASSIUM METABISULPHITE
Adelaide, 5 cs., £18.; Boulogne, 8 kgs., £34.; Melbourne, 8 cs., £96.; Sydney, 3 cs., £9.

POTASSIUM PERMANGANATE—
Bangkok (F.), 7 cs. (pt.), £7.

POTASSIUM PRUSSIATE—
Antwerp, 5 cks., £110.; Brisbane, 1 kg., £8.; Madras, 4 cs., £28.; Montreal, 2 cs., £25.; Paris, 10 kgs., £127.

POTASSIUM SALTS (*otherwise undescribed*)—
Jamaica, 1 cs. (pt.), £13.

PYROGALLIC ACID—
Madras, 3 cs., £35.

ROCHELLE SALTS—
Canton, 2 c., £11.; Hong Kong, 2 c., £14.; Sydney, 4 c., £10.

SALAMMONIAC—
Abadan, 2 kgs., £6.; Cape Town, 1 ck., £6.; Madras, 5 cks., £14.; Melbourne, 10 cks., £20.; Shanghai, 2 c., £8.; Singapore, 5 cs., £12.

SALICYLATES (*otherwise undes.*)—
Buenos Aires, 1 cs. (pt.), £10.; Montreal, 2 cs. (pt.), £13.; Sydney, 6 cs., £112.

SALICYLIC ACID—
Hong Kong, 1 cs., £12.

SALTPETRE—
Amsterdam, 2 t., £84.; Beira, 10 c., £12.; Cape Town, 10 c., £21.; Dunedin, 1 t., £42.; Durban, 2 t. 1 c., £41.; Durban, 1 t. 2 c. (F.), £42.; Melbourne, 2 t., £83.; Perth, 2 c., £8.; Rio de Janeiro, 2 t. 9 c., £98.; Santos, 2 t. 9 c., £98.; Seychelles, 13 c., £30.; Sydney, 3½ t., £137.

SHEEP DIP—
Antwerp, 6 cs., £18.; Buenos Aires, 52 t. 7 c., £2,590.; Bluff, 2 t. 15 c., £185.; Comodoro Rivadavia, 6 t. 19 c., £174.; Durban, 6 t. 1 c., £435.; Hastings 11 t. 13 c., £720.; Launceston, 1 t. 6 c., £45.; Oamaru, 9 t. 13 c., £608.; Rio Gallegos, 4 t. 13 c., £116.; San Julian (Arg. Rep.), 9 t. 5 c., £232.; Santa Cruz (Arg. Rep.), 6 t. 19 c., £174.; Timaru, 15 t. 15 c., £935.; Wellington, 20 t. 4 c., £1,255.

SILVER NITRATE—
Hong Kong, 1 cs., £97.; Santos, 1 ck. (pt.), £6.; Singapore, 7 pkgs. (pt.), £6.; Shanghai, 1 cs. (pt.), £14.; Wellington, 1 cs., £24.

SODIUM BENZOATE—
Madras, 9 c., £117.
Paris, 10 c., £125.

SODIUM BICARBONATE—
Calcutta, 8 c., £21.; Canton, 10 c., £8.; Delagoa Bay, 4 c., £6.; Durban, 18 c., £33.; Fremantle, 10 c., £13.; Montreal, 2 c., £8.; Pt. Elizabeth, 4 c., £6.; St. Helena, 10 c., £11.; Shanghai, 7 c., £13.; Singapore, 3 c., £8.; Trinidad, 5 c., £10.

SODIUM BICHROMATE—
Hong Kong, 11 c., £23.

SODIUM BISULPHITE—
Penang, 1 t. 17 c., £65.

SODIUM BROMIDE—
Adelaide, 2 c., £10.
Dunedin, 1 cs., £9.

SODIUM CARBONATE—
Madras, 2 c., £10.; Pt. Sudan, 2 c., £5.; Singapore, 18 cs. (pt.), £13.

SODIUM CITRATE—
Hobart, 1 c., £15.

SODIUM IODIDE—
Copenhagen, 1 cs., £98.

SODIUM NITRATE—
Townsville (transit) (F.), 10 c., £15.

SODIUM PERBORATE—
Karachi, 1 c., £7.
Sydney, 5 c., £24.

SODIUM PYROPHOSPHATE—
Sydney, 10 c., £23.

SODIUM SALICYLATE—
Dunedin, 1 cs., £7.

SODIUM SALTS (*otherwise undes.*)
Calcutta, 5 c., £22.

SODIUM SULPHATE—
Calcutta, 10 c., £6.; Irish Free State, 4 c., £13.; Singapore, 5 c., £9.; Sydney, 10 c., £10.

SODIUM SULPHIDE—
Bluff, 26 t. 5 c., £420.; Dunedin, 2 t. 12 c., £42.; Lyttleton, 29 t., £465.

SODIUM SULPHITE—
Melbourne, 1 t., £26.; Singapore, 18 cs. (pt.), £16.; Sydney, 1 t., £26.

SODIUM SULPHOCARBOLATE—
Calcutta, 1 cs., 1 c., £11.

SODIUM TARTRATE—
Calcutta, 1 c., 1 cs., £10.
Hobart, 1 c., £6.

SPENT OXIDE—
Amsterdam, 934 t. 5 c., £2,378.
Rouen, 200 t. 9 c., £635.

SULPHUR—
Melbourne, 2 c., £7.; Petrograd (F.), 25 t., £225.; Seychelles, 2 c., £7.; Shanghai, 2 c., £8.

SULPHURIC ACID—
Accra, 3 c., £9.; Beira, 2 t., £37.; Bombay, 1 c., £5.; Channel Isles, 1 t., £41.; Colombo, 3 c., £13.; Kilindini, 16 c., £35.; Pt. Sudan, 3 t., £47.; Rotterdam, 2 t., £50.; Sekondi, 1 t., £20.; Singapore, 3 t. 3 c., £97.; Valparaiso, 1 t., £107.

SUPERPHOSPHATE—
Beira, 2 t., £12.; Durban, 290 t. 11 c., £2,161.; Las Palmas, 5 t., £35.

TANNIC ACID—
Calcutta, 1 cs., £9.

TARTARIC ACID—
Adelaide, 3 t. 15 c., £397.; Auckland, 7 c., £37.; Bluff, 7 c., £43.; Bombay, 1 c. (F.), £7.; Calcutta, 1 c., £9.; Cape Town, 1 t. 17 c. (F.), £319.; Concepcion, 5 c., £41.; Durban, 2 c. (F.), £15.; Durban, 3 c., £11.; East London, 1 c., £8.; Fremantle, 5 c., £31.; Gothenburg, 4 c., £24.; Hong Kong, 10 c., £82.; Irish Free State, 5 c., £33.; Madras, 10 c. (F.), £61.; Mauritius, 2 c., £16.; Melbourne, 10 t. 10 c., £1,281.; Mornnigao, 1 cs., £5.; Newcastle, 1 c., £8.; Pisco, 1 c., £10.; Pt. Alma, 10 c., £61.; Pt. Elizabeth, 2 c. (F.), £18.; Reval, 10 c. (F.), £69.; Rotterdam, 10 c., £62.; Singapore, 3 c., £26.; Sydney, 6 t. 10 c., £793.; Tientsin, 1 c., £8.; Trujillo, 1 c. (F.), £9.; Tuticorin, 1 c., £8.

THEOBROMINE—
Hamburg, 1 cs., £60.

ZINC CHLORIDE—
Haiphong, 5 drms., £9.
Saigon, 20 drms., £37.

ZINC OXIDE—
Christiania, 20 cks., £37.; Madras 50 kgs., £116.; Petrograd, 105 cks., 95 brls., £1,861.; Singapore, 1 ck., £5.; Toronto, 350 cks., £1,480.; Wellington (F.), 3 brls., £6.

ZINC SULPHATE—
Melbourne, 3 drms., £9.
Sydney, 4 cks., £66.

ZINC SULPHIDE—
Hamburg, 2 cks., £39.

Week ending September 29.

ANTIMONY REGULUS—
Durban, 13 t. 10 c.
Madras, 5 c.

BEESWAX—
Trieste, £75.

FERRO TUNGSTEN—
Stockholm, 5 t.

FULLER'S EARTH—
Fredrikstad, 42 t.; Nantes, 5 t.; New York, 45 t.; Seattle, 25 t.

GLUE, SIZE, AND GELATINE—
Antwerp, 2 t. 6 c.; Boston, 19 t. 17 c.; Brisbane, 5 c.; Calcutta, 10 t. 10 c.; Cape Town, 5 c.; Dar-es-Salaam, 1 c.; Dunkirk, 2 t.; Durban, 2 t. 8 c.; East London, 15 c.; Helsingfors, 10 c.; Karachi, 3 c.; Lagos, 17 c.; Madras, 2 t. 13 c.; Malta, 9 c.; Mauritius, 2 t. 3 c.; Melbourne, 5 t. 1 c.; Oporto, 2 t. 13 c.; Penang, 16 c.; Pt. Elizabeth, 9 c.; Rangoon, 4 c.; Rio de Janeiro, 1 t. 12 c.; San Francisco, 15 c.; Shanghai, 2 c.; Sydney, 2 t. 2 c.; Tampico, 4 c.; Trinidad, 3 c.; Vera Cruz, 5 c.

PARAFFIN WAX—
Kilindini, 10 c.

PLUMBAGO—
Buenos Aires, 1 t. 2 c.; Delagoa Bay, 1 t.; Dunedin, 10 c.; Madras, 6 c.; Monte Video, 10 c.; Montreal, 5 t. 2 c.; Perth, 5 c.; Stockholm, 2 c.

QUININE—
Amoy, 2,000 oz.; Bombay, 2,056 oz.; Calcutta, 22,772 oz.; Melbourne, 100 oz.; New York, 5,000 oz.; Pt. Harcourt, 350 oz.

SALT—
Bombay, 6 c.; Cape Town, 1 t. 3 c.; Dunedin, 65 t.; Durban, 4 c.; East London, 1 t. 19 c.; Jeddah, 1 c.; Kilindini, 3 c.; Karachi, 10 c.; Lyttleton, 40 t.; Maceio, 3 c.; Madras, 1 t. 15 c.; Paramaribo, 13 c.; Pt. Elizabeth, 1 t. 12 c.; Pt. Sudan, 3 c.; Pt. Swettenham, 6 c.; St. Helena, 1 t.; Toronto, 7 c.

SHELLAC—
Tampico, 1 c.

SOAP—
Abadan, 2 t. 19 c.; Ahwaz, 1 c.; Alexandria, 1 t. 10 c.; Amsterdam, 2 t. 5 c.; Auckland, 1 c.; Bahamas, 2 t. 8 c.; Barbados, 1 t.; Bermuda, 18 c.; Bombay, 3 t. 10 c.; Boulogne, 2 c.; Calcutta, 17 c.; Channel Isles, 1 c.; Christiania, 5 c.; Christchurch, 12 c.; Cologne, 1 t. 16 c.; Demerara, 1 c.; Dunedin, 13 c.; Durban, 17 c.; Hobart, 1 c.; Iquique, 1 c.; Karachi, 5 t.; Kilindini, 3 c.; Larache, 5 t. 12 c.; Launceston, 4 c.; Madras, 1 c.; Mauritius, 1 c.; Melbourne, 2 c.; Montreal, 8 c.; Paris, 2 c.; Perth, 2 c.; Pt. Elizabeth, 1 t. 8 c.; Pt. Harcourt, 1 c.; Pt. Sudan, 6 t. 13 c.; Pt. Said, 3 c.; Sekondi, 5 c.; St. Helena, 17 c.; St. Lucia, 1 t.; Sydney, 3 c.; Shanghai, 3 c.; Singapore, 4 c.; Tanga, 1 c.; Trinidad, 3 t. 13 c.; Vancouver, 1 c.; Wellington, 8 c.; Winnebah, 1 t. 17 c.; Zanzibar, 2 c.

SPERMACETTI WAX—
Kobe, 1 t.

STEARINE—
Christchurch, 7 t. 4 c.

TALLOW—
Antwerp, 25 t. 4 c.; Cologne, 25 t.; Danzig, 15 t.; Nantes, 25 t. 12 c.; Paris, 47 t. 13 c.; Penang, 1 t. 14 c.; Rotterdam, 10 t.

WHITE LEAD—
Auckland, £411.; Beira, £115.; Bombay, £218.; Brisbane, £91.
Dunedin, £106.; Durban, £190.; East London, £230.; Gisborne, £49.; Gothenburg, £35.; Hong Kong, £52.; Grenada, £6.; Lyttleton, £287.; Madras, £23.; Melbourne, £759.; Oamaru, £44.; Rangoon, £52.; Rio de Janeiro, £96.; Sydney, £1,154.; Townsville, £89.; Trinidad, £55.

ZINC ASH—
Antwerp, 5 t.

MANCHESTER.

Week ending September 25.

AMMONIUM SULPHATE—
Dunkirk, 3,055 bgs.

CALCIUM CHLORIDE—
Bagdad, 37 drms.

CHEMICALS (*otherwise undescribed*)
France, 65 kgs.
Montreal 156 pkgs., 25 bgs.

COAL TAR PRODUCTS—
Creosote
U.S.A., 3,984 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Melbourne, 1 kg.
New Zealand, 5 drms.

GLUE—
Montreal, 100 bgs.

SALT—
Bluff, N.Z., 4,060 bgs.; Brisbane 1,116 bgs.; Napier, 1,801 bgs.; Quebec, 1,600 sks.

SOAP—
Alexandria, 3 cs.; Cairo, 10 cs.; Christchurch, 32 cs.

NEWCASTLE-ON-TYNE

Week ending September 29.

AMMONIA—
Copenhagen, 5 cks.

ANTIMONY—
Antwerp, 62 kgs., 6 cks.; Hamburg, 15 cks.; Montreal, 78 cks.

BARYTES—
Antwerp, 300 bgs.

CAUSTIC SODA—
Antwerp, 121 drms.; Bergen, 10 drms.; Copenhagen, 112 drms.; Hamburg, 139 drms.

COAL TAR PRODUCTS—
Tar
Bergen, 2,100 bgs.

LITHARGE—
Antwerp, 4 cks.; Copenhagen, 26 cks.; Hamburg, 60 kgs.

MAGNESIA—
Antwerp, 10 cs.
Montreal, 47 cs.

RED LEAD—
Antwerp, 2 kgs.; Bergen, 14 cks., 7 kgs.; Christiania, 53 cks.; Copenhagen, 12 cks.; Hamburg, 20 kgs., 145 kgs.; Montreal, 8 kgs.

SALT—
Christiania, 85 pkgs.

SOAP—
Antwerp, 20 cs.

SODIUM CARBONATE—
Montreal, 10 cs.

SODIUM SULPHITE—
Copenhagen, 10 kgs.

WHITE LEAD—
Antwerp, 560 ktls., 4 kgs.; Copenhagen, 30 cks.; Hamburg, 2 cks., 80 kgs.; Montreal, 160 kgs.

ZINC OXIDE—
Copenhagen, 21 cks.

N. & S. SHIELDS.

Week ending September 29.

ANTIMONY—
Callao, 9 c. 3 qrs.

CALCIUM CARBIDE—
Valparaiso, 1 t. 15 c. 1 qr.

SODIUM HYPOSULPHITE—
Arica, 3 t.

WHITE LEAD—
Talcahuano, 1 t. 19 c. 1 qr.

PRICES CURRENT.

WEDNESDAY, OCT. 3, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23/6	&	47/-
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	8½
Formic, 80/85%	*ton	52	0	0
Hydrofluoric. 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	18	0	0
Pitch (f.a.s. Liverpool)	ton	6	12	6
Pyridin	gallon	1	1	0
Tar, crude	ton	4	2	6
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	126	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	*lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	12	6
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	62	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	10	0
Formaldehyde, 40%	ton	76	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	0	0
Lead Acetate (brown)	ton	43	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge (British)	ton	41	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	3
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	3
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	25	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	9
Potassium Prussiate (yellow)	lb.	0	1	0
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/-	&	57/-
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	50	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11½
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	5½
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	4	0	0
Sodium Sulphide (conc.), 60/65%	ton	14	0	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	7	6
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	116	0	0
Antimony	ton	35	0	0
Copper	ton	61	12	6
Lead (Chemical Sheet), delivered	cwt.	1	16	6
Lead (Foreign Pig)	ton	26	5	0
Nickel	ton	130	0	0
Silver	oz.	0	2	8¼
Tin, English Ingots	ton	203	0	0
Zinc (Spelter)	ton	33	0	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	44	0	0
Linseed, Raw	*ton	46	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	13	6

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only.

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
Pure Chemistry at the Empire Exhibition	419
Sir William Pope and the B. D. C.	420
A Madagascan Mystery	420
The Late Dr. Harker	420
Electrical Power for Chemical Plants	421
Cadmium in Soldering Alloys	422
Gas Undertakers as Chemical Manufacturers	423
Mineral Production of Canada	423
Bleaching Liquors from Liquid Chlorine	424
Society of Public Analysts	425
Department of Scientific and Industrial Research	426
The Forthcoming World Power Conference	428
The British Empire Exhibition	429
The Directorate of the Dyestuffs Corporation	430
High-pressure Steam for Power Generation	431
Death of Mr. William Thomson	431
American Benzol Production	431
Items of Interest	432
Coming Events	433
Reports of Companies	434
Legal Intelligence	434
Gazette News	434
Fertiliser News	435
Cumberland Coking and By-product Industries	435
South Wales Notes	435
The Patent List:—	
Applications for British Letters Patent	436
Complete Specifications Accepted	436
Complete Specifications Open to Public Inspection before Acceptance	436
Abstracts of Latest Complete Specifications	437
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	437
New Companies	438
Thirty-five Years Ago	438
Market Reports:	
London "Open Market" Report	439
London Metal Market	440
Manchester Chemical Market	440
Swansea Market Report	440
Liverpool Chemical Market	441
West of Scotland Chemicals	441
Imports of Chemical Products	442
Exports of Chemical Products	444
Prices Current	448

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CURRENT TOPICS.

PURE CHEMISTRY AT THE EMPIRE EXHIBITION.

THE decision to organise a comprehensive exhibit dealing with pure chemical science at the forthcoming British Empire Exhibition is one on which the Association of British Chemical Manufacturers, the Royal Society, the Society of Chemical Industry, and the other scientific and technical bodies collaborating, have every reason to feel satisfied. The main outlines of the proposed exhibit and the reasons that have prompted the A.B.C.M. enthusiastically to support it were given by Mr. Woolcock on Monday at his conference with the editors of the various chemical trade and technical journals. The matter was also dealt with in detail by Dr. Levinstein in his address to the inaugural meeting of the session of the Manchester Section of the Society of Chemical Industry on Friday last. Dr. Levinstein is the chairman of the representative committee that has been formed to organise the scientific exhibit, and, as was pointed out by Dr. E. F. Armstrong, has devoted much time and energy to the project. At first thought it might appear anomalous that the A.B.C.M., a body the interests of which are of course commercial and which has already sole charge of the organisation of the industrial chemical exhibit, should contribute both money and effort to the purely academic exhibit. Yet when the ultimate objects and purposes of the Empire Exhibition are considered, it is seen that this latter section possesses an importance scarcely secondary to the industrial exhibit. As Dr. Levinstein pointed out, the purposes of the Chemical Sections of the Exhibition are to demonstrate the strength, efficiency, enterprise, and range of all branches of British chemical industry, and thus by enhancing this country's prestige in all parts of the world to create in the minds of overseas buyers a new and eminently favourable atmosphere with regard to the British fine-chemicals industry. It is now becoming fully realised that industries dependent upon research cannot be made to flourish by Government legislation, but can only prosper permanently in a country where chemical teaching and pure scientific research are adequate not only in quality, but also in quantity. The pure chemistry exhibit will impress upon overseas visitors the great amount of scientific work of the first order that British investigators have done for the benefit of mankind as a whole, and convince them that the present efforts to

establish a vigorous fine-chemical industry here are not sporadic, but are founded upon a basis of scientific achievement and reserves which assures eventual success. Incidentally, by assembling the results of British scientific accomplishment during the last forty years within comparatively small spatial compass, the exhibit should destroy once and for all the legend that we in this country are behind the Germans in any branch of chemical science. The scientific exhibit is to be divided into sections dealing with the following branches: Alkaloids, sugars, terpenes, natural colouring matters, coal-tar dyestuffs, agricultural chemistry, biochemistry, physical chemistry, inorganic chemistry, and general. Each section is in charge of our foremost specialist or specialists; Principal Irvine, for example, is organising the sugar exhibit, Sir J. J. Russell the agricultural chemistry exhibit, and Professor Gowland Hopkins the biochemistry exhibit.

SIR WILLIAM POPE AND THE B.D.C.

On another page we reproduce the letter written to the *Morning Post* this week by Sir William J. Pope, in which he criticises very adversely the constitution of the present directorate of the British Dyestuffs Corporation. Sir William's is only one more voice added to the growing chorus of informed opinion, but his reputation as a chemist and dyestuffs expert is so great that the chairman of the Corporation has thought it advisable at last to attempt an open reply. In this reply Sir William Alexander ignores entirely the main question raised by the Cambridge professor—namely, that of the necessity of incorporating technical experts in the directorate,—and has confined himself, in substance, to the assertion that all is yet well with the affairs of his organisation. Professor Green has resigned, it is true, but his successor has already been appointed in the person of Dr. W. H. Perkin, the well-known Oxford chemist and director for some years of the research work carried out at Oxford University on behalf of the Corporation. No one will disagree with the exceptional qualifications of Professor Perkin and his eminent suitability as the successor of Professor Green; but what guarantee is there that the new director of research will not in time find his position untenable and be compelled to adopt a similar attitude to his predecessor? Until the principle of technical representation on the Board is accepted, we are convinced that internal stability will never be reached in the Corporation. A statement by the present directors to the effect that they accept this principle and are prepared in the near future to recommend for election to the Board one or more technical men either from the ranks of their own employees or from outside their organisation, would be reassuring; but it must be admitted that the evidence yet available indicates that the directors do not accept this principle, at least so far as its immediate application is concerned. Sir William Pope's contentions are sound and put in perfectly definite language. There is one point, however, on which we think he has been rather unfair, and that is where he implies that the technical Press have emphasised unduly the question of the policy of the Board. For our own part, we have pointed out repeatedly the absolute necessity for technical representation on the Board as a matter entirely independent of the policy pursued by that Board. We still remain firm in our opinion, which we developed fully in these columns three weeks ago, that the expressed policy of the present directors is fundamentally sound; but any implication that we have confused the issues or not given our unqualified support to the principle of technical men managing technical enterprises would be quite unmerited.

A MADAGASCAN MYSTERY.

A recent issue of the *Board of Trade Journal* contains the isolated announcement that from now onwards anthraquinone may be imported into Madagascar duty-free. The most probable explanation of this remarkable notification no doubt is that the substance was inadvertently omitted from some former classification of the Madagascan Customs tariff by the French authorities and the present announcement is a belated amendment. We have not, however, been able to verify this supposition yet, so that the other possibilities must not be lost sight of. Can it be that this welcoming of imported anthraquinone on the part of the Malagasy shows that they also have realised the necessity of establishing a fine chemical industry and have determined to run no risks in the case of future hostilities by making a start with the manufacture of alizarin and allied dyestuffs? Are we to meet yet another competitor in the dyestuffs markets of the world? We confess we cannot answer these sinister questions, nor yet the further one of whether new uses for anthraquinone as distinct from its application as a dyestuff intermediate or as a catalyst in certain analytical operations have been discovered by the scientists of Madagascar. Perhaps some of our readers can enlighten us.

THE LATE DR. HARKER.

The death of Dr. John Allen Harker on Wednesday at the early age of fifty-three removes one of our most eminent practical exponents of chemical and physical science. Prior to the war Dr. Harker was best known by his work as head of the Thermometry Division of the National Physical Laboratory at Teddington. He was also a member of the Councils of the Physical Society of London and of the Faraday Society and a member of the committee of the British Association on Gas Engines. During the war he was responsible for the organisation of the work of the Nitrogen Products Committee of the Ministry of Munitions, and was director of the Research Laboratories set up to study modern nitrogen fixation processes. In recent years Dr. Harker has been a prominent member of the Oxygen and Gas Cylinders Committees of the Department of Scientific and Industrial Research. His masterly address on "Post-War Progress in the Fixation of Nitrogen" to the meeting of the British Association at Hull last year will long be remembered.

ELECTRICAL POWER FOR CHEMICAL PLANTS.

WHEN TO BUY AND WHEN TO GENERATE.

By Hartland Seymour.

At some time or other every chemical plant must make a decision whether the power necessary for the various operations is to be purchased from a central station or generated in the works. It is quite impossible to make any kind of general classification of plants which should or should not purchase power, because so many factors of varying weight enter into the problem.

The power requirements naturally depend upon the type of product turned out. In some cases a continuous and heavy supply of energy is essential; in others, the power necessary is slight and the supply intermittent. Again, the works may be very favourably situated for purchasing power, or they may be in a district where a central supply is not handy. In other cases the best arrangement is to buy part of the power and generate the remainder. In any case independence in the matter of power supply is desirable on account of breakdowns, and the manager or whoever is responsible for such a decision must make up his mind just how much this independence is worth to him.

Electrical Energy in Conjunction with Steam Power.

In some cases operations have been laid out with the view of utilising not only purchased electric energy, but also steam power generated at the plant. This arrangement does not take advantage of the lower power increment of either system, and cannot be recommended for general installation except in cases where the life of the operation is short. The power costs at such an installation will always be higher than could be obtained by generating all the power in an economical power plant, or by purchasing all the current necessary from a central station.

The source of power chosen should not affect the output of a chemical works provided that the available sources of supply are reliable. As a general rule, however, production costs do not depend on the source of energy, but the difference is not directly proportional to the costs of power delivered from the various sources, because with certain of these special equipment is made essential, and the fixed charges on these investments modify the cost that must be borne. Further, direct and indirect costs result inevitably from the interruptions which arise when certain central sources of supply are employed. Alternating current should be used for distributing power from the delivery point to the converter sub-stations at load centres, except where the power requirements on any particular operation are small. Whether the power is derived from a central station or from a generating station in the works does not affect the design of the system by which the energy is distributed. The one possible exception to this rule is where a small existing plant has a direct-current generating station. In such installations some advantage might be gained in the distribution system by an arrangement of converter sub-stations made possible by the purchase of energy.

Continuity and Uniformity of Public Electricity Supply.

It is not always a good policy to place a new chemical works where the owners cannot control the power supply. This is especially true if there is any doubt as to the reliability of the power supply, for it is obviously foolish to consider for a moment making the successful operation of the works dependent solely on a power supply that is liable to frequent interruptions of uncertain duration. Opinions differ on the degree of continuity of service to be expected with reason from a public supply. What we do know, however, is that it is possible to design and build power units for chemical plants which are reliable and in which interruptions are rare. In this case the owners of the works have a right to expect the same service from a public utility company. The only interruptions to continuous supply which the works should have to accept without murmur are those due to an "Act of God"—heavy storms, lightning, and the like.

Again, the power supply must possess some degree of uniformity. Frequencies, voltages, and pressures which vary from hour to hour are not conducive to satisfactory and efficient operation. In a properly designed plant uniformity of supply is one of the first considerations. If efficient service were demanded from the utility company by all those using the station or contemplating the purchase of power, there is no doubt that such a service would be forthcoming. The effect of this demand would be to force the utility company to restrict its load to its capacity, instead of straining after every prospective customer, with the promise that the plant would be developed so as to ensure uniformity of supply.

Effects of Interruptions or Variations in the Supply.

Generally, the operations in a chemical works are scheduled, and any irregularity in the power supply, even of only a few minutes' duration, serves to destroy this schedule and confuse any sequence of operations. In addition, the resumption of the energy supply more often than not leads to secondary disturbances arising when sets of machinery are put simultaneously into operation. Any interruption in the flow of energy reduces automatically the output of the works, but it does not, at the same time, suspend the payment of wages or lower the cost of raw materials. The result is an unproductive expense that sends up the cost of the finished material. A shut-down may not only reduce or wipe out any margin of product, but it may actually ruin the product. Power sources that cannot be relied upon result in an undependable production. This handicaps the works in obtaining contracts on a time-delivery basis, or if a time-delivery guarantee is given and subsequently broken, the reputation of the manufacturer suffers.

It may even be desirable to have the plant provided with a loop system of transmission so that energy may be derived from more than one source. Though line trouble must be expected in almost any system, it is unlikely that the same trouble will develop in two systems.

If a plentiful water supply for power-plant operation cannot be obtained in the vicinity, it is impossible to instal an isolated generating station. In this case it is just as unreasonable to equip a works with a generating plant which must depend on a distant source for its water, as it is to expect a continuity of power supply from an unreliable utility company.

The financial condition of the chemical works may not permit the erection of a private generating station; the investment necessary will vary between 20 and 40 per cent. (depending on the nature of the works) of the capital expenditure. In many cases this additional capital will not be forthcoming, when the only alternative is purchased power.

Costs Chargeable to Central-station Power.

Equipment at the works employing purchased power is usually simple. This consists of a transformer sub-station and the connection to the distributing buses. The purchase of power makes necessary some auxiliary equipment that would not be embodied in the plant design if the power were generated on the works. In any comparative cost schedule the investment, fixed, operating, and maintenance charges for such equipment should be included as a charge against central-station power. In any such comparison the costs chargeable to central-station power will cover:—

1. Cost of power delivery, reckoned on the basis of the established rates of the company.
2. Interest on investment required for lines, sub-station, and any other equipment essential to the power delivery.
3. Maintenance and fixed charges on lines, sub-station, and other equipment up to the point of delivery.
4. Labour chargeable up to the point of delivery.
5. Interest on investment for auxiliary equipment made essential by the purchase of power.
6. Maintenance and fixed charges on equipment as in (5).
7. Labour chargeable on equipment as in (5).

Central-station plants supplying energy to numerous works have a varied load, resulting in an annual load factor of very seldom less than 40 per cent. The annual oad factor of a single industrial plant may vary between 10 and 25 per cent. In this connection it should be remembered that the larger capacity and better load factor give the central station an advantage that neutralises any benefit enjoyed by the individual plant resulting from cheap water or low transport rates on coal.

Cost of Operating a Private Station.

Again, the individual plant cannot hope to generate power at a cost which is comparable to that achieved by the central plant. It is worth remarking here that considerable economy can be effected by the individual plant if low-grade or refuse fuels are burnt, especially refuse or waste from the works itself. There is also the realm of waste heat—but this is digression.

In calculating the cost of operating a private generating station, a very thorough study of the operating conditions is essential. The costs for the individual plant should be divided up under the following heads:—

(1.) Operation.—(*a*) Fuel. (*b*) Water, including cost of treatment and labour. (*c*) Engine-room labour, boiler-house labour, coal- and ash-handling labour, electrical labour. (*d*) Engine and boiler-room supplies.

(2.) Maintenance Costs.—Charges for engine-room, boiler-house, coal- and ash-handling, electrical equipment.

(3.) Fixed Charges.—Investment cost, amortisation cost, administration cost, insurance and taxes.

It must be realised that the manufacture of chemicals and the generation of power are two very separate and very distinct jobs. It is essential, therefore, that skilled men be put in control of the generating plant and the transmission system.

A Final Considered Opinion.

I have often been asked this question: To what extent may the cost of purchased power exceed the calculated cost of private generation to make it still worth while to buy power? I believe that though the annual cost of purchased power exceeds by 10 per cent. the estimated cost of generated power, it is still advisable to buy power. In other words, the value to the works of eliminating the necessity of building, equipping, and operating a private plant can be capitalised at 10 per cent. of the calculated power cost.

CADMIUM IN SOLDERING ALLOYS.

RECENT AUSTRALIAN RESEARCH.

OWING to the scarcity of metallic tin a considerable amount of research work was done during the war period by both the Central Powers and the United States in the substitution of tin by cadmium in alloys for soldering. Attention has again been drawn to this question as a consequence of the development of the electrolytic method of recovering zinc from its ores, which method requires the elimination of the associated metals in order to produce the extremely pure electrolyte necessary for the successful working of the electrolytic process. Apart from copper, which enjoys of course a well-established and wide market, the principal metal removed from the solutions is cadmium, which hitherto has been ranked amongst the semi-rare commercial metals.

Cheap, Pure Cadmium a By-Product of Electrolytic Zinc.

Cadmium metal was originally made commercially by fractional distillation of the first produced blue powder in the Silesian zinc works, and its recovery from baghouse fume and residues from lithopone plants has been taken up both in Germany and the United States. In both cases the method involved in its production is intricate and relatively costly. The electrolytic process, however, enables cadmium metal to be marketed at a price which brings its use as an alloy in solders within the range of commercial politics. The potential capacity of the world's large-scale electrolytic zinc refiners and the amount of raw material at their disposal, are such as to ensure adequate supplies of cadmium for the uses yet discovered or adumbrated by research.

The British Empire has been placed in an independent position as regards cadmium by the establishment of the Electrolytic Zinc Company's refinery at Risdon, Tasmania. The Research Department of this company has been reviewing the work done in America and the Continent, and conducting original research on the general subject of the uses of cadmium, and has just issued the following report* on the special subject of cadmium solders.

Details of Manufacture of Cadmium Solders.

Solders containing cadmium have been made and tested exhaustively by the Engineering, Electrical, and the Research Departments at Risdon, Tasmania. The solders have the following composition:—

	Per cent.		Per cent.		Per cent.
No. 1	Pb—90 Cd—10	No. 2	Pb—80 Cd—10 Sn—10	No. 3	Pb—90.8 Cd— 7.8 Zn— 1.4

Various samples of these alloys were prepared and the best method of preparation, which is practically parallel to the preparation of ordinary tin-lead solder is as follows:—The lead is melted first and when completely liquefied a little flux resin is added, the metal thoroughly stirred, and any dross formed during the stirring removed. In the case of Nos. 2 and 3 the tin and zinc respectively are then added and thoroughly stirred in. On addition of the cadmium the combined metals are stirred for about 1 hour, with occasional additions of flux when necessary. This period for stirring has been found essential in order to mix thoroughly the metals, but it may be shortened if the cadmium is mixed in small pieces and the whole stirred vigorously during the mixing and melting phase. In the preparation of each of the above solders there does not appear to be any tendency to segregation after the metals have been thoroughly mixed. Also with a cover of resin there is no excessive oxidation of the cadmium or tin in the solder at temperatures up to 450° C. Without a flux, oxidation is rapid at temperatures over 400° C., and in one test over 50 per cent. of the metal content of a batch was oxidised by stirring without a flux at 400-450° C.

The No. 3 solder containing zinc is approximately of the composition developed by the Research Department, Westinghouse Electric Company, and there are several points in its manufacture which should be noted. The zinc is only slightly soluble in a lead-cadmium mixture, and it is therefore advisable to add the zinc to the lead before the cadmium. This solder does not oxidise easily, and it may be prepared without the precautions which were found necessary for Nos. 1 and 2. The Westinghouse firm states that at 100° C. this solder is from 50-100 per cent. stronger than 50-50 tin-lead solder and about 30-50 per cent. stronger than pure tin. Our experience is that it is certainly stronger than any of the solders tried to date as well as being much easier to prepare.

Valuable Properties Revealed by Practical Tests.

Samples of these solders were submitted to the Engineering and the Electrical Departments for testing on a practical scale, most of the tests being carried out under observation by the investigator. The first feature observed was the higher melting-point of these solders. This was noted during tests in the anode casting division where the solder was used for finishing-off anode bars. For this work the solder was found to be perfectly satisfactory, the higher melting-point, however, making it necessary to use the blow-pipe for about 10 seconds longer in heating the anode bar. In the soldering of sheet work of different metals, they were found to be perfectly satisfactory. With zinc they worked perfectly, flowing extremely well and making a smooth and strong joint. With brass and copper they were also satisfactory, no difficulty being experienced in getting the solder to take on the surfaces to which it was applied. On galvanised iron they flowed well, behaving slightly better than tin-lead solder in forming a smooth joint whereas tin-lead solder tends to form a lumpy surface to the joint. On lead they were also satisfactory.

A Lead-Cadmium-Zinc Alloy Best for General Purposes.

Different fluxes have been tried and it was found that zinc chloride was the most satisfactory. With resin as a flux the joint appeared to be quite as strong as with zinc chloride, but the solder did not flow quite as readily. The strength of the different joints was tested roughly by tearing the joints after soldering, and at this stage it was found that the No. 2 solder containing lead, cadmium, and tin was not so strong as the others, and after consideration it was discarded. Similar considerations resulted in the adoption of the No 3 solder as being the best for all the purposes for which it has been put—*i.e.*, for all general soldering work involving the use of the iron. It has not been tested completely so far for bath work, in which the conditions of use are somewhat different. It has been noted that the solder tends to burn off the iron on overheating, but this is not to any greater extent than with tin-lead solder. Also the iron may be "tinned" with the cadmium solders as easily and as perfectly as with ordinary solder.

Not Ideal as Wiping Metals.

The different samples were also tested for use as wiping metal. For this purpose it was found that Nos. 1 and 3 were useless as they would not flow freely as a plastic mass, they burnt the wiping cloth and pieces pulled away from the body of the work during the wiping process. Their range of plasticity also appeared to be small. The No. 2 solder containing lead, cadmium, and tin was better in behaviour, but was not equal to ordinary wiping metal.

* See also article "The Technology of Soldering Materials" in *The Chemical Trade Journal and Chemical Engineer*, August 17, 1923, page 185.—Ed., *C.T.J. and C.E.*

Satisfactory for Electrical Uses.

The various samples were also submitted to the Electrical Department and tested under various conditions. For the tinning of cable ends, bus-bars, etc., the samples were found to be satisfactory. The No. 3 sample was also tested for use as a lug filling for cable ends. The completed lug and cable was suspended and weighted with a definite load and a current passed through until the cable pulled from the lug. Under similar conditions it was found that the lead-cadmium-zinc solder was better than 50-50 tin-lead solder, the lug holding for a longer period when this solder was used.

GAS UNDERTAKERS AS CHEMICAL MANUFACTURERS.

DISPUTE AT WOLVERHAMPTON.

THAT the vigilance of chemical manufacturers in regard to the operations of gas undertakings is unabated was shown on Friday, October 5, when Mr. H. C. Honey (Director of Gas Administration at the Board of Trade) held a public inquiry at the offices of the Board in connection with an Order granted to the Wolverhampton Gas Company under the Gas Regulation Act of 1920.

One of the matters proposed under the Order is a transfer of two pieces of land, approximately one acre in extent, and owned respectively by the Wolverhampton Gas Company and the Great Western Railway Company, owing to it having been found that the land belonging to the Gas Company could be made better use of by the Railway Company, and *vice versâ*. As regards the piece of land now owned by the Gas Company, when powers to acquire this were obtained, in 1900—before the time when the chemical manufacturers began to get active* in regard to the operations of gas undertakings as possible chemical manufacturers,—it was stipulated that the Gas Company must not manufacture any chlorine or sulphuric acid, and this restriction is to be attached to the piece of land now to be received by the Gas Company from the Railway Company.

The Alkali Manufacturers' Association and the "Model" Clause.

At the public inquiry referred to, the Alkali Manufacturers' Association appeared and asked, through its Parliamentary Agent, that the usual "model" clause, limiting the purchase of residual products from other gas undertakers for the purpose of manufacturing chemicals, should be inserted in the Order and apply to this small piece of land. The clause in question empowers a Gas Company or Authority to convert residual products arising from its own manufacture of gas, and to purchase and convert those arising from the manufacture of gas by other gas undertakers, but limits the quantity to be so purchased to one-third the quantity of the like residual product arising from the manufacture of gas by the gas company. It gives power also for the purchase, from gas undertakers and elsewhere, of the materials required to convert the residual products, but provides that chemicals shall not be manufactured exclusively from raw materials purchased from sources other than gas undertakings, or in the manufacture of which the use of residual products produced by the company or purchased from other gas undertakings is merely subsidiary.

The Wolverhampton Gas Company resented this, on the ground that no change has been made in the circumstances which existed in 1900, when, it was contended, the local people concerned obtained all the protection they desired. In reply to this, the Alkali Manufacturers' Association's Parliamentary Agent pointed out that in 1900 the controversy as to the operations of gas undertakings in the manufacture of chemicals had not arisen, and that it was justifiable for the Board of Trade to impose the one-third restriction upon the Company now.

The Director of Gas Administration intimated that he would consider the position and give a decision later.

Subsidence in Mines.—The Royal Commission on Mining Subsidence will meet to hear evidence at 5, Old Palace Yard, Westminster, on Monday, October 15, and Tuesday, October 16, at 10.30.

* For detailed reports of the evidence given before the Joint Select Committee of the House of Lords and the House of Commons on Gas Authorities (Residual Products) and the final report of this Committee see *The Chemical Trade Journal and Chemical Engineer*, vol. li. (July-December, 1912).—Ed., *C.T.J. and C.E.*

THE MINERAL PRODUCTION OF CANADA.

PROGRESS DURING FIRST HALF OF 1923.

WE have received from the Office of the High Commissioner for Canada (Kinnaird House, Pall Mall East, London, S.W. 1) a copy of the preliminary statistics of Canadian mineral production for the six months ended June 30, 1923. With the exception of structural materials and clay products, all the usual matter is included, and the figures for 1922 as finally revised are also incorporated. The Dominion Bureau of Statistics is to be congratulated on having made available so early such a quantity of vital statistics. We reproduce below part of the general review as given in the introduction to the report. Readers interested in the detailed statistics may obtain copies of the report on application to The Secretary, Office of the High Commissioner for Canada, at the address given above.

Measured in terms of the metallic and non-metallic mineral output and excluding structural materials and clay products, the mineral production of Canada during the six months ending June, 1923, was valued at 87,152,248 dollars, as compared with 69,861,109 dollars, the value of the corresponding production in the first six months of 1922. The output of these commodities during the twelve months of the calendar year 1922 was valued at 144,762,501 dollars, so the records for the present year show that an appreciable advance has been made both in relation to the output in the first six months of 1922 and also to the entire calendar year.

Recovery in Nickel and Copper.

The outstanding feature of the metal industry during the first six months was the recovery in the production of nickel and copper. The reopening of the smelters and refineries operated by the International Nickel Company and the British America Nickel Corporation resulted in a production of nickel during the first six months of the year which was nearly seven times greater than the production in the first half of last year, and the output of copper was more than double the quantity produced in the corresponding period last year. The copper output during the half-year was greater than the total production during the calendar year 1922; the nickel output was also nearly 60 per cent. greater than the entire quantity made during the twelve months ending December, 1922.

The production of gold and silver was maintained at about the same levels as in the corresponding period in 1922, while the outputs of asbestos, coal, lead, and zinc were higher than in the first half of 1922. Shipments of gypsum, while less in amount, were greater in value; and while the output of salt declined, the quantity sold was greater than in the half-year ending June, 1922.

Power developments in Northern Ontario have been watched with considerable interest by the mining industry. Sturgeon Falls power is now available; Metachewan is expected to be operating by autumn, and the developments on the Quinze River and by the Hollinger on the Abitibi River are being carried forward with a view to the elimination of the recurring spring power shortage that has handicapped these properties up to the present time.

Non-ferrous Metal Prices Approaching 1913 Levels.

An interesting situation is reflected in the price indexes of metals, etc., compiled by the Internal Trade Branch of the Bureau. Taking the average price for 1913 as a base of 100, the index for non-ferrous metals during the period under review stood at 99.9 in January, 97.8 in February, about 102 during the next three months, and 101.4 in June. That is to say, the average prices of non-ferrous metals in Canada during the first six months of 1923 were almost identical with the prices prevailing for these commodities in 1913. Non-metallic minerals, on the other hand, showed an average of approximately 85 per cent. in excess of the 1913 average. The non-metallic group includes such materials as coal, brick, lime, cement, glass, petroleum, pottery, sulphur and salt, etc. Iron and steel prices showed a greater fluctuation than either of the other two groups mentioned, and ranged from 157.3 in January to a maximum of 171.5 in June, the advance being gradual and continuous throughout the period. Mineral prices as a whole advanced slightly during the period, and were maintained at an average of between 55 and 60 per cent. above the prices prevailing in 1913.

BLEACHING LIQUORS FROM LIQUID CHLORINE.*

THE MATHIESON SYSTEM IN THE PULP AND PAPER INDUSTRY.

DURING the last few months several installations for the manufacture of bleaching liquors from liquid chlorine by the American Mathieson system have been made, and a more extended experience has been gained of the practical operation of the system.

Liquid chlorine is unquestionably now firmly established in the pulp and paper industry with every indication of rapidly supplanting bleaching powder. In the preparation of bleach liquors from liquid chlorine a lime or soda base may be used to combine with the chlorine, and it is essential that certain conditions be strictly observed if efficient and economical results are to be obtained. The liquid chlorine must be first vapourised into a gas before being absorbed by the base to guard against the possibility of local supersaturation of the solution with a resultant loss of the available chlorine.

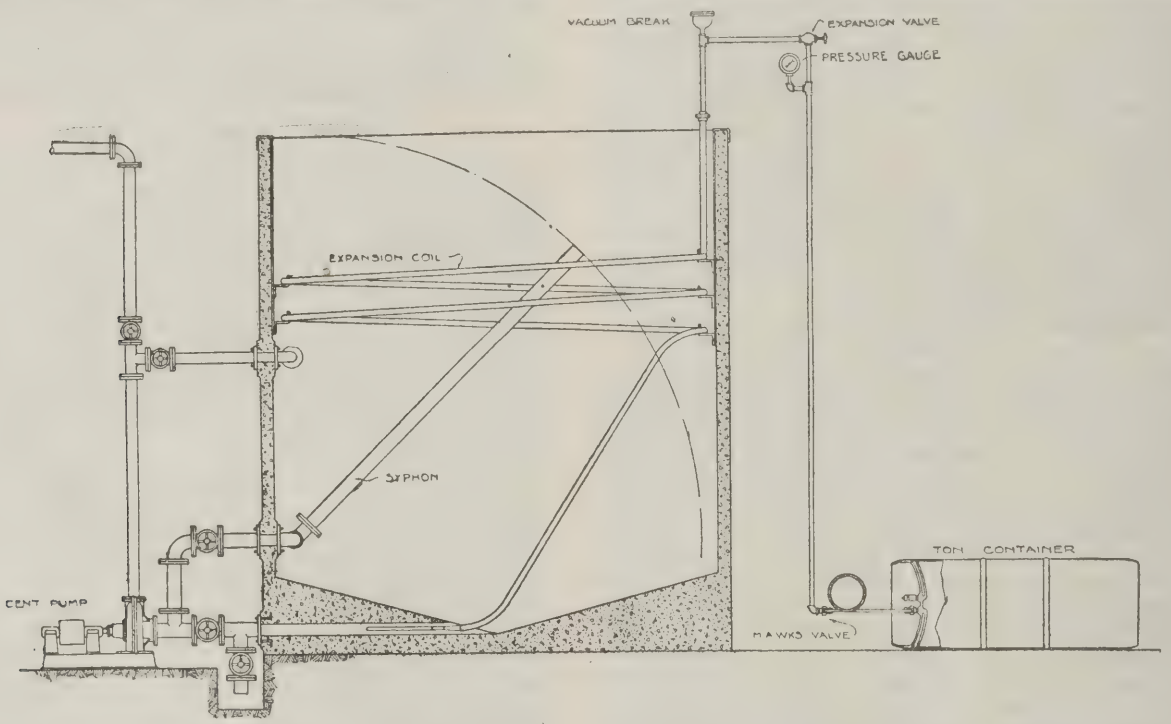
The reaction of the chlorine with the base produces heat which raises the temperature of the solution, the degree of temperature attained being in direct proportion to the amount of chlorine absorbed. Should a temperature of approximately 40° C. be reached decomposition of the hypochlorite begins, chlorates being formed, which increase rapidly as the temperature rises. To avoid losses from this source and maintain the full bleaching strength of the solution, it is important that the temperature of the solution be kept within this limit. It is also of importance that overchlorinating or passing chlorine into the solution in excess of the amount required to combine with the base be avoided. By so doing an acid condition of the solution is produced, its stability affected and a rapid decomposition of the hypochlorite takes place.

Vapourisation of the Chlorine.

The Mathieson system meets these conditions in an exceedingly simple and practical manner. The liquid chlorine is vapourised in a coil which is placed in the tank in which the bleach liquor is prepared and immersed in the liquor. In this way advantage is taken of the cooling effect of the latent heat of vapourisation of the liquid chlorine to counteract the heat of reaction of the chlorine with the base, and thus keep the temperature of the liquor within the limit at which decomposition of the hypochlorite takes place. The accompanying diagram shows a tank in which bleach liquor is prepared. It is of concrete construction 12 feet in diameter by 12 feet deep. It is equipped with an expansion coil of 2-inch heavy lead pipe which is connected at one end to the liquid chlorine supply pipe, the other end which is reduced to 1 inch terminates in the suction line of the pump. The centrifugal pump has a capacity of about 500 gallons per minute. The connection on the suction side of the pump is 5-inch pipe and the discharge line, which is 4-inch pipe, enters the tank about 4 feet from the top and placed tangential to it. The 5-inch drop syphon is connected to the suction line of the pump with valves and fittings as shown. The liquid chlorine supply line is 1-inch extra heavy iron pipe connected at one end to the container by a flexible copper tube. The other end, which is connected to the expansion coil, is fitted with a pressure gauge and expansion valve.

In the preparation of the bleach liquor a high-calcium lime is used to absorb the chlorine and either quicklime or hydrated lime may be employed. While quicklime is probably less expensive, hydrated lime is generally preferred as it can be more conveniently handled and the necessity for slacking and cooling the quicklime is dispensed with.

In operating, the tank is filled with water to within a few inches of the top, the centrifugal pump started and the required amount of lime added. Where quicklime is used about 1lb. per 1lb. of chlorine will be required, with hydrated lime from 1.15lb. to 1.2lb., depending on the quality of the lime. A container holding 2,000lb. of liquid chlorine is connected to the pipe leading to the expansion coil. The container is provided with two eduction pipes which project radially from the centre of the container in opposite directions so that chlorine either in the gaseous or liquid form can be withdrawn. With the valves in a vertical line and the connection made to the lower valve, liquid chlorine is withdrawn and the container can be completely emptied within two hours' time. When the milk of lime in the tank is in good circulation the valve on the container is opened and the liquid chlorine flows through the eduction pipe to the expansion coil, the rate being regulated by the expansion valve.



Use of the Expansion Coil.

The expansion coil should have sufficient area to provide the necessary heat interchange, and it has been found that about 70 feet of 2-inch lead pipe will vapourise from 1,000lb. to 1,200lb. of liquid chlorine per hour. The chlorine gas on leaving the coil enters the suction of the pump where it is absorbed by the milk of lime. The circulation of the liquor by the pump is continued until all the chlorine is absorbed, as indicated by a pressure gauge on the liquid chlorine pipe

* Paper by J. H. MacMahon, of the Mathieson Alkali Works, Inc., Niagara Falls, to the Technical Association of the American Pulp and Paper Industry, on Sept. 20, 1923. From *The Oil, Paint, and Drug Reporter*, Sept. 24, 1923.

line. The container is then disconnected, the circulating pump stopped and the batch allowed to settle. The clear liquor is then drawn off by the drop syphon and pumped to the storage tank. If the volume of the liquor in each batch is 8,000gals., a uniform concentration of 30 grammes per litre of available chlorine of a hydrometer strength of about 6° Bé. will be obtained.

There will be a gradual accumulation of sludge in the chlorinating tank due chiefly to impurities in the lime. It will be found that several batches can be run before it becomes necessary to wash the sludge. The wash liquor is pumped to a separate tank to be used as make-up liquor for succeeding batches and the sludge run to waste. The loss of chlorine from this source should not exceed one per cent. The liquid chlorine can be discharged from the container at a rate of 1,000lb. to 1,200lb. per hour and the batch can be chlorinated, the liquor settled and pumped to the storage tank within 6 hours. Assuming the sludge is washed after a three or four batch run, the tank will have a capacity of at least three tons of liquid chlorine per day of 24 hours or the equivalent of about 10 tons of bleaching powder. Should the sludge, however, be washed in a separate vessel and the tank used exclusively for chlorinating and settling the liquor, the capacity will be increased to 4 tons of liquid chlorine per day.

The Chlorine Containers.

The one ton tank in which the liquid chlorine is shipped is on all forged steel container with a wall thickness of ⅜in. The outside diameter is 30 inches and overall length 80 inches. The head of the drum is lap-welded in the body proper and has a thickness of ¾inch; a bonnet which is easily removed fits over the valves, protecting them from injury. Each drum is equipped with six safety plugs, three screwed into each head, filled with fusible metal of melting-point approximately 150° F. The purpose of these plugs is to relieve the contents before a pressure is reached sufficient to rupture the tank in case of exposure to fire. The weight of the tank alone is approximately 1,300lb. and contains 2,000lb. of liquid chlorine. These tanks are tested for an internal pressure of 500lb. per square inch.

It will be seen from the description given that the Mathieson system embodies novel features which offer many advantages in the preparation of bleach liquors from liquid chlorine. The method employed for vapourising the liquid chlorine ensures a rapid and steady flow of gas and dispenses with the use of evaporating devices which require to be steam heated, and the cooling effect on the liquor by the vapourisation of the liquid chlorine will be found to be of especial advantage, particularly during the summer months, when difficulty is experienced in keeping the temperature of the liquor down to avoid losses of the available chlorine through overheating.

By the introduction of the unit principle the operation is carried out with practically automatic control, and the necessity of skilled labour is not required. The lime can be so finely adjusted that the alkalinity of the liquor is greatly reduced, with a corresponding increase in its bleaching velocity. Bleach liquors of this characteristic combined with a uniform concentration of the chlorine content enable the bleaching of the stock to be carried out with greater efficiency and economy.

With the installation of this system no special equipment is necessary, and it can be readily adapted to existing bleach plants at little expense, as where the individual bleach tanks have not the required capacity to take the full contents of the ton container, two or more tanks can be connected together and operated as a single unit. In installations of this kind the expansion coil with the necessary connections is usually about the only additional equipment required, and so little change is necessary in the existing piping and general arrangement of the tanks that the consumer is in the advantageous position of being able to utilise his equipment either for the use of liquid chlorine or bleaching powder.

Power Plant at Wembley.—Work has been started on the electric power station which is to supply the British Empire Exhibition next year at Wembley with driving power and light. The power station is itself to form one of the exhibits in the Electrical and Allied Industries Section of the Palace of Engineering, and will be representative of some forty electrical manufacturing firms.

SOCIETY OF PUBLIC ANALYSTS.

At the ordinary meeting held at Burlington House, on Wednesday, October 3, Mr. P. A. Ellis Richards, president, in the chair, certificates were read for the first time in favour of: L. E. Campbell, J. T. Hannon, C. L. Hinton, D. W. Kent-Jones, T. W. Alan Shaw, W. H. Simmons, K. E. N. Williams, and P. N. Williams. Mr. Robert C. Grimwood was elected member of the Society.

The Sampling of Coal.

Attention was drawn in a paper on this subject by J. H. Coste, E. R. Andrews, and W. E. F. Powney to the difficulties encountered in sampling coal, which is often a heterogenous mixture, and in consequence of which the variations in composition of different "patches" are extremely wide. These variations are likely to be more extreme in those cases where the bulk is large, and where it is impossible to sample throughout the dump. General considerations that should govern the sampling were suggested, and stress was laid upon the point that if, as often happens, different workers obtain different results from samples taken from the same bulk, the discrepancies are not due to mistakes in working, but are indicative of the variability in composition of the coal. Experiments were described in which (1) it was shown how difficult it is to obtain a homogeneous set of samples from so small a quantity of coal as 70-80lb., and (2) the variation in composition of samples taken progressively from a bulk of about 400lb.

A New Test for Castor Oil.

The method described by H. B. Stocks, in a paper entitled "A New Test for Distinguishing Castor Oil from Other Oils and Determining Its Purity," is based on the following facts: Ordinary soap solutions are alkaline to phenol-phthalein. On titration with standard acid solution a point is reached at which a state of equilibrium exists and the pink colour disappears. The amount of acid required increases with the dilution up to about 1 part in 150, or higher, at which point it becomes practically constant. With soaps of oleic, palmitic, and stearic acids, and soaps from oils composed of these acids, the figures are equivalent to approximately half the total combined alkali. With castor oil soap it is only 3 to 11 per cent. of the total.

To carry out the test, 5 grammes of the oil to be examined are saponified with alcoholic KOH, neutralised, evaporated to remove alcohol, made up to 100 c.c., 10 c.c. being diluted with 250 c.c. of neutralised distilled water and titrated with hydrochloric acid in presence of phenol-phthalein. Castor oil gives figures varying between 4.8 and 7.9, and figures are given in the paper for a number of fats and oils and rosin, in each case very much higher than for castor oil.

Volumetric Estimation of Vanadium in Steel.

The estimation, according to an account given by A. T. Etheridge, is carried out in the same solution in which the chromium has already been estimated by treating the aqueous solution of the sulphates of the metals with permanganate, filtering, removing any colour due to iron, treating with standard ferrous-sulphate solution, and titrating with permanganate. This gives the chromium figure. The solution is then adjusted so that it contains about 10 per cent. by volume of sulphuric acid, excess of ferrous sulphate is added, and the solution titrated with potassium bichromate, using as indicator 5 c.c. of diphenyl carbazide prepared by dissolving 0.5 gramme in 1-2 c.c. glacial acetic acid and diluting to 500 c.c., and adding to each 5 c.c. 3 drops of 25 per cent. sulphuric acid and 1 drop of potassium-bichromate solution, resulting in the formation of a deep purple colouration. About half the indicator should be added within 1 or 2 c.c. of the end of the titration, and the titration continued till the purple colour has practically disappeared. The remainder of the indicator solution is then added, and the end point occurs within 1 or 2 drops with the formation of an apple-green tint. It is necessary to have (1) a small amount of ferrous solution present at the time the indicator is added (2) 10 per cent. sulphuric acid, (3) absence of nitric acid (except in traces).

The Iodimetric Determination of Sugars.

In a paper on the subject by L. C. Hinton and T. Macara, the authors stated that the aldoses—*e.g.*, dextrose and lactose—are quantitatively converted to the corresponding monobasic acids by iodine in alkaline solution at ordinary tem-

perature, provided the proportions af alkali and iodine to sugar are suitably controlled. The slight oxidation of sucrose and levulose found by other observers was confirmed, and the extent of this action was shown to depend considerably on time and temperature of reaction, as well as on the proportions of iodine and alkali used. Using standard conditions, it is possible to determine sucrose accurately in mixtures by titration before and after inversion, but the determination of other sugars is liable to be affected by non-sugar reducing substances. The method is so convenient, however, that it recommends itself technically for approximate determinations of invert sugars.

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH.

REPORT FOR THE YEAR 1922-23.

THE Report of the Committee of the Privy Council for Scientific and Industrial Research for the year 1922-1923 has just been published (London: H.M. Stationery Office; post free, 4s. 2d.). In view of the present financial condition of the country it has been decided to incur an estimated expenditure of £276,863. for 1923-24 as against £297,437. in 1922-23. Sir George Beilby, Sir Maurice Fitzmaurice, Professor Farmer, and Sir John Snell have been re-appointed to the Council for a further period of three years.

Prospective New Research Associations.

It is pointed out that the policy of co-ordination between the research boards of the Department and outside research establishments has been continued during the past year with great success. Only one new research association—namely, that of the flour milling industry—has been established since July, 1921, although many other prospective associations have been discussed from time to time. Such prospective associations include adhesives, liquid fuels, pottery, paint, preserved foods, china clay, paper, drugs, mining, and grinding plant. It is not possible at the moment to forecast whether any of them will actually come into being. The Sugar Research Association has not yet started full operation. Commenting on the resignation of Sir George Beilby, the Committee states:—

The Resignation of Sir George Beilby.

With great regret we have accepted the resignation by Sir George Beilby, LL.D., F.R.S., a member of our Advisory Council, of his onerous duties as Director of Fuel Research and Chairman of the Fuel Research Board. In view of the many years devoted service he has voluntarily given to his country, first, as a member of Lord Fisher's Board of Invention and Research, a little later, as chairman of the Trench Warfare Research Committee, and, since the beginning of 1917, as the directing brain of the Government investigations into the many-sided problem of fuel economy, we have felt it impossible to press further sacrifices upon him. He had planned and brought into existence the remarkable Fuel Research Station at East Greenwich, he had conducted a number of valuable researches into the use of coal, peat, alcohol, and other fuels, he had been the first to lay firm the foundations of the baffling problem of low-temperature carbonisation, he had solved for the Board of Trade the question of charging for town gas on a scientific and equitable basis, and he felt that the time had come for him to step aside for the organisation of the future work to be placed upon a broader basis. But we congratulate ourselves and the country on his willingness to remain on the Advisory Council and to continue his help as Honorary Adviser to the Fuel Research Board. The Hon. Sir Charles Parsons, K.C.B., F.R.S., and Sir Richard Threlfall, K.B.E., F.R.S., have consented to continue their services, and Sir Richard Threlfall has accepted appointment as Chairman. We have appointed Mr. C. H. Lander, D.Sc., M.I.Mech.E., A.M.Inst.C.E., hitherto Assistant to the Director, to be Director of Fuel Research. It is intended to give him the assistance of a number of small panels of experts to advise him in problems affecting particular industries or group of industries.

Summary of the Year's Finance.

The expenditure of the National Physical Laboratory during 1922-23 amounted to £164,906. Of this sum, £49,404. was provided from fees for tests and special investigations for outside bodies, £32,025. from repayments from the Service departments for work undertaken directly for them, and £8,929. for two programmes of investigation of which the cost was met from special research funds and the interest of the Million Fund in equal proportions. For the current financial year we have decided that routine tests and scientific services, not of the nature of research, undertaken for the civil departments of State shall be carried out on repayment terms. The expenditure on the work of the Fuel Research Board during 1922-23 amounted to £40,695. This sum includes the cost of work at the Station, £37,437.; the cost of research carried out elsewhere than at the Station, £4,798.; other expenditure, £3,258. It does not include grants made on the recommendation of the Fuel Research Board to the Manchester City Council for research on domestic heating, and to Low Temperature Carbonisation, Ltd., for the investigation into a new type of retort, and included in the expenditure on aided researches, to which reference is made below. Receipts from sales and test fees amounted to £765.

The number of industrial research associations which have received licences from the Board of Trade is 25, and, of these, 22 are in actual operation. Grants to associations for the financial year 1922-23 amounted to £95,345., and the balance of the Million Fund remaining unexpended on March 31, 1923, amounted to £721,505. A substantial part of this balance will be required to complete the payments of grants to the associations named during the remainder of their quinquennial grant periods, and allowance must be made for the establishment of new research associations. Any further grant aid to existing associations on the basis of the scheme recommended by the Advisory Council will have to be found out of the unappropriated balance. During the financial year 1922-23, we have made 8 grants in aid of scientific investigations conducted by other bodies, of which 6 were in continuation of previous grants. The expenditure on these grants amounted to £6,244., of which £4,195. was met from the vote of the Department, and £2,049. from the interest of the Million Fund.

During the academic year 1922-23 we made 304 grants to research workers and students-in-training. Of these 252 were allowances to students to enable them to take advantage of the facilities in training in research afforded by various Universities and colleagues or other research institutions, 38 were personal grants to research workers to undertake independent research or to act as scientific assistants to other investigators, and 14 were personal grants to scientific workers to enable them to employ laboratory assistants or to purchase equipment. The total expenditure on these grants during the academic year 1922-23 is estimated at £50,000. as compared with £45,931. during the academic year 1921-22. The expenditure during the financial year 1922-23, covering half of each of these academic years, was £47,905. The expenditure of the Department on headquarters administration during the financial year 1922-23 was £32,567.

The total expenditure of the Department during the financial year 1922-23 was £497,549. This sum was made up of £264,493. from the Exchequer, £48,103. from the interest of the Million Fund, £95,345. from the capital of the Fund, and £89,608. from fees for tests and special investigations for outside bodies, and from contributions towards research funds. The saving on the estimate, due to the restriction of the research programme effected under the direction of the Advisory Council, made it unnecessary to call on the grant-in-aid of £39,500. voted by Parliament in 1921-22 for the unforeseen developments of researches undertaken by the Department, and this grant-in-aid has been carried forward to 1923-24.

The Advisory Council.

The Advisory Council, which is the executive of the Department and responsible for devising an ordered policy of scientific research within the financial provision made by the Privy Council Committee, publishes a detailed account of its activities during the year under review. We abstract below the main features of this report in so far as it relates to the work of the individual Research Boards and Committees of the Department. Work that has already been published will in most cases not be referred to. (It may be mentioned here that Sir William S. McCormick is the administrative chairman of the Advisory Council, and that the other members are Sir G. T. Beilby, Professor Sir J. Cadman, Professor J. B. Farmer, Sir M. Fitzmaurice, Sir G. G. Goodwin, Mr. W. B. Hardy, Principal J. C. Irvine, Sir H. A. Miers, Sir J. F. C. Snell, Sir J. J. Thomson, Sir

R. T. Threlfall, Professor S. Young, and the secretary Sir H. Frank Heath.)

Work of the Fuel Research Board.

During the year, new experimental vertical retorts, based on Scottish shale oil practice, have been erected with a view to low temperature carbonisation on a commercial scale. It is proposed to briquette a blend of coking and non-coking coals by raising them to a temperature below the decomposition point, and then subjecting them to pressure without any added binder. The briquettes will then be carbonised in the new retorts. A considerable amount of preliminary work was necessary before the details of the retort and briquetting press could be decided on, and the plant has not yet been running sufficiently long for any conclusion to be reached.

Comprehensive tests have been carried out on the efficiency of water-gas plant working under various conditions. The results have been published in Fuel Research Board Technical Paper No. 6. An investigation has been carried out at the request of the Development Commission into the carbonisation of seaweed, with a view to examining the possibility in the present circumstances of reviving the seaweed industry on the Atlantic coast. A report on this is being prepared for publication.

Survey of the National Coal Resources.

The Committee for the Survey of the Lancashire and Cheshire area, the establishment of which was reported last year, has been at work throughout the year, and valuable data and experience have been gained. It has been possible to prepare a preliminary correlation of data for this area, but much more information must be collected before this can be either as complete, or as reliable, as that published for the Yorkshire, Nottinghamshire and Derby area. Two of the most important of the seams in the Lancashire and Cheshire area have been dealt with in a fairly exhaustive manner, and the question of the publication of the results is now under the consideration of the local committee. The work carried out at H.M. Fuel Research Station, both in large-scale work in the retorts and by tests of special samples of a few cwt., has given valuable information as regards these seams. This work forms an important part of the examination of the seams, and supplements the purely laboratory examination of samples.

The Committee on the Sampling and Analysis of Coal has presented an interim report on methods of analysis of coal, recommending those it considers the best. The report is based on a large amount of experimental work carried out by the Committee during the past eighteen months, and is now in the press. The Committee has still to deal with the difficult question of sampling.

Progress in Power Alcohol Investigations.

Further knowledge has been accumulated in regard to the optimum conditions for carrying out the acid hydrolysis of cellulosic materials, and the mechanism is now well established to ensure the maximum production of pentoses with a very low strength of acid at a moderate temperature and pressure. The fermentation of the pentoses, by means of Bacillus *acetoethylicum Anthrop*, has been the subject of a number of laboratory and semi-technical scale experiments with wheat-straw and African grasses, and the following conclusions have been drawn from them:—(1) For the preparation of the mass, the hydrolysis of the cellulosic material must not be carried too far, otherwise inhibitory substances are formed which have a retarding effect on the progress of the fermentation. (2) It is unnecessary to add food, or marble, or cinders to the mash, as was indicated in the original American experiments. (3) The optimum hydrogen ion concentration for growth and fermentation must be sought between 7.7 and 8.8 per cent.

Supplies, in quantity, of African grasses are now being procured for manufacturing scale experiments to enable the economics of the process to be studied. This fermentation produces a mixture consisting of approximately 85 per cent. of ethyl alcohol and 15 per cent. of acetone.

Work on the direct fermentation of cellulosic materials by means of micro-organisms has included: (1) a search for micro-organisms capable of fermenting cellulose direct; (2) the determination of the minimum concentration of glucose required by yeast for alcohol production; (3) the determination of the maximum concentration of glucose accumulated by various types of mould during their growth on and decomposition of cellulose. The results so far obtained are inconclusive.

The production of alcohol on a commercial scale for use as an ingredient of a liquid fuel for internal combustion engines has been commenced in this country. The Distillers' Company, Ltd., has erected mixing plants at three centres, and is supplying "Discol," which is a mixture of 50 per cent. denatured alcohol and 50 per cent. of a blend of hydrocarbon spirits.

The Second Memorandum on Fuel for Motor Transport, circulated to the Dominions and Colonies in 1921, was duly considered by some of them, and the following is a brief summary of the reports received, together with information obtained from other sources.

The Commonwealth of Australia.—The possibility of producing power alcohol commercially in Queensland from sweet potatoes grown for the purpose, and from waste molasses, has been privately investigated, and, as a result, attempts are being made to start the industry. Meanwhile, power alcohol is being made from molasses on a small scale at the Commonwealth Acetate of Lime Factory near Brisbane.

New Zealand.—The use of the pulp resulting from the preparation of New Zealand flax (*Phormium Tenax*) as a source of alcohol, is the subject of experiment, and, according to the *New Zealand Journal of Science and Technology* (1922.5.237), motor fuel is being successfully produced from molasses and waste vegetable materials.

Union of South Africa and the Protectorates.—"Natalite," consisting of alcohol and ether, is being produced, mainly from molasses, in South Africa in considerable quantities, but not on a sufficient scale to meet all requirements. There would appear to be no early prospects of the manufacture of power alcohol in Basutoland, Bechuanaland Protectorate and Swaziland.

Southern Rhodesia.—The South African Syndicate issued a prospectus in September, 1922, in connection with the manufacture of "Acetol," a liquid fuel for internal combustion engines consisting of 80 per cent. alcohol made from molasses, and 20 per cent of other ingredients of which acetylene is one.

Kenya Colony and the Protectorates of Nyasaland.—There are possibilities of the production of alcohol for power purposes from the molasses of the sugar refineries recently started and about to be started in these Colonies.

Gold Coast.—Experiments on the cultivation of cassava as a raw material for the manufacture of power alcohol are being carried out.

Nigeria.—In view of the value of cassava as a foodstuff and of the cost of its cultivation, it was considered that there is no present prospect of the production of power alcohol in Nigeria from this root, which would otherwise have been a very suitable material for the purpose.

Federated Malay States.—The possibilities of producing alcohol for power purposes from the juice of the nipah palm are being investigated.

British Guiana and the West Indies.—Several sugar firms in British Guiana have investigated the possibilities of producing motor fuel locally from waste molasses, and the Government is assisting the enterprise by temporarily exempting the industry from taxation. The opinion was generally expressed by the authorities of the West Indian Islands that there were little or no prospects of the manufacture of alcohol for power purposes. In Barbados it was reported that a local syndicate was considering the question of its production from residual molasses, and in British Honduras that the local sugar planters were doing likewise. In view of the falling off in the requirements of rum there is an increasing tendency, however, to turn the residual molasses of the sugar refineries into power alcohol.

Production of Formaldehyde by Hydrocarbon Oxidation.

Investigations on behalf of the Chemistry Research Board have been continued at the Royal Naval Cordite Factory on the oxidation of hydrocarbons. The chief object of these investigations is to provide, if possible, a method of manufacturing formaldehyde in this country. The laboratory investigations on the subject have continued and extended the results of previous investigations. Several papers, embodying the scientific results of the work, have been published. The laboratory results are of such a nature as to indicate a possible, though not very promising, commercial method of manufacturing formaldehyde, and the Board decided to continue the investigations on a semi-manufacturing scale in order to obtain definite data on the possible value of the method. This work has been proceeding throughout the year. It is not yet complete, but so far as it has gone at present, it does not appear likely that a successful commercial method will be evolved.

At the Research Department, Woolwich Arsenal, attempts were made to produce formaldehyde by the interaction

between hydrogen and carbon monoxide, and hydrogen and carbon dioxide, respectively, in the presence of various catalysts. Only traces of formaldehyde were obtained in each case. Experiments were also made on the partial oxidation of methane in presence of silica-gel as catalyst, and these gave some measure of success, although the results were less promising than those obtained at Holton Heath without a catalyst. It was thought that the addition of carbon dioxide to the methane-oxygen mixture might increase the yield of formaldehyde on the methane consumed, and this appeared to be supported by experimental evidence.

The investigations on the chlorination of methane, undertaken at Oxford, have yielded results of considerable interest, and arrangements have now been made, with the consent of the Admiralty, to transfer the work to the Royal Naval Cordite Factory where experiments on a larger scale will be carried out.

Experiments on luminous radium compounds have been continued at the National Physical Laboratory. The variation of the rate of decay of luminosity with radium content has been further investigated. The possiblity of substituting mesothorium for radium has been examined. The substitution has some disadvantages, owing to the shorter life of mesothorium; but it may be of practical advantage under certain conditions.

Causes of the Oppau Explosion.

Investigations have been carried out with the object of ascertaining the causes of the explosion of ammonium sulphate-nitrate at Oppau in Germany. The Government Chemist made a thorough examination for the Board of samples of the salt obtained from Germany. No impurities such as could be held responsible for the explosion were detected. The salt appeared to be in the form of mixed crystals, and not a double salt. The cause of the hardening of the salt is attributed to the presence of a small quantity of moisture: in this condition it cakes under pressure. Experiments have been carried out at the Research Department, Woolwich, on the possibility of detonating the salt. The results are mainly negative in character; it has been found impossible to cause detonation, even under very favourable conditions. The exact cause of the explosion remains, therefore, somewhat obscure.

Corrosion of Aluminium and Its Alloys.

Work on the corrosion of aluminium and its alloys has been continued under the direction of a Committee of the Institute of Metals. In spite of the difficult nature of the subject, substantial progress has been made. Attention has been mainly directed to the protection of the metal by the formation of a skin of oxide. It has been established that while this method delays corrosion under ordinary conditions, it fails under very severe conditions such as are experienced when metal is alternately wetted by sea-water and then dried. The film of oxide has strong adsorbent properties, and, by the adsorption of suitable materials which are very difficult to remove, the protective properties of the film are greatly enhanced. Trials made of samples of aluminium and certain of its alloys, protected by these means, have hitherto proved extremely satisfactory. An account of the work will be published.

Recent Adhesives Research.

Since the publication of the first report of the Adhesives Research Committee, attention so far as the composition and properties of adhesives are concerned has been concentrated upon glue and gelatin to the exclusion of other adhesives. The properties of gelatin alter considerably with its ash-content, and, in order to study the fundamental properties of this substance, it was deemed advisable to work out a method whereby large quantities of electrically-neutral gelatin containing only a small percentage of ash could be prepared. This was successfully accomplished, and large-scale preparations are now being undertaken.

During the past year, a new line of research has been initiated at Bristol University. Little is known as to the fundamental nature of adhesion, and it was considered that this problem was one of the utmost importance. Professor J. W. McBain, Ph.D., F.R.S., undertook to direct work on this topic, and already promising results have been obtained. The final test of a glue must be the tensile strength of a glued joint prepared from it. Such work is being conducted at the Royal Aircraft Establishment, where a close study of the nature of the rupture of glued joints of various types is being made.

Oxygen Research.

During the year the report of the Oxygen Research Committee has been prepared and will shortly be published. This report consists principally of a description of the Committee's own investigations and results, particularly in the improvement of the known methods of handling liquid oxygen and liquid air on a practical commercial scale. Of these methods the Committee has been principally concerned with the development of the double-walled vacuum vessel as a container for the liquid.

Gas Cylinders Research.

At the close of the year 1921-22, after the publication of its first report, the Gas Cylinders Committee turned its attention to the problems relating to cylinders for the transport of gases in the liquid state, and to the consideration of the possibility of the use of alloy steel or other alloys for the manufacture of light cylinders. The progress made in these researches is as follows:—

Liquefiable Gases.—A review was made in the first place of the known information on the physical properties of the so-called "non-permanent" gases which came under the purview of the Committee. It was found that not only were there many discrepancies, but that, in some cases, information of vital importance to the work of the Committee was not available. It was decided, therefore, to undertake the experimental verification of the uncertain data, and the determination of the unknown data, at the National Physical Laboratory. The necessary experimental plant has been designed and constructed, and these investigations are now in progress. In order further to assist the Committee, a questionnaire was circulated to gas-compressers regarding the corrosive effects, if any, of liquefied gases on cylinders, and regarding the nature and quantity of impurities found commercially in these gases. A good response was made by the trade to the Committee's request.

Cylinders of Alloy Steel.—After reviewing the possibilities of manufacturing cylinders of various alloy steels, it was decided to secure if possible the co-operation of steel and gas-cylinder manufacturers. A questionnaire on the subject of alloy steels suitable for the manufacture of gas cylinders was therefore sent to a number of firms, and, as a result of the replies received, an order has been placed with three firms for the supply of a number of experimental cylinders.

Cylinders of Duralumin.—In order to explore further the possibility of the production of light cylinders for special purposes, a specification was drawn up for the manufacture of cylinders of duralumin. Some experimental cylinders have been manufactured and supplied, and an exhaustive series of tests is now in progress at the National Physical Laboratory.

THE FORTHCOMING WORLD POWER CONFERENCE.

ARRANGEMENTS FOR NEXT YEAR'S MEETING AT WEMBLEY.

CONSIDERABLE progress has been made in the preparations for the World Power Conference, to be held at the British Empire Exhibition, Wembley, from June 30 to July 12, 1924, under the Presidency of the Earl of Derby. The conference, as has already been announced, is being promoted by the Council of the British Electrical and Allied Manufacturers' Association, in co-operation with technical and scientific institutions and industrial organisations in Great Britain and other countries, to consider how the industrial and scientific sources of power may be adjusted nationally and internationally. This purpose is to be achieved by the consideration of the potential resources of each country in hydro-electric power, oil and minerals, the comparison of experiences, the discussion of methods of technical education in different countries with a view to the improvement of existing facilities, etc., whilst a good deal of discussion will also be directed to the possibility of establishing a permanent World Bureau for the collection of data, the preparation of inventories of the world's resources, and the exchange of industrial and scientific information through appointed representatives in the various countries.

Scope of the Conference.

The conference has been divided into five divisions, as follows:—(1) Power Resources; (2) Power Production; (3) Power Distribution; (4) Power Utilisation; (5) General.

These five divisions are sub-divided into 13 sections Thus, Division 1 consists of Section A, which will review national power resources and will cover a general survey, the investigation of national resources, power resources available and utilised, administration, and the electrical power market. Division 2 is to be divided into five sections, B to F, dealing respectively with water power production, the preparation of fuels, steam power production, internal combustion engines, and power from other sources. Division 3 is to consist of Section G only, which will cover power transmission and distribution. Division 4 will consist of four sections—namely: (H) Power in industry and domestic use; (J) Power in electro-chemistry and electro-metallurgy; (K) Power for transport; and (L) Power for illumination. The final division has two Sections, M and N, the former to deal with economic, financial, and legal matters, whilst the latter will deal with research, standardisation, education, health, publicity, and general problems.

Papers to be Presented and Discussed.

So far the following papers have been arranged, for presentation to and discussion by the appropriate sections: —"The Coal Resources of the World," by Sir Richard Redmayne, K.C.B.; "National Review of Water Power in Great Britain and Ireland," by Professor A. H. Gibson; "Problems Relating to Run-off, Storage, and the Allocation of Catchment Areas in Great Britain and Ireland," by W. J. E. Binnie; "Points Affecting Economy in General Lay-out and Design," by C. M. Norrie and W. H. Munro; "The Scope of Development to meet Progressive Demands," by E. C. Bergstrom; "Steam Generation," by Sir James Kemnal; "Steam Turbines," by the Hon. Sir Charles Parsons, K.C.B., F.R.S.; "Internal Combustion Engines," by James Richardson; "The Transmission and Distribution of Electrical Energy," by C. H. Merz; "Large Generators," by A. B. Field; "High Voltage D.C. Generation and Distribution of Electrical Energy," by J. S. Highfield; "Mechanical and Hydraulic Variable Transmission of Power," by Dr. H. S. Hele-Shaw, F.R.S.; "The Application of Electrical Energy," by Sir Alexander Kennedy, F.R.S., "The Application of Power to Rail Transport," by Roger T. Smith and C. B. Collett; "The Application of Power to Road Transport," by Colonel R. E. Crompton, C.B.; "Illumination," by C. W. Sully; "The Financial Aspect of Hydro-Electric Development," by George Balfour, M.P.; "International Standardisation," by C. le Maistre, C.B.E.; "The Education of the Apprentice," by Professor A. P. Lawrie and Professor F. G. Baily; "The Education and Training of the Engineer of the Future," by A. P. M. Fleming, C.B.E.; "The Importance of Greater Public Interest in Mechanical Progress," by T. C. Elder; "Co-operative Publicity in the Public Supply of Electricity," by J. W. Beauchamp; and "The Study of the Human Element in Production," by D. R. Wilson.

Participating Countries and Officials.

A number of other papers are under consideration. The participating countries to date are Australia, Austria, Belgium, Canada, Czecho-Slovakia, Denmark, France, Great Britain, Greece, Holland, India, Italy, Norway, Roumania, Sweden and the United States. Mr. D. N. Dunlop is the Organising Director, other officers appointed to date being: —*Chairman*, Programme Committee: Mr. Roger T Smith; *Secretary*, Water Power Section: Lieut.-Col. C. M. Norrie, D.S.O.; *Secretary*, Engineering Sections: Mr. A John Dannhorn; *Secretary*, Chemistry and Physics Section: Mr. H. Talbot (Representing the Chemical Engineering Group of the Society of Chemical Industry); *Secretary* to the Organising Director: Mr. W. M. Burt. The official languages of the conference are English and French.

American Alkali Prices.—The following contract prices for alkali products during the remainder of this year and the whole of 1924 have been announced by the Mathieson Alkali Works, Inc. The prices in all cases are in dollars per 100lb.: 58 per cent. light soda ash, in bulk 1.33, in 200-lb. bags 1.45, in 300lb. barrels 1.69; 58 per cent. dense soda ash, in bulk 1.42, in 300lb. bags 1.51, in 400-lb. barrels 1.75; 76 per cent. solid caustic soda, in 700lb. drums, 3.165; 76 per cent. ground caustic soda, in 425lb. drums 3.60, in 425lb. barrels 3.85; 76 per cent. flaked caustic soda, in 400lb. drums 3.60, in 400lb. barrels 3.85; U.S.P. bicarbonate of soda, powdered, in 112lb. kegs 2.25, in 330lb. barrels 2.00, in 400lb. barrels 2.00, in 200lb. paper-lined bags 1.90, in 200lb. plain burlap bags 1.875, in bulk 1.75. Prices of granular U.S.P. bicarbonate of soda are 37.5 cents per 100lb. higher.

THE BRITISH EMPIRE EXHIBITION.

PROGRESS MADE IN THE CHEMICAL SECTION.

MR. WOOLCOCK, the General Manager of the Association of British Chemical Manufacturers, met the editors of the various technical journals at the offices of the Association in Piccadilly on Monday last, to discuss with them the progress which has been made with the preparation of the Chemical Section. In the course of the conversation, Mr. Woolcock said:—

"The Chemical Section which is being organised by the Association and occupies nearly 40,000 square feet in the Palace of Industry will be built in such a way as to form a Hall within the Palace. About £100,000. will be spent in presenting to the public a picture of the present state of British chemical industry. No important firm in the industry will be unrepresented, and the whole of the individual exhibits numbering about one hundred will, by reason of their position and character, combine to form a magnificent illustration of the industry. The treatment of the individual stands is being done on lines which have never before been attempted, and the old and somewhat hideous structures which have disfigured exhibitions in the past will not appear.

Considerable attention has been paid to the lay-out and to the decoration of the Chemical Hall. There will, for example, be about two hundred yards of a specially-painted frieze illustrating various operations in chemical manufacture, and as the majority of the stands are being designed by the same architect the treatment of each stand is likely, while maintaining the individuality of the occupier, to present a very pleasing picture of the Hall as a whole. It has not, however, been considered sufficient that we should merely show visitors examples of the products of the industry. The best possible exhibition of this kind would leave one question unanswered. The visitor may be satisfied that he is witnessing a demonstration of the position to which the industry has attained, but what the critical person who examines the exhibit requires to know is whether there is behind this example of what has been achieved a scientific basis which will ensure the continuance of this progress. For this reason in the centre of the Chemical Hall there is to be illustrated the progress which has been made in pure chemistry during the past twenty or thirty years, with a view to showing that the stream of scientific invention in this country is still flowing steadily onwards."

The "Pure Chemistry" Exhibit.

Mr. Woolcock then proceeded to outline the scheme of classification which has been adopted for the Scientific Section, and enumerated a number of names of those scientists who have already promised their assistance and very few of the outstanding scientific men of the day were absent from the list. Continuing, Mr. Woolcock said:—"The Scientific Section is being organised by a Committee consisting of representatives of the following bodies:—The Chemical Society; the Institute of Chemistry; the Society of Chemical Industry; the Society of Dyers and Colourists; the Pharmaceutical Society; the Institution of Petroleum Technologists, and the Institution of Chemical Engineers.

This Committee is working in close co-operation with the Royal Society. Sir Herbert Jackson acts as the representative of the Royal Society on the Committee and myself in a similar capacity on the Royal Society Committee. In this way we shall prevent any overlapping. In order that both the general public and scientific persons may have a record of the exhibit, it is proposed to publish a number of pamphlets specially written for the purpose dealing in popular language with the various classes of exhibits in the Scientific Section. In addition to this it is proposed to publish in more technical language a work, which will not only explain the scientific exhibits, but which will put on record in a very complete form the state of our knowledge in chemical matters at the date of the exhibition. It is anticipated that there will be a very large demand for this valuable record, and that it is likely to find a place on the bookshelf of every scientist. The various chapters will be written by the acknowledged experts in their subjects, and I anticipate that the contents of this book will be very valuable matter for reference."

Co-operation of the Technical Press.

Mr. Woolcock invited the assistance of the editors in making widely known what was being prepared for the

exhibition next year, and the following resolution was unanimously passed:—"That our best thanks be extended to Mr. Woolcock for his courtesy in inviting the editors of the trade and technical Press to meet him, and that we undertake to give him any assistance in our power in organising the publicity service of the Chemistry Section."

THE DIRECTORATE OF THE DYESTUFFS CORPORATION.

SIR W. J. POPE'S CRITICISM AND THE CHAIRMAN'S REPLY.

On Monday, October 8, the following letter from Sir William J. Pope of Cambridge University was published in the *Morning Post*:—

Sir,—The national organisation for re-instating the coal-tar colour industry in this country, the British Dyestuffs Corporation, Limited, again claims public attention by the retirement of Mr. A. G. Green, F.R.S., its director of research, by reason of "his dissatisfaction at the absence of technical knowledge upon the board of directors and his belief that the permanent establishment of the dyestuffs industry in this country is impossible under these conditions." The reason given is but a succinct restatement of the condemnation, so widely expressed, of the Government scheme when in its initial stages; it translates the common observation that every large and successful manufacturing concern in the world is directed by men acquainted with the objects of manufacture, and that failure always results when such men are excluded from the directorate. The establishment of a sound dyestuff industry in Great Britain is so vital to the national well-being that it is worth while reviewing the history of the recent attempt made to achieve this end, and to point out why the attempt is failing.

The Board of Trade's Attitude in 1915.

The guiding principles of the scheme under which the Corporation is now working were forced upon the country by the Board of Trade early in 1915. They embody the experience of Mr. J. M. Robertson, then Parliamentary Secretary to the Board of Trade, that "he knew of many chemical concerns which had been ruined by having highly-gifted scientific men on their boards. When such men were on the boards the position of the other directors was often a difficult one." The fact that Mr. Robertson's statement was entirely untrue has really no bearing on the subject; we all know of large business concerns which have failed because presided over by brilliant business men whose cheerful optimism led them ultimately to penal servitude. But what was stated served the purpose of the Board of Trade and of its President, Mr. Walter Runciman, which was to establish a dyestuff industry under political auspices untrammeled by directors possessing any knowledge of dyestuff manufacture. Whilst the Board of Trade in 1915 was devoid of chemical talent, and its chiefs, Mr. Runciman and Mr. Robertson, took the dyestuff industry as an incident in their political activities this Government Department was able to force its project upon the country—although the project was almost universally condemned by the Press and although many of the leaders in science and technology pronounced failure to be inevitable. Unfortunately, a perusal of the newspaper criticisms early in 1915 will surprise the reader by the accuracy with which the gloomy forebodings of the experts who knew about the subject have been fulfilled.

Both Mr. Runciman and Mr. Robertson had the political temperament: that is to say, each possessed that certainty and precision of judgment concerning intricate problems, of which he knew nothing so characteristic of the amateur. They have handed their method of administration of national affairs on to worthy successors, and have lost interest in the dyestuff industry. Yet these gentlemen were able to launch their amateur dyestuff proposition, the Government taking up £1,700,000. of share capital. The great names in chemical industry do not figure in the list of original subscribers to the share capital. The British Dyestuffs Corporation still runs, or rather limps, under amateur auspices, because the amateur realises that, in presence of the expert, "the position of the other directors was often a difficult one," and consequently makes expert knowledge a disqualification for a seat on the board. This is the reason for Mr. Green's retirement from the service of the Corporation.

Amateur Constitution Still Preserved by Directorate.

Throughout its frequent changes the directorate of the Corporation has preserved the amateur constitution framed by its founders; it insures against efficiency by a rigid exclusion of any of the many great industrial chemists who have done so much to keep our country in the forefront as a centre of chemical manufacture. The Chairman may be an eminent legal luminary, he may be a Writer to the Signet, or he may be, as at the moment, a business man of proved ability and integrity. Apart from the Chairmanship, the directorate baffles comprehension by the kaleidoscopic rapidity with which distinguished amateurs join the board, and after a brief space retire into well-earned obscurity. At the moment the board includes men distinguished in Colonial affairs, railway management, accountancy, etc., but no one with any knowledge of chemical manufacture; it also comprises one of our greatest soldiers, a universally respected Field-Marshall, who has served in the Regular Army since 1877. It is but fair to note that the directors share the financial vicissitudes of the other shareholders; the actual value of the shareholdings of the six directors is about £2,000. All will agree that six amateurs, directing a £10,000,000. concern involving a most intricate manufacturing business of which they are entirely ignorant show much public spirit in sinking £2,000. of their own money in the enterprise.

The Depreciation of B.D.C. Shares.

The proof of the efficiency of an amateur directorate is, of course, to be found in the results achieved; here little criticism is possible because the Corporation has progressed in entire accord with the programme obvious eight years ago. After eight years of unexampled opportunity—difficulty of import and the certainty that the country would support any businesslike and non-political scheme for establishing an essential industry—the capital of £10,000,000. has depreciated to about one-third of its original value at present Stock Exchange quotations. The amateur has really done rather well; he was expected, on the average scientific and technical chemical anticipation, to destroy about £1,000,000. of capital value per annum. But the comedy still continues because some £3,000,000. worth of assets still awaits annihilation. The gold brick was invented to meet the needs of the business man.

How the Undertaking May Yet Be Saved.

Doubtless the shareholders desire to save the fraction which yet remains of the original capital and still wish to see a sturdy coal-tar industry established in this country. Their course of action is clear. They should replace the Colonial, railway, accountancy, and military experts on the board by a few sober business men accustomed to collaborate in big business enterprises, and add to the directorate a couple of talented technical chemists and an experienced chemical engineer, these three chosen from the scores who are now engaged in worthily developing the vast chemical industries of this country in loyal co-operation with their business colleagues. By so doing the Corporation would tap a class of expert hitherto foreign to its constitution; had it commanded such a directorate from its inception, and so attracted the whole-hearted participation of the dyers and other colour users, the British Dyestuffs Corporation would have been to-day in a secure position.

One note of warning may be struck here. On each of the numerous occasions when a scientific or technical member of the staff of the Corporation has retired, having realised that the amateurs are stifling the enterprise, the news and technical press has been loaded up with sententious articles indicating that the resignation results from disagreement with the policy of the board, and pointing out that the scientific or technical man is often an uncommercial idealist, prone to disregard all aspects of a business proposition other than those of scientific research. Without labouring these questions, it may be stated as obvious that the main cause of lack of success of the British Dyestuffs Corporation resides in the fact that, after eight years of existence, the amateur directorate has been unable to distinguish even one technically trained person from among the many hundreds who have passed through the works as worthy to take a place on the board and to discuss technical and business problems on terms of equality with his colleagues. Throughout these eight years no man of conspicuous standing as an administrator and technical expert in our great chemical industries has been persuaded to accept a seat on the board.

Meanwhile Mr. Green has resigned because the directorate of the British Dyestuffs Corporation includes no person who

knows anything about either the nature or the manufacture of its multitudinous products; the next move would seem to lie with the shareholders.—Yours, etc.,

William J. Pope.

Sir William Alexander's Reply.

On Wednesday, October 10, the following letter from Sir William Alexander appeared in the *Morning Post*:—

Sir,—It is not the desire of my Board to be drawn into any discussion, but the statements of Sir William Pope always demand attention. You will therefore permit me perhaps to state the facts very briefly.

Owing to the present abnormal trade depression, my Board, after close consultation with the scientific men within the Corporation's organisation, decided upon a policy of curtailment—but only curtailment—of the heavy expenditure on research. This policy was confirmed by the shareholders in a general meeting.

The peremptory refusal of any member of the staff to carry into effect a decision taken after the fullest consideration could only lead to one course, which, in fact, was taken.

It is proper to say that Mr. Green's resignation will not denude the Corporation of ample technical service, nor affect, we hope, its progress. On the other hand, it will assist those who have financial interests to safeguard to effect some justifiable and necessary economies.

Professor W. H. Perkin to be New Research Director.

Those interested may care to know that Professor W. H. Perkin, F.R.S., who for some considerable time has been on the scientific staff as Controller of the Corporation's Research Colony at Oxford University, will now add to his duties by advising and supervising the research staff at headquarters. Professor Perkin's knowledge and experience of dyestuffs require no comment.—Yours, etc.,

Wm. Alexander, Chairman.

HIGH-PRESSURE STEAM FOR POWER GENERATION.

GERMAN WATER-TUBE BOILER FOR 850lb.

As is well-known the tendency everywhere nowadays is to adopt super boiler pressures for power generation. Not only is the standard power station practice to-day in Great Britain 350lb. and 700° F., but in the United States this figure is at present over 400lb. We now understand that the firm of A. Borsig of Berlin is constructing a large water-tube boiler, with an evaporation of 15,500lb. of steam per hour, but which is to work at 850lb. gauge pressure.

The design embodies one top drum and two bottom drums, connected by slightly bent tubes, the drums being constructed of a heavy forging made from one piece of metal, without the use of riveted or welded joints, and subsequently annealed after forging, whilst special arrangements are made with steel plates so that the drums do not come into direct contact with the hot flue gases. This (the fact that no abnormal stresses will be set up in the thick drums) is claimed to be one of the essential portions of the design.

The general principle is based on experimental work carried out for a number of years past by W. Schmidt, also well known for his work on high-pressure superheaters, who contends that there is no real difficulty in working ordinary water-tube boilers at these enormous pressures, providing that the metal is made sufficiently thick, and that due arrangements are included to prevent internal stresses. The boiler does not include an economiser in the ordinary sense of the word, because the very high temperature of the boiler water permits of a low exit gas temperature, but what may be called the last section of the boiler is arranged in the form of long vertical tubes, which can really be considered as an integral economiser, lowering the final flue gas temperature to about 430° F. These tubes are of steel, the same as the rest of the boiler, but it is claimed that no undue corrosion takes place if the feed-water is "degassed" and heated.

Special Type of Water Gauge.

One of the troubles in connection with this type of boiler—and a small boiler on these lines was constructed by Schmidt in 1910, having 744 square feet heating surface and producing 1,500lb. of steam per hour at 850lb. pressure and 840° F.,—is the continual bursting of the gauge glasses. For this reason a special water level gauge has been constructed a considerable distance from the boiler, consisting essentially of a "U" tube, the lower part of which is made of glass containing mercury. Both the arms of the "U" tube are filled with condensed water, on the lines used in the working of steam meters, so that the actual indication of the level, as given by the mercury, is cool and not under pressure, and the small difference is read by means of a magnifying glass. It is stated that no trouble results from leaks, and this small boiler is said to have operated for about 15,000 hours, including starting up and shutting down say 1,500 times, without any trouble.

The object of generating steam at such enormous pressures is to use it in an engine or turbine, and to exhaust at normal pressures for ordinary use. In this particular case a back-pressure reciprocating engine is used, whilst remarkable results can be obtained also with a condensing quadruple expansion steam engine.

DEATH OF MR. WILLIAM THOMSON.

A PROMINENT MANCHESTER CHEMIST.

It is with great regret we record the sudden death, on Thursday week, at the age of 82, of Mr. William Thomson, F.R.S. Ed., F.I.C. The late Mr. Thomson, who died suddenly in his laboratory, had been a prominent figure among the chemists of Manchester and London for over half a century. Born in 1851, in Glasgow, he came to Manchester in 1869, and entered as assistant to Dr. Grace-Calvert, the Royal Institution Laboratory in Princess Street, the oldest chemical laboratory in Great Britain. Four years later, at the age of 22 years, he became a partner in the firm of Grace-Calvert and Thomson, and, on the death of Dr. Grace-Calvert a little time later, took sole charge of the practice, and combined with this the office of Public Analyst for Stockport, which he continued to hold until his death.

The late Mr. Thomson joined the Literary and Philosophical Society in 1873, and served on the Council for many years, acting as president from 1917-19. In November of last year, it will be remembered, he presented to the Society the actual tubes containing sulphides of calcium, barium, etc., which he demonstrated to Sir William Crookes in 1877, and which proved to be the first of three steps which led to the discovery of "X-rays" by Professor Rontgen. In recognition of his contributions to science, he was elected a Fellow of the Royal Society of Edinburgh, and he was one of the original members of the Society of Chemical Industry. He was also one of the leading forces in the Institute of Chemistry, of which he was elected a Fellow in 1877.

AMERICAN BENZOL PRODUCTION.

LARGE GROWTH IN RECENT YEARS.

According to figures given by D. W. Jayne, the president of the firm of Jayne and Sidebottom in *Drug and Chemical Markets* (September 19, 1923), the quantities of benzol produced in the United States during the years 1904 to 1920 inclusive, were as follows:—

Benzol Production in U.S.

	Gallons.		Gallons.
1904	285,000	1912	2,300,000
1905	360,000	1913	3,000,000
1906	400,000	1914	3,000,000
1907	375,000	1915	9,000,000
1908	485,000	1916	27,000,000
1909	885,000	1917	38,000,000
1910	1,500,000	1918	55,000,000
1911	1,600,000	1919	63,000,000
		1920	70,000,000

Statistics for the years before 1904 are not available, but the quantities were small. These figures include all grades of benzol, including solvent naphtha. Before 1915 the solvent naphtha was probably one-third of the total, whereas since the war it is nearer 5 per cent. of the total.

During 1921 and 1922, approximately ninety per cent. of the quantity of light oil was produced as compared with the figures for 1920. Some of the larger companies found little difficulty in securing coal for their coke ovens during the shortage and, as a consequence, many have kept production up to 95 per cent. Many of the smaller plants, however, did have coal difficulties, and it is believed that their figures were lower. An average production of about 90 per cent. for benzol in 1921 and 1922 is a fair estimate.

ITEMS OF INTEREST.

British Coal Output.—The coal output from the mines of Great Britain for the week ended September 29 was 5,574,600 tons, compared with 5,504,300 tons in the preceding week, and 5,177,200 tons a year ago.

New Blast Furnace.—Messrs. Dorman, Long and Co. are putting into operation at their Port-Clarence (Co. Durham) iron works a new blast-furnace, which is the largest in the North-East. It will have a producing capacity of nearly 2500 tons per week.

New Zealand Coal Discovery.—An important coal development is reported seven miles from Greymouth, N.Z. A seam of good hard coal, 12ft. thick, has been struck in a bore at a depth of 900ft., proving its continuity over a very large area. The seam is now being worked.

Nigerian Tin Developments.—The Nigerian Tin Corporation advise shareholders of the successful conclusion of the negotiations for the acquisition of a mining lease on the Kuru area at Bukuru. The agreement was actually signed on September 26, and the property is now under the company's control.

Trade Inquiries.—The following inquiries have been received at the Department of Overseas Trade, 35, Old Queen Street, London, S.W. 1, where further information may be obtained on application: (*a*) Linseed oil; (*b*) machine oil; (*c*) anti-friction grease, all for South Africa. (Ref.: 12,290/E.D./C.C./2.)

Journal of Scientific Instruments.—The first regular monthly number of the *Journal of Scientific Instruments*, produced by the Institute of Physics with the co-operation of the National Physical Laboratory, will appear on October 15. The annual subscription is 30s. (to Corporate Members of the Institute 24s.).

French Congress of Industrial Chemistry.—The third congress is to be held by the French Society of Chemical Industry at Paris, from October 21-27. The main theme of the conference is "Agriculture," and among the experts invited to address the congress is Sir John Russell, who will speak on "The Relation of Soil Organisms and Soil Fertility."

Norwegian Sodium-Nitrite Production Costs.—According to estimates made by the U.S. Tariff Commission, the cost of producing sodium nitrite in Norway by the arc process is 262 kronen per short ton. Of this total 40 kronen is due to power, 130 kronen to soda ash, and 26.2 kronen to labour. At current rate of exchange the total production cost works out at about £11. per ton.

New Dyestuffs Research Director. — Professor W. H. Perkin has been appointed adviser to the headquarters research staff of the British Dyestuffs Corporation, Limited, in succession to Professor Arthur G. Green, who recently resigned. He is Waynflete Professor of Chemistry and a Fellow of Magdalen College, Oxford, where for some time he has been controller of the British Dyestuffs Corporation Research Colony.

Business Notices.—Sir Alan Hutchings (director of South Yorkshire Chemical Works, Ltd.), has joined the board of Benzol and By-Products, Ltd. Mr. J. A. Davy (vice-president of the Yorkshire Coke Owners' Association, and formerly president of the Coke-Oven Managers' Association) has been appointed general manager of the company's colliery and works.—It is announced that Sir Courtauld Thomson has been appointed chairman of the Limmer and Trinidad Lake Asphalt Company, Ltd. The Right Hon. Lord Southborough has joined the board.

Japanese Production of Agar-Agar. — The average annual production of agar-agar in Japan during the period 1911-1920 was approximately 3,000,000 pounds. During recent years the production has dropped somewhat. For the 1922-23 season the output was estimated at 2,400,000 pounds, states a U.S. Commerce Report. About 75 per cent. of the output is exported. Oriental countries, principally China and the Malay States, where agar-agar is used as a foodstuff, normally take over 60 per cent. of the exports. The remainder goes to the United States, Great Britain, France, and Germany. This year's shipments to Europe and America have been unusually large, amounting to 1,600,000 pounds by the end of April.

Unemployment Figures.—The number of persons on October 1, 1923, recorded on the live registers of the Employment Exchanges in Great Britain was 1,246,200. This was 14,163 more than in the preceding week, and 239,587 less than the figure recorded on January 1, 1923.

Chemical Industry Club.—The annual dinner of the Chemical Industry Club will take place at the Connaught Rooms on Friday, November 23. Tickets, 15s. each, may be obtained from members or from the Secretary, Mr. J. Arthur Williams, 2, Whitehall Court, London, S.W. 1.

The Scottish Oil Industry.—The Scottish Shale Miners' Association and the Scottish Oilworkers Association have received letters from Scottish Oils, Ltd., saying that, in view of the present state of the industry, they are compelled to intimate a reduction of shale miners' and oilworkers' wages.

Overseas Trade in September. — Preliminary returns of Overseas trade for September show that imports totalled £88,265,581. and British exports £63,836,144. Compared with the preceding month, these figures show a decrease in imports of five and a half millions and an increase in exports of nearly four millions.

Dyestuffs Development Committee. — The Board of Trade announce that Dr. A. T. de Mouilpied, of the British Dyestuffs Corporation, Ltd., has been appointed a member of the Dyestuffs Industry Development Committee, set up under the Dyestuffs (Import Regulation) Act, 1920, in the place of Dr. Herbert Levinstein, F.I.C., who has resigned.

Oil Refineries in U.S. Decreasing.—Reports to Bureau of Mines at Washington show that 41 oil refineries throughout the United States have been compelled to close since the beginning of the year. In January there were 301 plants in operation, and at the end of August only 260. Since the latter date a number of additional refineries have shut down.

Obituary. — It is with great regret that we record the death of John Allen Harker, F.R.S., D.Sc., O.B.E., on Wednesday, after a very short illness. Dr. Harker is best known by his war-time work on the organisation of the labours of the Nitrogen Products Committee of the Ministry of Munitions and as Director of the Research Laboratories set up to study modern nitrogen fixation processes. Further reference to Dr. Harker is made in our editorial columns.

British Gas Consumption Statistics.—Statements made at the annual conference of the British Commercial Gas Association at Birmingham show that the increase in the consumption of gas during the decade 1913-1922 was 60,000 million cubic feet as compared with 45,000 million cubic feet in the preceding ten years. The total sales of gas for the year 1922 were 265,000 million cubic feet, an increase as compared with the year 1917 of 33,000 million cubic feet.

Reported French Dye Combine. — An unofficial report from Paris states that "La Compagnie Nationale des Matieres Colorantes" has absorbed the "Etablissements Kuhlmann." (The latter company, which was established in 1825, and has a capital of 100,000,000 francs, manufactures not only dyestuffs, but pharmaceutical products, fertilisers, and many heavy chemicals.) It is also stated that the capital of the Kuhlmann firm is to be increased by 50,000,000 francs.

Deterioration of Structures in Sea Water.—The third interim Report of the Committee of the Institution of Civil Engineers has now been published, price 3s. net. The contents include the report on the investigations to protect timber against teredo; reports on the work carried out at the Marine Biological Laboratory, Plymouth; general report on the creosoting and impregnation of timbers; general report on the protection of iron and steel from corrosion by preservative coatings; report on the influence of strain upon the incorrodibility of iron and steel.

Arsenic in Food Preservative.—At Glasgow Sheriff Court on Tuesday a fine of £10. was imposed on the Midlothian Chemical Company, Ltd., for having, in premises in Dundas Street, sold a food preservative which contained 200 parts per million of arsenic, whereas it should not contain more than five parts per million. An agent who appeared on behalf of the respondents explained that they were not manufacturing chemists. The preservative was bought from a firm of manufacturing chemists in the city and the respondents had no knowledge of the presence of arsenic in it.

Mercury Production.—A statement issued by the management of the Almaden Mercury Mines is to the effect that the production of mercury during the first eight months of this year amounted to 23,585 bottles. Sales during this period totalled 35,988, leaving a stock on hand at September 1 of 16,545 bottles. The value of sales was 9,457,401 pesetas, representing an average price of 274.07 pesetas per bottle.

Dusts in Coal Mines. — Lieutenant-Colonel G. R. Lane-Fox, M.P., Secretary for Mines, announces that a memorandum has been prepared, and is now on sale, price 1s., for the Safety in Mines Research Board, recording the information at present available with regard to the application of incombustible dusts in coal mines as a precaution against coal-dust explosions.

Shoe and Leather Fair, 1923.—At the Shoe and Leather Fair, 1923, Necol Industrial Collodions, Ltd. (a "Nobel" concern), show on Stand No. 64-66, in the Gallery, a selection of their products, including Necol plastic wood, Necol enamel for split leather, Necol grain-leather finishes, varnish for light and fancy leathers, enamel for hat leathers, and waterproof cement for joining leather belting.

The Origin of Petroleum.—In a paper presented to the Institution of Petroleum Technologists on Tuesday night, Mr. E. H. Cunningham-Craig reviewed the theories of the genesis of petroleum. He concludes that as a result of the most recent work by Professor A. E. Flynn, of Nova Scotia, and others upon the gels separated from torbanites, the case for the origin of oil from vegetable matter has been fully established.

Tariff Notes.—Revised regulations dealing with the importation of sheep dips into South Africa have been issued, and are published in the Board of Trade *Journal*, October 4.—In the same issue appears a detailed list of chemicals and applied products which require an export licence on exportation from Germany.—An open general licence has been issued permitting the export from the United Kingdom of the following industrial explosives: Dynobel, Samsonite, Thames Powder, Sabulite No. 1, Super-Sabulite, Barwick, Hertford.

Dyestuffs Import Licences. — The Board of Trade *Journal* announces that applications for import licences under the Dyestuffs Regulations Act, 1920, during September numbered 457, of which 311 were from merchants or importers. To these should be added the 34 cases outstanding on September 1, making a total for the month of 491. These were dealt with as follows:—Granted, 342; referred to British makers of similar products, 79; referred to reparation supplies available, 30; outstanding on September 30, 1923, 40.

University News.—A graduation ceremonial was held on Friday last at St. Andrew's University, Principal Irvine, Vice-Chancellor, presiding, when the two recently appointed professors were installed in their respective chairs—Professor John Read, University of Sydney, to the Chair of Chemistry; and Professor Adam Patrick to the Chair Medicine.—The degree of D.Sc., *honoris causa*, has been conferred on Professor The Svedberg by the University of Wisconsin. Dr. Svedberg has been lecturing on colloid chemistry during the summer session of the University.—The Brown University of U.S.A. has awarded the degree of Doctor of Laws to Professor McBain, of Bristol University.

South Australian Minerals. — The adverse economic factors prevailing in the State of South Australia during 1922 were such that the mineral production in that year was the lowest in value since 1898. The value of the production was £331,514., against £902,549. in 1921. The production of gypsum during 1922, however, was the largest since this mineral was first obtained in the State, and it is further anticipated that the increase (in quantity from 34,383 to 45,241 tons, and in value from £29,427. to £37,650.) will be maintained by the further exploitation of the Penong deposits, which are shortly to be connected by rail to a port at Cape Thevenard. The largest individual contributor to the value of the total production was crude salt, the quantity and value being 48,657 tons and £109,478. respectively, but the former is less than the average of the last ten years, though the price has risen from 15s. per ton in 1913 to 45s. in 1922. The production of copper was 1,185 tons, a decrease of 347 tons, but the value fell from £106,370. to £73,646., a decrease of £32,724., the average price being £62. per ton in 1922, and £69. in 1921, against an average of £88. for the last ten years.

Bleaching with Percarbonates.—Amongst the products now frequently used in bleaching may be mentioned, hydrogen peroxide, sodium peroxide and sodium perborate. M. Bollis (*L'Avenir Textile*, June, 1923) now points out that sodium percarbonate, which has only been used hitherto on a very small scale, is worthy of more consideration as a bleaching agent. The product, the formula of which is $Na_2C_2O_6$, contains 120-130 grammes of active oxygen per kilogramme, is more stable than sodium peroxide, liberates its oxygen with perfect regularity, and does not necessitate the use of additional materials. Sodium percarbonate may be employed with all fabrics to the extent of about 1.5 to 2 per cent. on the weight of the fabric.

COMING EVENTS.

Society of Chemical Industry (South Wales Section).—Meeting, **Friday, October 12,** at **7.30 p.m.,** at the Technical College, Cathays Park, Cardiff. Discussion: "The Smoke Problem," to be opened by H. J. Bailey.

Institute of Metals (Sheffield Section).—Meeting, **Friday, October 12,** at **7.30 p.m.,** at the University, St. George's Square. Paper: "Electric Resistance Furnaces," by A. G. Lobley.—**(Swansea Section):** Meeting, **Friday, October 12,** at **7.15 p.m.,** at University College, Singleton Park. Chairman's address by E. E. Dendy.—**(Birmingham Section):** Meeting, **Tuesday, October 16,** at **7 p.m.,** at the Chamber of Commerce, New Street. Chairman's address by Dr. F. Johnson.—**(Scottish Section):** Meeting, **Friday, October 19,** at **7.30 p.m.,** at 39, Elmbank Crescent, Glasgow. Paper: "Large Metallic Crystals and Some of Their Properties," by Professor H. C. H. Carpenter.

Society of Dyers and Colourists (Manchester Junior Section).—Meeting, **Friday, October 12,** at **7.30 p.m.** Paper: "The British Colour Industry," by Dr. H. Levinstein.

Institution of the Rubber Industry (Manchester Section).—Meeting, **Monday, October 15,** at **7.30 p.m.,** at the Midland Hotel. Discussion: "Rubber Machinery," to be opened by H. C. Young.

Hull Chemical and Engineering Society.—Meeting, **Tuesday, October 16,** at **7.45 p.m.,** at the Photographic Society's Rooms, Grey Street. Paper: "Spinning Tops and Gyroscopic Motion," by L. C. Perkin.

Chemical Society.—Meeting, **Thursday, October 18,** at **8 p.m.,** at Burlington House, Piccadilly, London, W. 1. Paper: "The Catalytic Activation of Molecules and the Reaction of Ethylene and Bromine," by R. G. W. Norrish.

Institute of Chemistry.—Conference, **Thursday** to **Saturday, October 18** to **20,** at Liverpool. Thursday, reception and dinner; Friday, presidential address by A. Chaston Chapman, at 10 a.m.

Textile Institute.—Autumn Conference, **October 18** and **19,** at Leicester. The chief papers will be: "Artificial Silks," by P. E. King; and "The Application of Dyes to Fibres and Fabrics," by Professor J. Thorpe.

Society of Dyers and Colourists (Manchester Section).—Meeting, **Friday, October 19,** at **7 p.m.,** at 36, George Street. Paper: "Some Aspects of the Theory of Quinones," by Professor R. Robinson.

Society of Chemical Industry (South Wales Section).—Meeting, **Friday, October 19,** at **6.30 p.m.,** at Thomas's Café, Swansea. Joint meeting with South Wales Section of the Institute of Chemistry. Discussion: "Short Cuts in Analysis."

Institute of Physics. — Meeting, **Monday, October 22,** at the Institution of Electrical Engineers, Victoria Embankment, London, W.C. 2. Paper: "The Physicist in the Textile Industries," by Dr. A. E. Oxley.

Institute of Chemistry (Manchester Section).—Annual general meeting, **Wednesday, October 24,** at **7 p.m.,** at the Textile Institute, St. Mary's Parsonage. Paper: "Some Aspects of Water-tight Cases," by S. E. Melling.—**(Glasgow Section):** Annual general meeting, **Thursday, October 25.**

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, October 26,** at **7 p.m.,** at 36, George Street.

British Association of Chemists.—Annual meeting, **Saturday, October 27,** at Birmingham.

REPORTS OF COMPANIES.

Dolcoath Mine, Ltd.

The statutory meeting was held at Camborne on Friday, October 5, Mr. Oliver Wethered (chairman) presiding. Mr. Wethered, in the course of his speech, said:—The outstanding feature of the statement sent to you is that it records the subscription by old shareholders and others of over £60,000.—£66,195. 5s., to be exact. Of this sum 1s. per share of the 5s. assessment has been paid, and the balance of 4s. per share, spread over a prolonged period, is owing by 1,240 subscribers, with an average remaining liability of less than £34., and without any large blocks of shares, so that the payment of the calls is assured. With the £65,000. guaranteed by the Government our financial position is materially better than we expected it to be when we last met you, and the managing director states that the cost of work so far is well within his estimate. Moreover, when the liquidation of the company is closed there will remain for future issue 139,370 shares yielding about £65,000. Summing up the capital position, we shall have no debenture and no preference shares, but only a liability for the £65,000. guaranteed by the Government, to be extinguished by annual payments over a period of years, and I may say that meanwhile we are not debarred from paying reasonable dividends. It is early days to talk of dividends, but it is well that you and the investing public should know that we have no old-man-of-the-sea on our shoulders, but a businesslike and equitable agreement.

DIVIDENDS.

Rio Tinto Company, Ltd.—Dividend out of the estimated profits of the year 1923 of 10s. per share, or 10 per cent., on the ordinary shares, payable on November 1, less tax. The interim dividend for 1922 was the same.

Alianza Nitrate Company, Ltd.—Interim dividend of 20 per cent. on account of profits for the current year. A similar dividend was declared a year ago.

Canada Cement Company. — Dividend of 1¾ dollars per share, less tax, on common shares, payable October 16. Last year, dividend same.

Glenboig Union Fire Clay Company, Ltd.—Net profit for year ended August 31, including £11,979. brought forward (less directors' and auditors' fees), amounts to £33,968., which the directors recommend should be disposed of by payment of a dividend at the rate of 20 per cent., less tax, carrying forward £10,155.

Forster's Glass Company, Ltd.—Profit for year to March 31 last, £2,287., reducing debit balance to be carried forward to £29,292.

Bryant and May, Ltd.—Interim dividend of 4 per cent., free of tax, on the ordinary and partnership shares for the half-year ended September 30, to be paid on November 1. The interim dividend for the preceding year was the same.

Canadian Explosives Company.—Dividend of 1¾ per cent. for the quarter ended September 30 on the seven per cent. preferred shares (the same as a year ago).

LEGAL INTELLIGENCE.

ANILINE DYE AND CHEMICAL COMPANY, LTD.

In the Lancashire Chancery Court at Manchester on Monday Vice-Chancellor Lawrence, K.C., had before him two summonses in the matter of the winding up of the Aniline Dye and Chemical Company, Ltd., Trafford Park, Manchester. It appeared that the liquidator, Mr. J. Todd, of Great Winchester Street, London, had entered the names of the executors of the late Earl of Shrewsbury and Talbot in respect of 89,500 £1. shares, and of Sir Henry Busby Bird in respect of 10,500 £1. shares as contributories. On the ground that the shares were fully paid up the Vice-Chancellor was asked to strike the names of the executors off the list of contributories. The 100,000 shares were purchased by Lord Shrewsbury and Sir Henry B. Bird as fully paid up, and were so allotted. In August, 1920, a Mr. Tinling, who had a controlling interest in what was known as the New Era Syndicate, approached the Earl of Shrewsbury and Sir Henry Bird, and proposed that they should lend £50,000. to complete the purchase of the Larne Salt and Alkali Company in Ireland. This property, it was proposed, would be transferred to the Aniline Dye and Chemical Company, which would pay for it by the issue of 136,000 fully paid up £1. shares. The nominal capital of this concern was £250,000., of which £114,000. had already been issued. The proposal was discussed in London, and the Earl of Shrewsbury expressed a desire to get the views of a stockbroker upon the matter. Another meeting was held, at which a stockbroken was present, and the result of the discussion was that Lord Shrewsbury said he would prefer to buy the shares rather than to lend money on the security of them. It was ultimately agreed that the Earl of Shrewsbury should find £45,000. and Sir H. B. Bird £5,000., and that they should buy 100,000 shares outright. It was also made a term of the arrangement that the Earl and Sir H. B. Bird should be made directors of the company.

At this point counsel consulted, and it was stated that terms of arrangement had been come to

Mr. Cunliffe said the liquidator considered that there was a case for investigation. The company's books had been examined, and he was satisfied that the names should be struck off the list of contributories.

The Vice-Chancellor: Then I will make an order to that effect.

No order was made as to costs.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

British Cellulose and Chemical Manufacturing Company, Ltd., London, S.W.—Registered September 20, mort. (supplemental to Trust Deed dated August 4, 1922, securing £500,000. 1st deb. stock).

Swithen Bleachworks, Ltd., Haigh (Yks.), chemical manufacturers.—Registered September 20, £400. 1st, £200. 2nd., and £200. 3rd debs. respectively, to Miss M. E. Wakefield, Mrs. R. M. Wakefield, and L. S. Wakefield, all of Church Lane, Thornhill, Dewsbury.

SATISFACTION.

Chadwicks (Manchester), Ltd., bleachers and finishers.—Satisfactions registered September 21, £1,000., part of amount registered June 5, 1912; and £500., registered March 11, 1913.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Concrete, Ltd., Leeds.—H. F. Holloway ceased to act as receiver September 20.

Price's Soap Company, Ltd.—Resolved September 3: That the company be voluntarily wound up; confirmed September 19. H. G. Rushton, Lever-ho., Blackfriars, London, E.C., liquidator.

Sapon Soaps, Ltd., London, E.C.—C. F. N. Gibbons ceased to act as receiver September 18.

Shaka Salt Company, Ltd.—Resolved September 19: That the company be voluntarily wound up. E. O. Mosley, 16, Bolton Street, Bury, liquidator.

Western Chemical Company, Ltd.—Resolved September 3: confirmed September 19: That the company be voluntarily wound up. W. Moore, 9, Clifford Street, New Bond Street, London, W., liquidator.

Western Chemical Company. — We are notified by the Western Chemical Company (Paisley), Ltd., Sandyford Works, Paisley, that they are in no way connected with the Western Chemical Company, Ltd., referred to under the "Gazette News" heading as being voluntarily wound up.

Manchester Literary and Philosophical Society.—At a meeting on Tuesday of the Manchester Literary and Philosophical Society, Professor H. B. Dixon, the president, gave an address dealing with coal-dust explosions at the Mines Department experimental station at Eskmeals. Before speaking on this subject, he said that he was glad to find the Council of the Society busily engaged on plans for the extension of the Society's headquarters. That the meeting-place of one of the oldest scientific societies—made ever memorable by its association with Dalton and Henry, Fairbairn and Joule, Roscoe and Schunck, Crawford Williamson and Osborne Reynolds—should be widened to meet modern conditions was not to be untrue to its past, but was the best means of maintaining the traditions and keeping green the memories it was their pride to cherish.

FERTILISER NEWS.

Nitrate of Soda.—Shipments from Chile during September amounted to 139,000 tons, of which 92,000 tons are due for Europe (including Egypt), 32,000 tons for the United States, and 15,000 tons to other countries. With the production for the month estimated at 160,000 to 165,000 tons, the stocks on the coast are increasing, and at September 30 last stood at approximately 960,000 tons, which compares very favourably with 1,495,000 tons twelve months ago. Shipments to Europe are still very much below pre-war figures, and this fact is emphasised by the quantity loading at October 1—viz., 36,000 tons, against 170,000 tons at the same date in 1913. The world stocks, which have been steadily increasing since May, as is natural during the off-season, now reach 1,448,000 tons. The spurt in buying which took place in the early part of September has been mainly responsible for the lack of interest shown during the latter half of last month and the opening portion of October. Since the announcement of prices for the current season, it is estimated that sales made by the Association for delivery over the present nitrate year amount to about 1,280,000 tons. To be added to this quantity, however, is the nitrate carried over from last year in the form of unshipped sales at June 30, amounting to 140,000 tons, and about 90,000 tons sold by producers not belonging to the Association. It is anticipated by the Producers' Association also that a further 800,000 tons will yet be required, bringing the total sales for delivery over the coming fertiliser year up to 2,300,000 tons. Of the actual sales so far made, amounting to 1,510,000 tons, some 770,000 tons are due to Europe, 600,000 tons to America, and the balance to Japan and other countries. All the new official business will be at the arranged price of 21s. per quintal, all the cheaper first-hand material having been purchased. According to the schedule of prices issued, nitrate for delivery over the second half of next June was fixed at 19s. 3d. per quintal, but in response to inquiry for material delivered over that period it was stated that no commitments were authorised for delivery later than April. It appears, therefore, as if the trust is adopting a cautious attitude, seeking to maintain high prices and short production rather than face the problems involved in a definite move towards larger output. A semi-official message stating that the possibility of a reduction in prices had been discussed at a meeting of producers in Valparaiso recently has met with a widely broadcasted denial from the London Nitrate Committee. The official denial not only contradicts the assumption that prices may be lowered, but that they may be altered at all. It seems clear from this, therefore, that the Producers' Association do not anticipate such a demand as cannot be met by the present rate of production, or out of existing stocks.

Sulphate of Ammonia.—The home demand for this fertiliser is still quiescent, in spite of the moderate price increases recorded in this column last week. One is tempted to think that, with the present tendency in this country to restrict expenditure in farming to the lowest possible limit, even to the point of neglecting fertilisers, it would have been better to have left prices alone. Even working by a prearranged schedule, as the Federation have stated they are doing, the fact that fertiliser prices are still going up, while receipts from the sale of agricultural produce are becoming smaller and smaller, tends to influence the farmer to an extent out of all proportion to the actual infinitesimal increase in price. With the present export demand, of course, the Federation do not need to go to extreme lengths to encourage the domestic consumer; but the fact remains that the British export of by-product ammonium sulphate will have to face very strong competition from the United States, and eventually from the synthetic nitrogenous fertilisers. This being so, it seems as if the Federation might have foregone the strict adherence to a schedule in an effort to persuade farmers to use more sulphate. Be that as it may, it is well to take note that inquiry from abroad is quietening off a little, and it is possible that exports during September, which represent orders over previous months, will be lower. If it were not for the import duty of about £1. or more per ton, it would be possible at the present low prices to import British sulphate into the United States, where the demand exceeds the supply, and prices are higher than the British material would be, even when delivered in America. A report from the other side of the Atlantic states that some Canadian resale material was, indeed, available at a price which would have allowed a profit after payment of import duty. It will be remembered that quite recently German manufacturers of nitrogenous fertilisers decided to abandon paper-currency quotations for their products. Instead of quoting marks per unit, the price of rye was taken as the basis of values; but owing, doubtless, to considerable difficulty in adjusting prices in the various districts, a more stable system has been found in what veritably amounts to quoting in foreign currency. The price for internal consumption, therefore, has been fixed on a gold-mark standard, sulphate of ammonia standing at 1.05 gold marks per unit of nitrogen per 100 kilogrammes. Payment can be made, it is stated, alternatively in securities of the gold loan, or in paper marks on the basis of the dollar exchange.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The outstanding feature of the position is that while the number of furnaces in blast in the hematite pig-iron producing district between Workington and Carnforth is only fourteen, nearly all the iron that is being smelted is the ordinary iron, for which the local coke is suitable. In West Cumberland scarcely any low-phosphorus iron is being made, and in the Furness district the proportion is not one-third. Another furnace has now been put into operation, and there is every prospect that in January there may be three or four additional furnaces blowing. An improvement in the steel trade as well as in the iron trade will be chiefly accountable for the expansion of production at the furnaces, the outlook as regards activity at the rail mills at Barrow and Workington early next year being quite healthy, and it may be seen, therefore, that the coal and coking industries are likely to have an exceedingly busy winter. At the present time both industries are easily disposing of their production. All the nuts and smalls are wanted for the coking plants, which are very busy. Some part of the make of coke is going to the Furness district, which is receiving, in addition, over 8,000 tons of East Coast coke weekly. The largest proportion is being absorbed by the furnaces in West Cumberland. Smelters are paying from 29s. to 33s. per ton, according to carbon content. What is going to the Continent commands from 34s. to 37s. per ton, f.o.b. Residuals are a fairly satisfactory trade. The tar is being taken by the local chemical works, and the make of crude benzol and sulphate of ammonia is moving away quite briskly.

SOUTH WALES NOTES.

[Specially Contributed.]

There are signs of further improvement in the tinplate trade, and inquiries have greatly improved. Though manufacturers are anxious to book for delivery, merchants are still reluctant to enter into any large volume of business, the feeling among buyers being that prices will be easier. The merging of Richard Thomas and Co., Ltd. and the Grovesend Steel and Tinplate Co., Ltd. is considered as of great importance as the total assets are in the neighbourhood of £12,000,000. It is reported that other amalgamations also are proceeding in the tinplate industry. The patent-fuel business is of a steady description, the chief export markets just now being British West Indies, Algeria, France, Italy, Spain and Egypt. There have been very heavy movements in oils during the week, the importation of the National Oil Refineries amounting to some 20 million gallons of crude petroleum. There is more activity in cokes, exports having expanded. A conference was held at Cardiff on Saturday last between the owners and employees of the by-product plants, to consider the latter's application for wage increases. An agreement was reached whereby the men are to receive an increase of 5 per cent. as from the 1st inst. to the end of the year when the situation will be reviewed.

Among the imports to Cardiff were 1,674cwt. liquid glucose from New York, 7 sulphur burners from New York for Messrs. F. W. Berk and Co., Ltd., 438cwt. phosphorus from Montreal, and 11 tons ferro silicon from Gothenburg; to Swansea 199 tons copper ore from Pomaron, 17cwt. chemical sheet lead from Antwerp, and 11 tons plumbago from Genoa; to Newport 20 tons ferro alloys from Antwerp. Among the exports were 23 tons mineral pitch-asphalt and 5 tons chloride of lime to Hennebont, 9 tons zinc ashes to Havre from Newport.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

September 24 to 29 (inclusive).

Charcoal. Bloxam, A. G. (*Akt.-Ges. für Anilin-Fabrikation*). 23,965.
Working Quartz. British Thomson-Houston Co., Ltd. (*General Electric Co.*). 23,956.
Purifying or Softening Water. Crosfield & Sons, Ltd., J.; Hilditch, T. P.; and Wheaton, H. J. 23,838.
Arseno-benzene Derivatives. Farbwerke vorm. Meister, Lucius, and Brüning. 24,306.
Diaminodiaryldialkylmethanes. Farbwerke vorm. Meister, Lucius, and Brüning. 24,307.
Cement. Girouard, Sir E. P. C. 24,222.
Compound for Detection, Oxidation, or Combustion of Inflammable Gases. Gumbley, J. P. 24,228.
Refining Metals. Harris, H. 24,029.
Dyeings on Fibre. Johnson, J. Y. (*Badische Anilin- and Soda-Fabrik*). 24,121.
Sulphur Furnace. Metallbank-und Metallurgische Ges. 24,023.
Effecting Transfer of Heat Between Liquids and Gases. Miller, T. F. 24,149.
Synthetic Ammonia. Norsk Hydro-Elektrisk Kvælstofaktieselskab. 23,950.
Sterilising Organic Substances. Quain, J. R. 23,921.
Filters. Shaw, H. S. Hele-. 23,936.
Closure of Cylinders for Compressed Gases. Soc. Anon. d'Applications des Gaz Liquéfiés. 24,077.
Kneading and Crushing Machines. Thomson, Ltd., D. 23,821.
Acid Phosphate Salts Soluble in Water. Williams, J. G. 24,166.

COMPLETE SPECIFICATIONS ACCEPTED.

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1922.

Alloys of Molybdenum. Norske Molybdenprodukter Aktieselskabet. 8,013. **177,516**
Evaporators. Morison, D. B. 8,632. **204,075**
Washing-agents. Bloxam, A. G. (*Akt.-Ges. für Anilin Fabrikation*). 9,994. **204,077**
Paints. Trevor, S. R.; and Moosman, J. E. 16,270. **204,093**
New Dyestuffs Containing Sulphur. Ransford, R. B. (*Cassella and Co. Ges., L.*). 16,927. **204,108**
Dyeing of Cellulose Acetates. Clavel, Dr. R. 20,713. **204,179**
Aluminium Alloy. Geyer, A. 23,429. **190,996**
Separation of One or More Constituents of Liquid Mixtures. British Cellulose and Chemical Manufacturing Co., Ltd.; and Bader, W. 24,128. **204,196**
Lead Arsenate. McDougall, I.; and Howles, F. 27,828. **204,223**
Fermentation Chambers, Silos, or the Like. Krantz, F.; and Krantz, Dr. H. 31,159. **189,128**
New Vat Colouring Matters. Johnson, J. Y. (*Badische Anilin and Soda Fabrik*). 32,423. **204,241**
Vat Colouring Matters. Johnson, J. Y. (*Badische Anilin and Soda Fabrik*). 34,370. **204,249**

1923.

Alkylation and Aralkylation of Carbazol. National Aniline and Chem. Co., Inc. 1,091. **192,376**
Gas-cleaning Apparatus. Andersen, N. M. 7,678. **204,274**
Blasting Detonators. Eschbach, W. 8,701. **204,277**
New Azo Dyes. Farbenfabriken vorm. F. Bayer and Co. 9,161. **195,649**
Dyeing Cellulose Esters. Johnson, J. Y. (*Badische Anilin and Soda Fabrik*). 9,324. **204,280**
Benzaldehyde and Benzoic Acid. Carbide and Carbon Chemicals Corporation. 11,110. **197,319**
Manufacture from Cyanamide of Fertilisers Containing Soluble Organic Nitrogen. Soc. d'Etudes Chimiques pour l'Industrie. 12,686. **197,690**
Chromates and Bichromates. Jouve, A. J. B.; Helbronner, A.; and Soc. Hydro-Electrique and Metallurgique du Palais. 22,625. **203,709** and **204,290**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Liquid Air or Liquid Oxygen Explosives. De Wendel et Cie, les Petits Fils de F. 21,682. **204,312**
Granulating Slag. Gelsenkirchener Bergwerks-Akt.-Ges. Abteilung Schalke, and Opderbeck, E. 22,746. **204,318**
Working up Copper Cellulose Sludge. Vereinigte Glanzstoff-Fabriken Akt.-Ges. 23,240. **204,322**
Substances from Boron and Carbon. Hartstoff-Metall Akt.-Ges. (Hametag). 23,567. **204,337**

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ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Facilitating Chemical Reactions. J. W. Spensley and Chemical Engineering Company (Manchester), Ltd., Manchester. British Patent, **201,968,** of 1922.

Chemical reactions that are usually brought about only by long heating, agitation, or both, are effected rapidly and at lower temperature by intimately mixing the interacting substances, with or without others, by passing them through a high-speed centrifugal pin disc mill of the horizontal disc type, in which a continuous stream of the substances is introduced at the centre and the mixture is discharged substantially all round the circumference. The mill preferred is that described in Specification 186,462. Examples are given of the production of hard soap, soft soap, dry soap powder, resin size, lubricants, disinfectants, caustic soda, and vulcanising compositions and accelerators for the vulcanisation of rubber, and the purification of edible oils by the removal of free fatty acids. Reference has been directed by the Comptroller to Specification 186,462.

Filtering Media. H. Bechold, Frankfurt-on-Main, Germany. British Patent, **202,143,** of 1922.

In order to secure a sterile filtrate, materials such as diatomaceous earth, cellulose, clay, sand, gravel, and coke, used for filtering water, fruit juices, serum, toxins, and other liquids, are impregnated with metals having a lower solution tension than hydrogen or compounds of such metals which are not readily soluble. In the case of metals, two are used together, and the metals are of higher solution tension than platinum or one is of higher solution tension than platinum and the other of lower solution tension than silver. Suitable substances include copper, copper oxide, copper ferrocyanide, copper carbonate, silver, silver oxide, silver sulphocyanate, silver chloride, silver chromate, mercury, mercuric oxide, mercurous chloride, bismuth, bismuth trioxide and pentoxide, arsenic, antimony, and antimony oxide. Amalgams or alloys may be used. The impregnating materials may be deposited in the filtering mass by chemical action therein, or introduced in a gaseous state. Auxiliary substances which will serve to maintain a uniform distribution of the active material may be used. In one example, filtering-material is impregnated with silver chloride by first introducing gaseous ammonium chloride and then a solution of silver nitrate. In a second example, the filtering material is treated successively with solution of tannin or albumen, mercuric chloride, and caustic soda, the material being thus impregnated with mercury or mercuric oxide. In a third example, filtering material is impregnated with copper by treating it with a solution of copper sulphate mixed with cane sugar or dextrin, and then drying and heating.

Purifying Gases. J. G. Taplay, London; and W. L. Galbraith, Westminster. British Patent, **202,024,** of 1922.

Gases are freed from hydrocyanic acid with the production of ammonium sulphocyanide by treating the gas in the presence of sulphuretted hydrogen, ammonia, and water with calcium, barium, or strontium bicarbonate. The gas, which must be free from tar, may be passed through a solution of the bicarbonate, such as calcium bicarbonate, or may be brought into contact with the solid carbonate in presence of water and carbon dioxide, which, if not already present, are added to the gas. The ammonium sulphocyanide is washed off the surface of the solid carbonate from time to time—*e.g.*, by a spray of water.

Bituminous Emulsions. H. A. Mackay, London. British Patent, **202,021,** of 1922.

Aqueous emulsions of bitumen of the kind artificially prepared from petroleum (*e.g.*, Mexican asphalt), are prepared by melting the bitumen and adding thereto, with agitation, first about 2½-5 per cent. of a higher fatty acid, and then a dilute (1-2 per cent.) solution of potassium or sodium hydroxide or carbonate at a temperature of 215-225° F., the heating and agitation being maintained until emulsification takes place. Preferably the agitation is continued during cooling. Unsaturated acids, such as oleic acid or the acids from linseed oil or marine oil, may be used. The emulsions may be used for coating or impregnating stone, wood, metal, felt, and other materials, or as a binding-agent in road-making. Specifications 28178/10, 202,230, and 202,231 are referred to.

Lignone Sulphonic Acids. C. F. Cross, London; and A. Engelstad, Vardol, Norway. British Patent, **202,016,** of 1922.

Wood and like lignified materials are resolved by treatment at 100-110° C. with a strong aqueous solution of sulphurous acid substantially free from sulphuric acid. In an example, wood prepared as for the bisulphite process is treated with six times its weight of a seven per cent. solution of sulphurous acid purified from sulphuric acid. The mass is heated with open steam for six hours; then steam at a temperature of 105-110° C. is employed for a further ten hours to complete the resolution. The liquor containing the lignone derivatives may be evaporated to dryness, preferably under reduced pressure, or prepared in concentrated form for transport. These derivatives are stated to be different from those contained in sulphite-cellulose liquor.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Catalytic Materials. C. Urfer, Geneva. British Patent, **199,027.** Convention date, June 12, 1922.

A metal, its hydride or nitride, is obtained in a finely divided state by first preparing the amalgam of the metal and then heating it *in vacuo*, hydrogen or nitrogen respectively. The metals specifically referred to are alkaline earth metals, lithium, chromium, manganese and cerium. The powdered products serve as catalytic materials, particularly for the synthesis of ammonia, in which case it is stated that the synthesis can be effected without the use of pressure or at low pressures and at relatively low temperatures. According to the example, chromium amalgam is prepared by electrolysis and then distilled either *in vacuo* to obtain powdered chromium or in nitrogen to obtain the nitride.

Soaps. T. Legradi, Vienna (Assignee of I. Wieninger, Munich, Germany.) British Patent, **202,263.** Convention date, August 8.

Dehydrated hard soaps are obtained by prolonged heating of the entire mass obtained when fat is saponified with caustic liquor in presence of excess of fat or of unsaponifiable organic or mineral fat-like matter. Suitable matters specified are paraffin oil, vaseline, wool-fat, fats and fatty acids such as stearine, oleine from wool fat, waxes such as beeswax, and paraffin, ceresin, montan, or japan wax. Hard soaps of large resin or potash content may thus be obtained. In an example, 40kilos. of hard fat soap made from hardened train or fish oil, 40kilos. of palm-kernel oil fatty acids, 20kilos. of paraffin wax, and the necessary caustic potash liquor of 50 per cent strength are heated with stirring until no more water vapour escapes. The mass is then moulded and compressed.

Active Charcoal. Farbwerke vorm. Meister, Lucius and Brüning, Hoechst-on-Main, Germany. British Patent, **200,889.** Convention date, July 15, 1922.

Active charcoal is obtained by heating, in presence of an acid of phosphorus, carbonaceous material such as wood, turf, straw, brown coal, or a mixture of these materials, in a revolving furnace, internally heated by combustion gases. The entry of air or excess of oxygen into the combustion gases may be permitted; the presence of oxygen in the gases leaving the furnace is advantageous.

Active Charcoal. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. British Patent, **201,163.** Convention date, July 22, 1922.

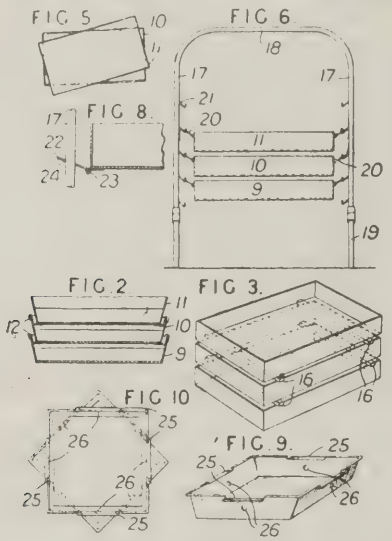
Active charcoal, of a practical hardness and not too voluminous, is made from peat or lignite by mixing it with finely divided wood and carbonising, with or without impregnation by a chemical reagent. In an example peat is ground and mixed with sawdust and the mixture soaked with a solution of phosphoric acid. It is then compressed in moulds and carbonised, for instance, in a revolving kiln.

Aldehyde Motor-spirit Mixtures. H. Terrisse, Geneva. British Patent, **202,264.** Convention date, August 12.

Motor spirit is obtained by adding acetal, paraldehyde, or both, with or without acetaldehyde, to alcohol, to refined petroleum alone or with petrol, to the 80-340° C. fraction distilled from tar from coal, schiste, lignite, peat, or wood, or to other hydrocarbons. Examples include the use of 60 parts of alcohol or petroleum with 40 parts of paraldehyde, and of 65vols. of coal-tar distillate with 20vols. of paraldehyde, 13vols. of acetal, and 2vols. of acetaldehyde

Sulphur Burning. Texas Gulf Sulphur Company, Inc., Manhattan, New York, U.S.A. (Assignees of W. H. Kobbé, Manhattan, New York, U.S.A.) British Patent, **202,283.** Convention date, August 8, 1922.

The burning of sulphur, particularly sulphur containing organic impurities such as oil, is effected by distributing the sulphur in superposed layers near enough for the heat of combustion of one layer to be largely transmitted to an adjacent layer or layers. The apparatus described comprises superposed trays or receptacles, which are suitably spaced apart and may be arranged in a furnace structure or in a casing, or may be used unenclosed, as for fumigating. Trays 9, 10, 11, Fig. 2, may be stacked by means of hooks



12 supported upon the edges of the lower trays, or by rods 16, Fig. 3, or by handles 20 engaging hooks 21 upon a frame 17, 18, 19, Fig. 6, or by sheet-metal gripping members 22, Fig. 8, which are hinged at 23 to the trays and have holes 24 somewhat larger than the frame side 17, so as to grip the frame while being readily adjustable and allowing the trays to be placed in contact if it is desired to extinguish the combustion. Or the trays may be stacked upon one another in staggered angular relation, as shown in Fig. 5, in which case the sides may be cut away as at 25, Fig. 9, to allow of secure stacking as shown in Fig. 10. In such a case the sides are provided with holes 26, which allow of feeding the whole stack from the uppermost tray, the molten sulphur flowing through the holes 26 to the lower trays in succession.

Vulcanising Indiarubber. Naugatuck Chemical Company, Naugatuck, Connecticut, U.S.A. (Assignees of S. M. Cadwell, Leonia, New Jersey, and O. H. Smith, New York.) British Patent, **200,789.** Convention date, July 13, 1922.

In the process for accelerated vulcanisation which consists in incorporating with indiarubber, etc., or with latex a metal in combination, an amine, a material comprising sulphur, and a material comprising carbon disulphide or oxysulphide, one or more of the ingredients is or are introduced into the rubber by diffusion, either in liquid or gaseous state or in solution in an organic solvent such as benzol, carbon tetrachloride, gasoline, or chloroform. Sulphur may be used in the free state or in a compound from which it is transferred to the rubber under vulcanising conditions. For hot vulcanisation it may be replaced by certain nitro compounds. Suitable amines and derivatives of carbon disulphide and oxysulphide are those mentioned in Specification 177,493. Compounds containing more than one of the vulcanising ingredients may be used—*e.g.*, oxynormalbutylthiocarbonic acid disulphide (carbon disulphide and sulphur), tetramethylthiurammonosulphide (carbon disulphide and amine), and zinc butyl xanthogenate (zinc and carbon disulphide). The Specification contains several examples.

NEW COMPANIES.

Milton Proprietary, Ltd. — Capital £200,000., £1. shares (100,000 10 per cent. cumulative participating preference). Manufacturers of and dealers in chemicals and disinfectants, etc. Office: 125, Bunhill Row, London, E.C. 1.

Anglo-American Cattle Products Company, Ltd.—Private company. Capital £10,000. Cattle products merchants, dripping and edible fat manufacturers, etc. Office: 5, Castle Street, Liverpool

British Ferro-Silicate Tar Macadam and Concrete Company, Ltd.—Private company. Capital £5,000. Office: 5, Quay Parade, Swansea.

Edmund Martin, Ltd. — Private company. Capital £15,000. Manufacturers of and dealers in all kinds of animal lubricants, etc. Office: 167, Caledonian Road, London, N.

Geo. H. Brass and Co., Ltd.—Private company. Capital £2,000. Raw fat refiners, soap, oil, and size merchants, etc. Office: Acklam Street, Middlesbrough.

Jane Hambling, Ltd.—Private company. Capital £2,000. Manufacturing chemists. Office: 14, New Bond Street, London, W.

Japan All Producers, Ltd. — Private company. Capital £1,000. Manufacturers of and dealers in varnish at 34, Swinnow, Bramley, Leeds.

Lustrafil, Ltd. — Private company. Capital £30,000. Makers of artificial silk, etc. Office: Valley Mills, Nelson, Lancs.

Sotyr Institute, Ltd.—Private company. Capital £2,000. Manufacturers of and dealers in certain secret compounds and medicinal preparations. Office: 175, Northumberland Park, Tottenham, N. 17.

Spectrum, Ltd.—Private company. Capital £5,000., in 4,975 10 per cent. non-cumulative preference shares of £1. and 500 deferred preference of 1s. each. Manufacturers, importers, and exporters of and dealers in dyestuffs, etc. Office: 30, City Road, London, E.C.

T. H. Newsome and Co., Ltd.—Private company. Capital £15,000., £1. shares (6,000 6 per cent. cumulative preference). Grease manufacturers and oil merchants. Office: 34, Dewsbury Road, Leeds.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," October 13, 1888.)

Electrically Refined Sugar.—The report has been published of a meeting of the shareholders of the Electric Sugar Refining Company, held at Liverpool, to meet Mr. Roberts, on his return from a visit paid to America, in order to be present at demonstrations of actual work there. It will be seen from the report of the proceedings at these demonstrations that the spectators were only allowed to congregate on the lower floor, and witness there the delivery into barrels of sugar conveyed by spouts from an upper floor. They were not allowed to inspect the machinery nor any of the manufacturing processes whatever, so that although we see no reason to doubt that sugar really fell into barrels in their presence, there is absolutely no proof that this sugar was produced by any electrical process. It is stated that "when steam was turned on they heard the deep rumble of machinery on the two upper floors," and that this "deep rumble" was followed by a "shower," increasing to a "pouring volume," of sugar; but, even if this statement be true, we fail to discern that the "deep rumble of machinery" in a distant apartment proves the electrical refining of the sugar which fell. Indeed, to our minds, there is a smack of theatrical artificial thunder and unreality about the whole affair, and it would not be surprising if subsequent events prove commercial electrical refining to be a myth, only devised by some clever Yankee, to successfully extract gold from British purses.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals. — A few changes have taken place during the week in values, but generally the market keeps up well, despite the prolonged slowness of business. The position on the Continent tends to harden the spot position, in consequence of the uncertainty of supplies and the dearer rates now coming to hand from Germany. The German crisis does not, however, affect this market so much as the pharmaceutical section. One of the chief movements during the past week has been the continual fall in the price of spot formaldehyde, but this item is likely to be much steadier at the new rates. **Acetic Acid,** 80% technical, £47.; 80% pure, about £49.; 98% glacial, £60. in casks and £72. to £73. in glass demijohns, ex wharf London; the spot position is steadier after last week's slightly easier tone, and business has been satisfactory. **Acetone,** British Government specification about £125. per ton in drums; inquiry continues for spot supplies which are steady at the rates quoted. **Alum,** lump, in casks, £10. to £10. 10s. per ton; dealers continue to offer at these prices, but are not finding much business. **Arsenic,** Cornish, white powdered, on spot, about £60. to £61. per ton; foreign material offering at about level rates; inquiry has been good from America, but little business has been done so far in that direction. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. to 1s. 5½d. per lb.; dealers' quoted prices are a shade firmer this week, and some little business has been booked. **Bleaching Powder,** 35—37%, on spot, £10. to £10. 10s. per ton; offers from the Continent, f.o.b., are at about £9. per ton; there has been little moving of late. **Barium Chloride,** 98—100%, about £15. per ton; moderate business transacted at about this figure. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27. per ton; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers quote at these unchanged rates for home trade only; their prices for export vary according to destination; dealers are quoting under similar conditions for home trade at—commercial, granulated £23. 10s., and powdered at £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers' prices, for home trade only, packages free, carriage paid in Great Britain, are unchanged. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; dealers are offering at competitive prices. **Cream of Tartar,** 99—100%, about 88s. per cwt., less 2½%; this price is being fairly well maintained, and some little business has been done. **Citric Acid,** B.P., crystals, about 1s. 5d. per lb., less 5%; the spot market remains very dull and exceptionally weak; hardly any inquiry for stocks offering. **Epsom Salts,** commercial quality, about £4. 10s. per ton, in bags; dealers offering at this rate, with not much inquiry on hand. **Formaldehyde,** 40%, about £65. per ton; a further material reduction in spot prices is recorded, and the position is not very steady; business has been fair. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; dealers are offering at slightly easier prices, with not much business materialising. **Lead Acetate,** brown, about £41.; white, about £42. per ton; spot supplies appear to be short, and the position is firm, and may advance. **Litharge,** about £35. 10s. per ton; dealers continue to offer at about this figure, with occasional business being done. **Lithopone,** 30% Continental red seal, £22. 10s. to £23. per ton; this market is a little firmer this week at the improved rates quoted. **Ammonium Chloride,** grey galvanisers', £30. 10s. to £31. per ton; the spot position is steady and unchanged, with business limited. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers' prices are unchanged. **Oxalic Acid,** about 5¾d. to 6d. per lb.; the tone here is just a shade easier, with the market still quiet. **Carbonate of Potash,** 90—92%, £26. to £27.; 96—98%, about £29. per ton; dealers' prices remain about the same, with inquiry slow. **Chlorate of Potash,** crystals and granular, about 2¾d. per lb.; dealers' prices quoted; business very small. **Caustic Potash,** 88—92% solid, about £31. per ton; spot prices hold firm, although there has been little business doing; Continental position is also firm. **Permanganate of Potash,** commercial quality, about 9d. per lb.; dealers' prices are somewhat easier this week, with business dull. **Prussiate of Potash,** yellow, about 1s. per lb.; dealers are quoting very steadily at this price, but are not doing any good business. **Sulphate of Potash,** 90%, £11. per ton, ex ship; a reduction in price is notified. **Mercury,** about £10. per bottle of 75—76lb., net; the spot position keeps fairly steady at about this figure. **Red Lead,** imported, about £35. 10s. per ton; dealers are doing a fair business at about this figure. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £43.; fine white, £25. to £26. per ton; spot supplies are restricted, and, with the position on the Continent firmer, dealers' prices are fully maintained. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; export, about £5. 5s. per ton, f.o.b.; prices are steady, with good inquiry on the market. **Acetate of Soda,** about £24. to £24. 10s. per ton; some spot supplies are available, with prices steady and inquiry small. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers' prices show no change; business is only occasional and small. British makers' prices for home consumers on contract are at: 70—72%, £17. 17s. 6d.; and 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers' price, for home trade only, carriage paid in Great Britain, is unchanged. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in bags, carriage paid in Great Britain; British makers quoting at this figure for home trade only. **Bichromate of Soda,** home trade, about 4½d. per lb.; British makers' quotation is unchanged at this figure. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers quoting at these figures. **Hyposulphite of Soda,** pea crystals, about £14. to £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £9. per ton, in casks; dealers' prices are level on the week, with business slow. **Nitrate of Soda,** 96%, about £13. 5s. per ton, f.o.r. or f.o.b.; this market keeps steady at this rate. **Nitrite of Soda,** 100%, about £26. 10s. per ton; at this rate the market keeps quite steady. **Prussiate of Soda,** about 6d. per lb.; dealers continue to quote at this price, but business is not at all brisk. **Sodium Sulphide,** 60—62% solid, about £14.; ditto, broken, about £15. 5s. per ton, in drums; 60—65% concentrated, £14. per ton, in casks; dealers have been doing very little business here. **Sulphate of Copper,** £25. 5s. to £25. 10s. per ton; the market appears to be fairly easy and dull at these rates. **Tin Crystals,** about 1s. 4d. per lb.; no change to record. **Tartaric Acid,** B.P. crystals, on spot, 1s. 1½d. per lb., less 5%; supplies freely offered, with hardly any demand; the position is very weak. **White Lead,** imported, about £42. per ton; dealers are doing a limited business at unchanged prices. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers report no change in their quotations.

Pharmaceutical Chemicals.—Owing to a general stiffening of prices on the Continent, and to the uncertainty of further supplies from Germany, the spot position in many items is firmer this week. Business has been moderately good, but the volume continues rather limited. **Acetanilid,** crystals and powder, 1s. 9d. to 1s. 10d. per lb.; some spot holders have advanced their quoted rates; the market tends to move in this direction. **Acetyl-Salicylic Acid,** B.P., 3s. 1d. to 3s. 2d. per lb.; this market is firmer, with spot supplies limited; inquiry has been good. **Benzoic Acid,** B.P., 2s. 3d. to 2s. 6d. per lb.; inquiry remains small, with quoted rates unchanged.

Diethylbarbituric Acid, B.P. (barbitone), 17s. 6d. to 18s. per lb.; higher rates are being quoted on spot, but the demand is slow. **Salicylic Acid**, B.P., 2s. 3d. to 2s. 4d. per lb.; at these rates the position is very steady, with inquiry quite good. **Tannic Acid**, leviss, 3s. 3d. to 3s. 6d. per lb.; spot supplies are offered at about these prices, with not much business doing. **Amidopyrin**, about 14s. 3d. to 14s. 6d. per lb.; this market has remained dull, with no change in quoted values. **Ammonium Bromide**, about 6¾d. to 7d. per lb.; spot business has been slow, and prices are about the same. **Benzonaphthol**, about 5s. per lb., nominal; no business reported. **Betanaphthol**, resublimed, 1s. 10d. to 2s. per lb.; this market is dull, and rather weak. **Benzaldehyde 03**, about 3s. per lb.; quoted prices are steady on a quiet market. **Calcium Lactate**, 1s. 9d. per lb.; at this price the market is fully maintained, with moderate business about. **Chloral Hydrate**, duty paid, about 4s. per lb.; spot parcels are available at or just under this rate. **Creosote Carbonate**, about 8s. 3d. per lb.; there is no improvement in demand, and quoted rates are unaltered. **Creosote**, B.P., about 2s. 6d. per lb.; at this price the market is rather easy and dull. **Guaiacol Carbonate**, about 9s. 9d. to 10s. per lb.; spot prices have advanced, and the market is firm. **Hexamine**, 3s. 11d. to 4s. per lb.; spot quotations are much firmer this week, owing to scarcity of offers and higher rates from the Continent. **Hydroquinone**, about 3s. 6d. per lb.; there is not much inquiry on spot, and dealers' prices are rather unsteady. **Methyl Salicylate**, 2s. 8½d. to 2s. 9d. per lb.; a further advance in prices quoted by spot holders is recorded, with the market firm. **Methyl Sulphonal**, about 15s. per lb.; there is still but little inquiry for this material, with prices on spot unaltered. **Paraformaldehyde**, 3s. 6d. to 3s. 9d. per lb.; the market is somewhat firmer this week. **Paraldehyde**, 1s. 5d. to 1s. 6d. per lb.; these rates are better maintained, owing to advances on the Continent. **Phenacetin**, 6s. 2d. to 6s. 3d. per lb.; dealers are quoting at about these levels, but something in the way of an advance is looked for. **Phenazone**, 7s. 6d. to 7s. 9d. per lb.; spot rates have hardened during the week, and may go still higher. **Phenolphthalein**, 6s. 6d. to 6s. 9d. per lb.; this market holds quite steady. **Potassium Bromide**, B.P., crystals and granular, 6¼d. to 6½d. per lb.; at these rates the spot position is fairly steady, but business is still slow. **Potassium Permanganate**, B.P., about 9½d. per lb.; at this price the spot market holds up well, and fair business is being done. **Potassium Sulphoguaiacolate**, about 5s. 6d. per lb.; quoted rates show no change, with inquiry poor. **Resorcin**, 5s. 6d. to 5s. 9d. per lb.; there are some little signs of a firmer tone here. **Sodium Bromide**, B.P., crystals and granular, 7¼d. to 8d. per lb.; dealers are offering at about these prices, but there is not much doing. **Sodium Salicylate**, powder, about 2s. 6d. per lb.; crystals, about 2s. 8d. per lb.; higher prices are being asked by dealers; Continental offers are scarce and dearer. **Sulphonal**, about 14s. 6d. per lb.; hardly any inquiry about, and quoted rates are unchanged **Terpin Hydrate**, about 1s. 9d. per lb.; spot values show no change, and market steady. **Thymol**, about 15s. per lb.; business remains dull, with prices quoted unaltered.

Coal-tar Products, Intermediates, Etc. — Pitch continues to harden in price, and is becoming more active. Other products show no material change, and the demand generally has been on the small and slow side. **Aniline Oil**, about 9d. to 9¼d. per lb., drums free; the position is level on the week, with the market slow. **Aniline Salt**, 9½d. to 10d. per lb., casks free; inquiry is poor, and quoted rates are unchanged. **Betanaphthol**, 1s. 1d. to 1s. 2d. per lb.; dealers are doing just a few small orders at about these figures. **Benzol**, about 1s. 3¾d. to 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; the market is decidedly dull, and prices are not firm. **Toluol**, 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; quoted rates show no change on the week, with business dull. **Xylol**, pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; this market shows little life, and quoted rates are unaltered. **Naphtha**, about 1s. 4d. per gallon; at the price quoted the position is weak, with business dull. **Solvent Naphtha**, 90/160, 1s. 3d. per gallon, drums extra; inquiry remains poor, with no further reduction in price recorded. **Heavy Solvent Naphtha**, 90/190, 1s. 3d. per gallon, drums extra; the market remains flat, with prices rather easy. **Burning Oils**, crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; quoted rates show no change on the week. **Special Oil**, for Diesels and motors, 10d. per gallon, barrels free; quotations are at the old level, with business quiet. **Creosote Oil**, about 9½d. per gallon, f.o.b.; dealers seem rather unsteady at about this rate when quoting for the little business on the market. **Carbolic Acid**, crystals, about 1s. 2d. per lb., f.o.b.; the position keeps firm at this level. **Naphthalene**, about £19. 10s. to £20. per ton; the spot position is a little improved this week, with offers from the Continent advancing; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants**, 3s. 9d. per gallon, barrels free; dealers continue to quote at this old rate. **Pyridine**, about 21s. per gallon; with spot supplies short, the tone keeps firm at this high rate. **Hexamethylene**, about 3s. 9d. per gallon; a further slight advance is recorded in importers' quoted rates; business has been slow, but there has been a fair volume of inquiry. **Pure Methyl Alcohol**, about £90. per ton, in drums, ex wharf London; dealers' prices are steadily maintained in this region, with occasional business passing. **Pitch**, about 137s. 6d. per ton, f.o.b. East Coast; during the week inquiry and business in forward positions has been quite active, and prices have steadily appreciated, finishing the week quite firm, and showing every tendency to further advances.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £59. 17s. 6d. to £60., cash; £60. 12s. 6d. to £60. 15s., three months; electrolytic, £63. 10s. to £64. 10s. **Tin**: Standard, £203. 5s. to £203. 10s., cash; £199. 10s. to £200., three months; Straits, £204. 10s.; English, £204. 5s. **Lead**, soft foreign, £26. 7s. 6d., prompt; English, £27. 10s.; chemical sheet, 36s. 6d. per cwt. for 2-ton lots, delivered. **Spelter**, prompt, £32. 5s.; hard, £26. 10s. **Antimony**, English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34. 10s. to £35. **Aluminium**, 98—99%, £115.; foreign, £100., c.i.f. **Nickel**, £130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 5s. **Bismuth**, 10s. **Platinum**, 500s. per oz. **Wolfram**, spot, 12s. 3d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

Business generally has been rather dull again during the past week, but values as a whole are unaltered. For alkali products current quotations are steady at recent rates, and makers fairly well engaged with orders. **Bleaching Powder** is dull at £11. 5s., soft woods, on rails works. **Glauber's Salt** lower at 70s. per ton, carriage paid. **Saltcake**, steady at £4. 10s., carriage paid, but inquiry is only small. **Chlorates** are easy at 3d. for **Potash** and 2¾d. for **Soda**. **Bichromates** are unchanged. American rock **Sulphur**, firm at £5. 5s. on rails. **Copper Sulphate** slow of sale, and price nominal at £25. 10s. to £26., f.o.b. **Phosphate of Soda**, easy at £15.; **Commercial Hyposulphite of Soda**, £9. 10s.; and **Concentrated Sulphide**, £14. per ton; **Nitrite**, firm at £26. 10s., ex store. White powdered **Arsenic**, steady at £61., on rails Cornish works. **Yellow Prussiate** is quiet at 1s. to 1s. 0½d. per lb.; **Soda**, 5½d. to 5¾d. per lb. **Carbonate of Potash**, 88—90%, is lower at £24.; but solid **Caustic**, 88—90%, maintained at £29., ex store. Grey and brown **Acetate of Lime** continue scarce, and values high. **Acetic Acid** and **Acetate of Soda** are firm in sympathy. **Acetone**, dull at £126. Miscible **Wood Naphtha**, 6s. 3d. per gallon. **Barium Chloride**, quiet at £15. per ton. **Lead Salts** are firm: White **Acetate** £41., brown £45.; **Nitrate**, £42, delivered. **Formaldehyde**, 40%, £65. per ton. **Formic Acid**, 85%, £51. per ton, ex store. **Oxalic Acid**, in small request at 5¾d. per lb. **Permanganate of Potash**, B.P., 9½d. per lb.

SWANSEA MARKET REPORT. Wednesday.

Tinplate prices continued on the fixed basis of £1. 3s. 1½d. per standard box, with business more active. **Galvanised Sheets** remained firm at £19. 2s. 6d. per ton, f.o.b. **Copper** in less inquiry and on the easy side, with prompt at £61. 12s. 6d. per ton, and three months £62. 2s. 6d. **Tin** not so active, with irregular quotations; for prompt £204. 12s. 6d. per ton, and three months £202. 12s. 6d. **Lead** rather firm on good offers at £26. 3s. 9d. per ton prompt, and

£25. 17s. 6d. forward for soft; English, £27. 15s. **Spelter,** rather easier tendency, with consuming demand not strong; prompt £32. 12s. 6d. per ton, and forward £32. 15s. **Zinc Sheets,** £39. 7s. 6d. per ton, f.o.r. at makers' works. **Sulphate of Ammonia** firm at late quotations. **Sulphate of Copper,** dull at £26. 2s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda,** steady at 13s. 6d. per cwt. **Bone Meal,** steady at £9. 2s. 6d. per ton for prompt Indian. **Pitch** prices were easier at £5. 18s. 6d. per ton for best qualities, at docks. **Oxalic Acid,** rather dull at 6¼d. per lb. on rail. **Arsenic** quiet, with easier quotations at £62. 2s. 6d. per ton for white powdered. **Copperas,** inactive at £2. 2s. 6d. per ton, including delivery London or equal. **Sulphuric Acid,** in fair demand at unchanged rates. **Benzol,** 1s. 4d. per gallon at works. **Linseed Oil** firm: raw £2. 6s. 9d., and boiled £2. 8s. 9d. per cwt. **Cottonseed Oil** in good demand, with common edible at £2. 3s. 3d., and deodorised £2. 6s. 3d. per cwt. **Coconut Oil** very steady, with Ceylon at £2. 4s. 9d. per cwt. **Olive Oil** quiet; Spanish, prompt, £66. 17s. 6d. per ton. **Turpentine** dearer; American, prompt, £3. 16s. 9d. per cwt. **Palm Oil** quietly steady; Lagos, £36. 10s. 6d., softs £36. 5s. 3d., mediums £36. 10s. 6d., and hards £37. **Coals** in better supply, and for immediate clearance concessions were offered: Best Admiralty smokeless £1. 7s. 6d., seconds £1. 6s. 6d.; ordinaries, £1. 5s. 6d. per ton, all f.o.b. **Anthracite,** fairly active: Best large £2. 7s. 6d., seconds £1. 17s. 6d.; Paris nuts, £3. per ton, all f.o.b. **Patent Fuel** was quiet, and is firmly held from £1. 9s. to £1. 12s. per ton, f.o.b. **Cokes** in strong demand, and firm; export, £2. 2s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Business in the heavier chemicals continues steady, with a very fair movement in the home-trade branch; in the export branch orders have come to hand more freely, and shipments have been on a larger scale. **Bleaching Powder** has been in fair demand; the price for use in the United Kingdom is £10. 5s. to £10. 7s. 6d. per ton, and for export £11. 5s. to £11. 7s. 6d. per ton. **Chloride of Calcium** has been steadily called for, and is £5. 12s. 6d. per ton. **Caustic Soda** has again been in good request for use by the home trade, and has had a more active shipment for foreign ports; it is £19. to £20. per ton for 76%, carriage paid in the U.K. **Bicarbonate of Soda** continues in very fair demand for use by the home trade, and is £10. 10s. per ton, carriage paid, for such use; shipments on foreign account have been more active. **Soda Crystals** have been in rather good request for use in the U.K., and are £5. 5s. per ton, carriage paid, for the home trade. **Nitrate of Soda** has had a very limited inquiry for home-trade use, and is £13. 5s. to £13. 10s. per ton. **Borax** has been in very fair demand; commercial crystals are £25. per ton, and powdered £26.; higher grade crystals are £29. per ton, and powdered £30.; superfine is £31. per ton, in 2cwt. bags, carriage paid in the U.K. **Saltcake** has again had a fairly free sale, and is £4. 10s. to £5. per ton for home-trade use, and £5. to £6. per ton for export. **Bichromate of Soda** has had a fair and steady sale, and is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has sold with some freedom for use in the U.K., and has been shipped very freely for foreign ports; it is £7. 10s. per ton for the home trade, in bags, f.o.r. at works; and £8. per ton for export, this price varying somewhat according to destination. **Hyposulphite of Soda** has had a very fair inquiry; it is £10. to £11. per ton, in 2cwt. bags, for commercial, and £15. to £17. per ton for the photographic quality, in 1cwt. kegs. **Sulphide of Soda** has been in moderate demand; solid is £14. 10s. to £15. per ton, and crystals £8. 15s. to £9. per ton. **Chlorate of Soda** has been quiet, and is 3d. to 3¼d. per lb. **Phosphate of Soda** has been neglected, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been but little called for, and is 6½d. per lb. **Yellow Prussiate of Potash** has been in quietly steady demand, and is 1s. 1d. per lb. **Red Prussiate** has been rather more in request, and is 3s. per lb. **Carbonate of Potash** has moved but slowly, and is £29. to £30. per ton. **Nitrate of Potash** continues to sell steadily, and is £29. to £30. per ton. **Chlorate of Potash** has had a small sale, and is 3½d. to 4d. per lb. **Caustic Potash** has had a fair inquiry, and is £29. to £30. per ton. **Permanganate of Potash** continues to sell rather freely and is 9½d. to 9⅝d. per lb. **Bichromate of Potash** has again been in very fair request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been more in demand; first quality is £60. per ton, and second quality £57. per ton. **Sulphate of Ammonia** has been but little in demand for home-trade use, but has had a heavy shipment to foreign ports; neutral of 25¾% is £14. 12s. 6d. per ton, and ordinary of 25¼% £13. 9s. 6d. per ton for home-trade use, for October deliveries; for November, 2s. 6d. per ton more than the prices given is quoted. **Carbonate of Ammonia** has been in rather good request, and is 4d. per lb. **Muriate of Ammonia** has had a moderate inquiry; grey is £32. per ton. **Magnesia** has sold with some freedom: **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has had a very limited sale; it is £12. per ton for use in the U.K., and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been rather more in request, and is £8. to £10. 10s. per ton, according to quality. **Sulphur** has had a steady and very fair inquiry; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s., and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has had a rather slow sale, and is 1s. 2d. to 1s. 2½d. per lb. **Cream of Tartar** has had a very fair inquiry; it is £4. 10s. per cwt. **Boric Acid** has been steadily called for; commercial is £48. per ton, and powdered £51. per ton; B.P. grades are £54. to £60. per ton. **Citric Acid** has moved but slowly, and is 1s. 6d. to 1s. 7d. per lb. **Oxalic Acid** has been quieter, and is 6d. per lb. **White Acetate of Lead** has been but little in demand, and is £42. to £42. 10s. per ton. **Sulphate of Copper** has had a moderate inquiry for use in the U.K., but has been very quiet in the export branch of the trade; it is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been rather more in request, with a somewhat lower price; from £60. to £62. per ton is now being quoted for white powdered.

WEST OF SCOTLAND CHEMICALS. Wednesday.

Inquiry during the week has continued fair, and the home trade is, if anything, a shade better. Export inquiry, however, is small and of a limited character. Prices are steady, with arsenic reduced to a level at which some business has been done. Barium chloride is also easier. Lead acetate, brown, is in better inquiry, and the spot price has moved up slightly. Quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, lower at £66. 10s. per ton on spot; a steady market. **Barium Chloride,** £14. 10s. per ton; at this reduced price the market remains steady. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, makers' prices; demand rather poor. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted at slightly below this reduced figure. **Citric Acid,** 1s. 6d. per lb., less 5%; little business about at last week's quotation. **Copper Sulphate,** £27. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar,** £4. 3s. 6d. per cwt. for 99% at Glasgow; quotation shaded, but inquiry small. **Lead Acetate,** white £41. 10s. per ton on spot; brown, more inquiry at £43. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this lower figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** lower at 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. 2d. per lb.; at this price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £60. and £57. per ton respectively; crystals £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 12s. per cwt., net; a better market, with quotation unaltered. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate,** £9. 15s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; rather easier in tone, and inclined to be dull. **Tartaric Acid,** 1s. 2d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending October 6.

BARYTES—
Antwerp, 250 bgs.
Bremen, 10 cks.

BORAX—
Wilmington, 700 bgs.

BORON MINERAL—
Wilmington, 414 bgs.

CARBON BLACK—
Gothenburg, 10 cks.

CASEIN—
Nantes, 50 bgs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 288 pkgs.

CHROME ORE—
Beira, 1,000 t.

CREAM OF TARTAR—
Bordeaux, 124 brls.

GELATINE—
Bremen, 5 cs.

GLUE—
Antwerp, 22 bls.

MANGANESE ORE—
Colombo, 5,000 t.

PARAFFIN WAX—
Philadelphia, 150 brls.

SALT—
Bremen, 920 bgs.; Hamburg, qty.

SILICON METAL—
Baltimore, 48 kgs.

SOAP—
Antwerp, 2 cs.
Philadelphia, 14 brls.

SODIUM ACETATE—
Antwerp, 36 cks.

SODIUM SULPHIDE—
Antwerp, 39 drms.

TANNING MATERIALS—
Myrabolans
Calcutta, 578 pkts.
Wattle
Mombasa, 1,098 bgs.

WHITE LEAD—
Bremen, 21 cks.

ZINC OXIDE—
Antwerp, 20 brls.

GOOLE.

Week ending October 6.

BARYTES—
Antwerp, 100 bgs.

CALCIUM CARBIDE—
Antwerp, 50 drms.

DEXTRINE—
Amsterdam, 50 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Ghent, 1 can.

FERRO CHROME—
Dunkirk, 35 cks.

HYDROGEN PEROXIDE—
Ghent, 160 crbys.

MAGNESITE—
Hamburg, 93 bgs.

PYRITES (IRON)—
Huelva, 1,050 t.

SOAP—
Boulogne, 8 cs.

GRANGEMOUTH.

Week ending October 6.

ACETIC ACID—
Rotterdam, 5 cks.

CALCIUM CARBIDE—
Norway, 3,800 drms.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 2 brls.

FERRO SILICON—
Norway, 146 cks.

LITHOPONE—
Rotterdam, 60 cks.

POTASH—
Hamburg, 62 drms.

TALLOW—
Norway, 260 brls.

ZINC OXIDE—
Antwerp and Ghent, 80 brls.

GRIMSBY.

Week ending October 6.

CALCIUM CARBIDE—
Rotterdam, 200 drms.

CHEMICALS (*otherwise undescribed*)
Rotterdam, 66 drms.

KAINIT—
Antwerp, 50 t.

LITHOPONE—
Rotterdam, 3,524 pkgs.

MAGNESITE—
Hamburg, 10 cks.

SALT—
Ostend, 200 brls.

HULL.

OFFICIAL AMENDMENTS.

Deduct—

From return for week ending Sept. 30.

STEARINE—
Copenhagen, 1 t. 10 c.

TALLOW—
Buenos Ayres, 12 t. 11 c.

From return for week ending Sept. 23.

TANNING MATERIALS—
Sumac
Valencia, 1 t.

TAR (WOOD)—
Gothenburg, 2 t. 1 c.

Week ending October 6.

CAUSTIC POTASH—
Christiania, 82 t. 10 c.
Hamburg, 45 t.

CHEMICALS (*otherwise undescribed*)
Bremen, 19 c.
Hamburg, £150. and 5 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 920 lb.
Rotterdam, 344 lb., £300.

FERRO CHROME—
Antwerp, 16 t.; Trondhjem, 60 t.

FERRO SILICON—
Gothenburg, 33 t.

IRON OXIDE—
Malaga, 320 t.

PARAFFIN WAX—
Newport, 60 t.

ROSIN—
Bordeaux, 10 t.

SALT—
Hamburg, 136 t.

SOAP—
Ghent, 20 t.; Hamburg, 6 c.

STEARINE—
Antwerp, 3 t.; Hamburg, 2 t.

TALLOW—
Christiania, 22 t.

TANNING MATERIALS—
Valonia
Smyrna, 75 t.

TURPENTINE—
Abo, 10 c.

LEITH.

Week ending October 6.

ACETIC ACID—
Rotterdam, 1 ck.

BARYTES—
Hamburg, 34 cks., 50 dble. bgs.

BASIC SLAG—
Antwerp, 1,500 bgs.

CALCIUM CARBIDE—
Amsterdam, 500 drms.
Rotterdam, 150 drms.

CARBON (DECOLOURISING)—
Amsterdam, 20 bgs.

CREAM OF TARTAR—
Rotterdam, 36 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 31 cks.

GELATINE—
Antwerp, 3 cs.; Bremen, 6 cs.

GLUE—
Hamburg, 100 bgs.

LITHOPONE—
Amsterdam, 40 cks.
Rotterdam, 20 cks.

MINERAL COLOURS (*otherwise described*)—
Amsterdam, 1 ck.

POTASH—
Hamburg, 9 drms.

SALTPETRE—
Rotterdam, 10 cs.

SOAP—
Copenhagen, 24 cs.
Rotterdam, 5 cs.

LIVERPOOL.

Week ending October 6.

ACETIC ACID—
France, 12 cks.
Holland, 5 cks.

ALBUMEN—
China, 12 cs.

ARSENIC—
Australia, 14 cks.
U.S.A., 100 cs., 91 brls.

BARYTES—
Germany, £196 and 70 bgs., 32 cks.

BORATE OF LIME—
Argentine, 297 bgs.
U.S.A., 550 sks.

CARBON BISULPHIDE—
Germany, 45 cs.

CARBON BLACK—
U.S.A., 5 cs.

CARNAUBA WAX—
Brazil, 72 bgs.

CAUSTIC POTASH—
Germany, £665. and 154 drms.

CERAMIC COLOURS—
U.S.A., £93.

COAL TAR PRODUCTS—
Naphthalene
Germany, 60 cs.

CREAM OF TARTAR—
France, 90 kgs.

CRYOLITE—
Denmark, 150 bgs.

DEXTRINE—
Holland, 20 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
France, £203.

DYESTUFFS (NATURAL)—
Cutch
Straits, 100 bxs.
Fustic
France, 23 cks.
Hematine
U.S.A., 25 brls.
Logwood
France, 44 cks.
Quercitron
U.S.A., 85 brls., 100 bxs.
Unspecified
France, 8 cks.

FORMALDEHYDE—
Finland, 71 crbys.
Germany, 65 cks.

GELATINE—
Austria, 20 bgs.
Belgium, £173.

GLUE—
France, 52 bgs.

IRON OXIDE—
Germany, 8 cks.
Spain, 122 brls., 180 bgs.

KIESELGUHR—
Germany, 15 t.
U.S.A., 19 t. 9 c., and 5 brls.

LITHOPONE—
Germany, £200.

MAGNESIUM SULPHATE—
Belgium, 596 bgs.

MANGANESE ORE—
India, 2,500 t.; Japan, 18 t.

METHYL ALCOHOL—
U.S.A., 40 drms.

MINERAL COLOURS (*otherwise described*)—
Germany, 8 cks.

OCHRE—
Spain, 35 brls.

PARAFFIN SCALE—
U.S.A., 837 brls.

PARAFFIN WAX—
Burmah, 400 bgs.
U.S.A., 102 bgs., 217 brls.

PHOSPHATE OF LIME—
Belgium, 500 bgs.

PHOSPHATE ROCK—
U.S.A., 3,157 t.

PITCH (MINERAL)—
U.S.A., 600 brls.

PLUMBAGO—
Germany, 25 brls.

POTASSIUM CARBONATE—
Germany, 41 brls.

RED LEAD—
Italy, 32 brls.

ROSIN—
U.S.A., 4,428 brls.

SALTPETRE—
Germany, 100 kgs., 10 bgs.
Holland, 100 kgs., 5 bgs., 40 cks.

SOAP—
Holland, £90.; U.S.A., £1,089.

SODIUM BICHROMATE—
U.S.A., 34 cks.

SODIUM CHLORATE—
Spain, 20 brls.

SODIUM CYANIDE—
Canada, 672 drms.

SODIUM NITRATE—
Chil, 11,502 bgs.

SODIUM PHOSPHATE—
Belgium, 13 cks.

SODIUM PRUSSIATE—
Italy, 53 brls.

STEARINE—
Denmark, 290 cs.
Germany, £24. and 68 bgs.

SULPHUR—
Italy, 500 bgs.

TALLOW—
Argentine, 110 pkgs.
Australia, 110 cks.

TANNING MATERIALS—
Chestnut
Argentine, 100 cks.; France, 100 cks.; Italy, 25 cks.; U.S.A., 6 brls.
Gambier
Straits, 301 cs.
Myrabolans
India, 8,000 pkts., 563 bgs.
Oak
France, 100 cks.
Quebracho
Argentine, 2,016 bgs.
Valonia
Smyrna, 64 bgs.
Wattle
South Africa, 955 bgs.

TAR (ARCHANGEL)
Russia, 100 brls.

TAR (WOOD)—
Danzig, 105 brls.

TIN ORE—
Bolivia, 585 t.; Portugal, 11 t.; French West Africa, 11 t.; West Africa, 37 t. 10 c.

TURPENTINE—
U.S.A., 1,850 brls.

ULTRAMARINE—
France, 4 cks.

WHITE LEAD—
Germany, £88.; Holland, 1 ck.; Italy, 17 brls., 19 cks.

ZINC ASHES—
U.S.A., 520 bgs., 114 t. 19 c.

ZINC DUST—
U.S.A., 40 t.

ZINC OXIDE—
Belgium, 40 cks.
Holland, 38 cks., 25 cs.

ZINC SULPHATE—
Germany, £61.

ZINC WHITE—
Holland, 44 cks.

LONDON.

Week ending October 6.

ACETONE—
Germany, 7 c.
,, 1 t. 9 c. V. Blagden
Italy, 10 t. McGregor, Gow & Holland

ACETYL SALICYLIC ACID—*
£411.

* Entered under the Safeguarding of Industries Act.

ALBUMEN—
Belgium, £480.
,, £2,260. Baxter Hoare
China, £42,273.
,, £1,560. W. M. Smith
,, £7,810. Baxter Hoare
,, £17,208. C. Goldrei Foucard
,, £23,000. W. R. Loxley
,, £150 Fellows, Morton & Clayton
,, £135. R. Warner
,, £2,567. McDougall & Bonthron
France, £600. Baxter Hoare

ALUMINA—
Sweden, 20 pkgs.

ALUMINIUM HYDRATE—
Germany, 2 cks.

ARGOLS—
France, 986 pkgs.
Spain, 581
,, 304

ARSENIOUS ACID—
Japan, 200 pkgs. W. & S. Bowditch
Queensland, 38

BARYTES—
Belgium, 130 bgs. Felton & Crepin
Germany, 150 bgs. G. Elliott
,, 36 brls. ,,
,, 37 cks. Beck & Pollitzer
,, 110 H. W. Winter
,, { 175 bgs. W.
{ 72 cks. Harrison
,, 34 Burrell
,, 21 Dexters

BEESWAX—
Anglo-Egypt.
Sudan, 11 bgs.
Austria, 10
Belgium, 2 cs.
Fr. Somaliland, 2

BORATE OF LIME—
Chile, 100 t. Borax Consd.

CALCIUM CARBIDE—
Belgium, 1 t.
Czecho-Slovak. 41
Norway, 11
S.C.S. State, 14 10 c.

CARBON BLACK—
Belgium, 10 cks.
,, 90 brls.
U.S.A., 150 cks.
,, { 300 cs. Binney
{ 200 cks. Smith
,, 35 cs. H. W. Peabody

CARNAUBA WAX—
Brazil, 82 bgs.

CASEIN—
Argent. Rep., £8. R. Warner
,, £2,820.
,, £816 Rennacid Casein
France, £225.
,, £3,160. Guesdon
,, £1,635. Brit. Xylonite
,, £764. E. G. Boize

CHEMICALS (*otherwise undescribed*)
A. Turkey, £61.
France, £2,455 Burton Baker
Germany, £192.
,, £86. J. Schnurmann
,, £16. Johnson
,, £96 Ronsheim & Moore
,, £36. S. Pitt
Sweden, £24.
U.S.A., £10. Reandean
,, £52. Martins
,, £24. Davies Turner

CHEMICALS (*otherwise undes.*)—*
——— £2,407.

COAL TAR PRODUCTS—
Anthracene
Switzerland, £155.
Naphthalene
Belgium, £30. Jessop
Tar
Holland, 12 brls. P. W. Kallman
Unspecified
Germany, £5.
,, £5. Gerhard & Hey
U.S.A., £147.

CREAM OF TARTAR—
France, 40 pkgs.

DEXTRINE—
Germany, 6 t. 9 c.
Holland, 15 J. Braithwaite
,, 14 15 K. J. Mulder
,, 10 B. E. Burgoyne
,, 19 c. Rubeck, Thew

DIAMINOPHENOL—*
——— £138.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Czecho-Slovakia, £8. J. Janssen
France, £30. E. A. Kimpton
Germany, £37.
,, £63. Greeff
Switzerland, 1 pkg.

DYESTUFFS (NATURAL)—
Annatto
Java, 12 pkgs. Lavington
Cutch
Burmah, 250 pkgs.
Brit. N. Borneo, 100 pkgs. Hoare Wilson
Indigo
Brit. India, 10 chts. Parsons & Keith

FERTILISERS (*otherwise undes.*)—
Belgium, 250 t.
Brit. India, 11 Ralli
Denmark 13 Hollinghurst
France, 39 C. Page
Germany, 27 Coupe Friend
Sweden, 30
Uruguay 96

FORMALDEHYDE—
Germany, 50 pkgs. Zimmermann
U.S.A., 129 brls. Greeff

FUSEL OIL—
Austria, 1 ck. Honeywill
Czecho-Slovakia, 6 drms. ,,
Spain, 6 H. W. Allen

GELATINE—
Belgium, £1,942. Duche
Germany, £180. Crowe
,, £23. Ryley
,, £321. H. W. Winter
,, £144. A. C. Berens
,, £115.
,, £21. W. A. J. Tilleray
,, £1,228. H. W. Winter
,, £26. Williams & Geils
Holland, £126. F. Badham
Uruguay, £90. McCall

GLUE—
Belgium, £208.
,, £168. Cazaly, Mills
,, £120. P. Ingenlath
,, £300. O. Murray
,, £403. P. Ingenlath
France, £16. Crowe
,, £5. Ch. Vairon
,, £97. C. W. Hartrodt
,, £44. Rubeck Thew
,, £242.
,, £25. Van Oppen
,, £33. Union Glue & Gel.
,, £55. O. Murray
,, £92. A. J. Malicet
Germany, £25. H. Keller
Holland, £299. P. Ingenlath
,, £36.
,, £135. Burton Smart & Orford
U.S.A., £48. H. C. Hackney

GLYCERINE—
Holland, £288.
U.S.A., £195. Armour

IODINE—
Chile, £70,500.

ISINGLASS—
Brit. Guiana, 3 cks.
Brit. India, 30 cs.
Burmah, 8
France, 1 bl. W. M. Smith
Japan, 15 ,,
,, 15
Straits Setts., 2 cs.
,, 11 E. Boustead

KETONE—
Germany, £636 V. Blagden

LITHOPONE—
Holland, 280 cks. F. T. H. Nye

MAGNESITE—
Holland, £100. Ray
,, £141.

MAGNESIUM OXIDE—
Germany, £363.

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slovakia, 16 cks. E. W. Taylor
France, 68 Symons
Germany, 8 brls. Scheukers
,, 1 H. E. Becker
Spain, 24 S. Bramwell
,, 60 Ramon Aguye
,, 100 pkgs. Leach
,, 20 brls. C. S. Lovell

MONTAN WAX—
Germany, 100 bgs. Holroyds Oil & Cer.

OCHRE—
France, 129 brls. W. Harrison
,, 33 cks. S. Bramwell
,, 6 Felton & Crepin
Spain, 20 brls. Ramon Aguye

OZOKERITE—
Germany, 200 bgs. Holroyds Oil & Cer.

PARAFFIN WAX—
Holland, 1 t.
U.S.A., 22 to 16 c. Prices Pat. Candle
,, 67 14 Forwood & Sellar
,, 13 10 F. Chiesman

PHOSPHATE (*otherwise undes.*)—
Holland, 5 t. W. H. Muller

PITCH (*otherwise undescribed*)—
France, 50 brls. G. Elliott

PLUMBAGO—
Ceylon, 379 cks. H. Johnson
France, 23 bgs. Symons
Germany, 13 brls. R. Baker
Japan, 750 cks.

POTASH ALUM—
Belgium, 2 t. 1 c.
Germany, 42 pkgs.

POTASSIUM CARBONATE—
Europ. Turk., 158 pkgs. Centrosojus
Germany, 4 cks.
,, 62 Stephens
,, 6 Petri

POTASSIUM CHLORATE—
France, 20 pkgs. O. Murray

POTASSIUM NITRATE—
Belgium, 19 cks. Brit. & For. Metal & Chem.
Brit. India, 499 pkgs. G. & H. Green
Germany, 6 t. Burton Baker

POTASSIUM SULPHATE—
France, 1,260 pkgs. J. Harrison

PRUSSIAN BLUE—
Holland, 8 cks. Stancourt & Muir
,, 10
Saar, 11 Stephens
,, 6 H. Keller

ROSIN—
Portugal, 78 cks. Co-op. Wholesale
,, 40 Grindley
U.S.A., 1,250 brls. Rosin & Turp. Imp.
,, 200 Lowden Connell
,, 500 Fox Stockell

SALT—
Germany, 42 t. G. J. Kanaar
,, 15 Morris
Spain, 20 H. J. Enthoven

SHELLAC—
Brit. India, 3 t. 13 c. Litchfield & Saundy
Straits Setts., 3 t ,,

SOAP—
Austria, £610.
Belgium, £37.
Denmark, £268.
,, £37. Beck & Pollitzer
U.S.A., £600. L. F. Smith
,, £929. H. P. Hackney
Victoria, £1,800. L. F. Smith

SOAP—
France, £30. Beresford
,, £80. E. G. Francois
,, £129.
,, £258. J. E. Maeder
,, £7. Weigel, Leygonie
Germany, £29.
,, £1. A. Potter
,, £63. T. Meadows
,, £19. L. Duforest
,, £5. E. Friedlander
Italy, £90.

SODIUM HYPOSULPHITE—
France, 5 t.

SODIUM NITRATE—
Chile, 8 t.

STEARINE—
Belgium, 1 bg. H. H. Poole

TALLOW—
Argent. Rep., 29 t. 10 c. H. Bevan
Belgium, 6 brls. A. E. Garnham
Norway, 12 12 Nickoll & Knight
N.S.W., 5 pps.
N.Z., 11 t. 7 c. H. Hill
,, 2 6 Goad Rigg
,, 21 5 Weber Smith & Hoare
,, 200 9
Victoria, 8 5

TANNING MATERIALS—
Sumac
Italy, 450 pkgs. Fisher King
Unspecified
France, 5 pkgs. Pronk Davis & Rushby

TAR (*otherwise undescribed*)—
Norway, 1 brl. C. S. Lovell
Russia, 200 Thornett & Fehr

TARTARIC ACID—
Holland, 20 pkgs.

THORIUM NITRATE—*
——— £480.

TITANIUM WHITE—
Norway, 1 cs. Greeff

TURPENTINE—
U.S.A., 200 brls. Bowring Jones & Tidy

WHITE LEAD—
Italy, 78 cks. C. S. Lovell

ZINC OXIDE—
Belgium, 40 cks. Brit. & For. Metal & Chem.
,, 120 brls. M. Ashby
Holland, 60 F. T. H. Nye

MANCHESTER.

Week ending October 6.

ACETIC ACID—
Montreal, 713 brls., 51 crts.
Rotterdam, 60 cks.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 10 cks.

BORIC ACID—
Leghorn, 160 brls.

CALCIUM CARBIDE—
Fredriksstad, 190 drms.
Gothenburg, 1,100 drms.

CARBON BLACK—
New Orleans, 1,140 cs.

CAUSTIC POTASH—
Hamburg, 136 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 4 cks.
Antwerp, 18 cks., 198 bgs.

CITRIC ACID—
Marseilles, 50 cks.

COAL TAR PRODUCTS—
Naphthalene
Antwerp, 20 bgs.

CREAM OF TARTAR—
Hamburg, 48 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Amsterdam, 115 cks.
Rotterdam, 5 cks.
Rouen, 1 ck.

DYESTUFFS (NATURAL)—
Unspecified
Philadelphia, 190 bxs.

* Entered under the Safeguarding of Industries Act.

FERRO PHOSPHORUS
Hamburg, 21 cks.

FERRO SILICON—
Drammen, 183 brls.
Hamburg, 54 cks.

FERTILISER (*otherwise undescribed*)
Antwerp, 690 bgs.

FORMALDEHYDE—
Hamburg, 50 crts.

GLUCOSE—
New York, 75 brls.

GLUE—
Amsterdam, 25 bgs.
Rotterdam, 70 pkgs.

LEAD ACETATE—
Hamburg, 39 cks.

LITHOPONE—
Hamburg, 60 cks.
Rotterdam, 48 cks.

MAGNESITE—
Amsterdam, 200 bgs.

MAGNESIUM CHLORIDE
Hamburg, 1,123 cks., 89 drms.

MAGNESIUM SULPHATE—
Rotterdam, 450 bgs.

PARAFFIN SCALE—
New York, 171 brls.

PARAFFIN WAX—
Philadelphia, 250 brls.

PHOSPHORUS—
Montreal, 94 drms., 400 cs.

POTASSIUM NITRATE—
Antwerp, 14 cks.

PYRITES—
Pomaron, 680 t.

RED LEAD—
Genoa, 17 cks.

SALT—
Hamburg, 531 bgs.

SALTPETRE—
Hamburg, 10 bgs.

SILICON CARBIDE—
New York, 8 kgs.

SOAP—
Marseilles, 263 cs.
New Orleans, 100 brls.

SODIUM HYDROSULPHITE—
Amsterdam, 10 cks.

SODIUM NITRITE—
Hamburg, 50 brls.

SODIUM SULPHATE—
Hamburg, 100 bgs.

STEARINE—
Antwerp, 13 bgs.

SULPHUR—
Catania, 454 bgs.

SULPHUR OIL—
Leghorn, 60 brls.

SUPERPHOSPHATE OF LIME—
Hamburg, 6 cks.

SUPERPHOSPHATES—
New York, 522 brls.

TALLOW—
Fredriksstad, 660 brls.

TANNING MATERIALS—
Sumac
Palermo, 250 bgs.
Unspecified
New York, 20 brls.

TARTARIC ACID—
Genoa, 20 kgs.

TIN OXIDE—
Hamburg, 10 cks.

ULTRAMARINE BLUE—
Ghent, 14 brls.

WAX (*otherwise undescribed*)—
Boston, 5 brls.
Hamburg, 40 bgs.
New York, 95 brls.
Philadelphia, 269 brls.

WHITE LEAD—
Antwerp, 2 cs.
Rotterdam, 55 cks.

ZINC DUST—
Antwerp, 274 cks.

ZINC OXIDE—
Antwerp, 60 cks.
Rotterdam, 3 cks.

NEWCASTLE-ON-TYNE

Week ending October 6.

CALCIUM CARBIDE—
Christiania, 510 drms.
Rotterdam, 440 drms.

COPPER PRECIPITATE—
Huelva, 14 t.

PYRITES (IRON)—
Huelva, 3,800 tons.

RED LEAD—
Antwerp, 35 cks.

SALTPETRE—
Rotterdam, 10 cks.

SODIUM HYPOSULPHITE—
Antwerp, 50 bgs.

STEARINE—
Gothenburg, 7 bgs.

WHITE LEAD—
Rotterdam, 4 cks.

N. & S. SHIELDS.

Week ending October 6.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending October 6.

ALUMINIUM HYDRATE—
Pasages, 10 t.

CARBON BLACK—
Melbourne, £41.

CAUSTIC SODA—
Calcutta, 20 drms.

CHEMICALS (*otherwise undescribed*)
Alleppey, 179 pkgs.; Antwerp, 92 pkgs.; Bergen, 3 pkgs.; Bordeaux, 7 pkgs.; Bombay, 16 pkgs.; Calcutta, 139 pkgs.; Genoa, 21 pkgs.; Mauritius, 2,503 pkgs.; Melbourne, 530 pkgs.; Monte Video, 65 pkgs.; Montreal, 170 pkgs.; Natal, 405 pkgs.; Rangoon, 50 pkgs.; Sydney, 236 pkgs.

COAL TAR PRODUCTS—
Creosote Oil
Natal, 503 galls.
Pitch
Rochefort, £6,008.
Tar
Calicut, £1.; Helsingfors, £1,063. Karachi, 18 t. 1 c.; Mauritius, 10 t.; Natal, 1 t. 5 c.; New York, £106.; Rangoon, 12 t. 9 c.

PARAFFIN WAX—
Genoa, 14 t. 7 c.; Helsingfors, £216.; Leghorn, 30 t.; Natal, 10 c.; Newcastle, £950 and 50 t.

SHEEP DIP—
Buenos Ayres, £650.; St. Kitts, 12 c.; St. Lucia, 4 c.

SOAP—
Antwerp, 2 t. 4 c.; Montreal, 19 c.; Calcutta, 1 t. 2 c.; Natal, 5 c.

SODIUM BICHROMATE—
Melbourne, 5 t. 4 c.

SODIUM PHOSPHATE—
Mauritius, 5 t. 3 c.; Natal, 10 c.

SUPERPHOSPHATES—
Mauritius, 16 t.

TANNING MATERIALS—
Unspecified
Melbourne, £159.; Sydney, £79.

WOOD PRESERVATIVE—
Rangoon, 1 t. 13 c.

GRANGEMOUTH.

Week ending October 6.

PARAFFIN WAX—
Bordeaux, 336 bgs.
Nantes, 80 bgs.

SODIUM BICHROMATE—
Bordeaux, 22 cks.; Nantes, 16 cks.

HULL.

Week ending October 2.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 1 cs., 50 drms.; Antwerp, 6 cs., 200 drms.; Copenhagen, 29 pkgs., 3 cks., 6 cs., 97 drms.; Genoa, 112 drms. Ghent, 5 cks.; Gothenburg, 6 cks., 1 cs., 23 drms.; Helsingfors, 11 bls.; Melbourne, 58 kgs., 83 cs., 60 drms.; Rotterdam, 25 cks., 13 cs., 6 drms.; Sydney, 9 brls., 23 pkgs.

COAL TAR PRODUCTS—
Benzol
Hango, 2 drms.
Pitch
Antwerp, 2 cs.; Ghent, 1 cs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Gothenburg, 2 cs., 6 cks.

FERRO SILICON—
Sydney, 241 cks.

GLUE—
Copenhagen, 20 bgs.
Riga, 20 bgs.

SALT—
Amsterdam, 120 cs.
Bergen, 350 sks.
Trondhjem, 350 sks.

SOAP—
Copenhagen, 2 cks.
Ghent, 10 cs.

STEARINE—
Gothenburg, 5 brls.

LEITH.

Week ending October 6.

AMMONIUM SULPHATE—
Valencia, 1,773 t.

PARAFFIN WAX—
Copenhagen, 25 cs.

POTASSIUM BICHROMATE—
Copenhagen, 5 cks.

ROSIN OIL—
Copenhagen, 2 brls.

SALT—
Seydisfjord, 20 bgs.

SHEEP DIP—
Seydisfjord, 59 drms.

SOAP—
Seydisfjord, 2 cs.

TALLOW—
Newfairwater, 18 cks.

TALLOW OIL—
Copenhagen, 50 brls.

LIVERPOOL.

Week ending October 4.

ACETIC ACID—
Amsterdam, 7 c., £18.

ALUM—
Havana, 1 t., £11.; Hamburg, 5 t., £110.; Norrkoping, 30 t., £600.

ALUMINIUM HYDRATE—
Barcelona, 2 t. 18 c., £88.

ALUMINIUM SULPHATE—
Bombay, 13 t., £129.
Calcutta, 45 t., £425.

AMMONIA—
Rio de Janeiro, 19 c., £20.

AMMONIUM CARBONATE—
Alexandria, 10 c., £15.; Bahia, 1 t. 4 c., £41.; Cape Town, 6 c., £10.; Christiania, 1 t., £32.; Genoa, 3 t. 4 c., £80.; Galveston, 1 t., £25.; Gothenburg, 1 t., £26.; Havana, 2 t., £65.; Hamburg, 1 t., £23.; Marseilles, 4 t., £112.; New York, 1 t. 10 c., £54.; Palermo, 2 c., £48.; Sundsvall, 1 t., £25.; Shanghai, 2 t. 10 c., £71.; Villagarcia, 1 t., £31.

AMMONIUM CHLORIDE—
Bilbao, 5 t. 1 c., £169.

AMMONIUM SULPHATE—
Naples, 20 t. 2 c., £313.
Teneriffe, 28 t., £407.

ANTIFOULING PAINT—
Bilbao, 1 t. 10 c., £158.; Calcutta, 1 t., £72.; Demerara, 10 c., £49.; Malta, 2 t. 10 c., £228.

BARIUM SULPHOCYANIDE—
Rio de Janeiro, 10 c., £58.

BLEACHING POWDER—
Algoa Bay, 1 t., £16.; Arica, 3 t., £36.; Calcutta, 13 t. 15 c., £162.; Christiania, 10 t. 1 c., £90.; Melbourne, 2 t. 10 c., £32.; Madras, 2 t., £24.; Montreal, 10 t. 12 c., £97.; Philadelphia, 7 t. 19 c., £210.; Singapore, 8 c., £14.

BOILER COMPOSITION—
Antwerp, 1 t. 7 c., £50.
Hong Kong, 12 c., £96.

BONE BLACK—
Las Palmas, 10 t. 5 c., £52.

BORAX—
Cartagena (S.A.), 6 c., £27.
Genoa, 14 t. 16 c., £375.
Madras, 3 t. 15 c., £100.
Piraeus, 10 c., £13. 10s.
Serbia, 10 c., £13.

BORIC ACID—
Calcutta, 2 c., £9.

CALCIUM CHLORIDE—
Melbourne, 10 t. 1 c., £60.
Pt. Said, 2 t. 1 c., £12.
Sydney, 20 t. 9 c., £124.

CHEMICALS (*otherwise undescribed*)
Adelaide, 3 t., £78.; Auckland, 9 t. 19 c., £163.; Alexandria, 2 t., £52.; Brisbane, 10 c., £13.; Bombay, 2 t. 10 c., £62.; Calcutta, 106 t. 7 c., £848.; Cape Town, 10 t., £83.; Genoa, 1 t., £107.; Hong Kong, 11 t. 10 c., £98.; Las Palmas, 8 t. 5 c., £22.; Lyttleton, 2 c., £18.; Melbourne, 3 t. 5 c., £84.; Puerto Alegre, 5 t., £50.; Puerto Colombo, 8 c., £10.; Rio Grande do Sul, 10 c., £12.; Santander, 2 t. 10 c., £63.; Seville, 10 c., £52.; Sydney, 2 t., £52.; Wellington, 2 t., £112.

CITRIC ACID—
Shanghai, 2 c., £14.
Sydney, 5 c., £38.

COAL TAR PRODUCTS—
Aniline Oil
Danzig, 2 t. 16 c., £248.
Carbolic Acid
Calcutta, 3 qr., £20.
Cape Town, 11 c., £16.
Hamburg, 50 t. 2 c., £6,107.
Riga, 10 t., £1,600.
Creosote
Calcutta, 5 c. 2 qr., £10.
Naphthalene
Lagos, 2 t., £31.
Pitch
Calcutta, 1 t. 19 c., £40.
New York, 5 t. 8 c., £75.
Tar
Christmas Island, 2 t., £28.; Lagos, 3 t. 5 c., £34.; La Guaira, 3 t. 4 c., £37.; Perim, 1 t. 9 c., £17.
Tar Oil
Calcutta, 2 t. 17 c., £86.

COBALT OXIDE—
Hankow, 9 c., £462.

COPPER SULPHATE—
Monte Video, 19 t. 14 c., £494.
Zanzibar, 2 c., £2 10s.

CREAM OF TARTAR—
Havana, 1 t. 10 c., £139.; Monrovia, 2 c., £13.; Perth, 2 t., £175.; Sydney, 3 t. 5 c., £338.

DISINFECTANTS (*otherwise undes.*)
Adelaide, 15 c., £42.
Calcutta' 2 t. 5 c., £36.
Lagos, 6 c. 2 qr., £24.
Montreal, 1 t. 2 c., £73.

DISINFECTANTS (*otherwise undes.*)
Mollendo, 9 c., £20.; Opobo, 11 c., £27.; Pt. Swettenham, 9 c., £25.; Pt. Sulan, 1 c., £10.; Rio de Janeiro, 9 t. 15 c., £464.; Wanganui, 5 t. 6 c., £329.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 6 t. 6 c., £590.
New York, 1 t., £128.
Indigo
Chefoo, 11 t. 18 c., £1,660.
Shanghai, 18 t. 16 c., £2,622.
Unspecified
Adelaide, 4 c., £86.; Auckland, 3 c., £13.; Algoa Bay, 2 c., £17.; Dunedin, 2 t. 15 c., £806.; Hong Kong, 9 c., £119.; Lyttleton, 3 c. 2 qr., £100.; Melbourne, 9 c., £122.; Madras, 16 c., £863.; Montreal, 2 t. 6 c. 2 qr., £486.; Manila, 1 c., £32.; New York, 9 c., £81.; Oporto, 4 c. 2 qr., £58.; Shanghai, 2 t. 13 c., £690.

DYESTUFFS (NATURAL)—
Cudbear
New York, 2 t. 4 c., £66.
Logwood
Rio de Janeiro, 1 t., £62.
Unspecified
Montreal, 1 t. 3 c., £43.

ESSENTIAL OILS (SYNTHETIC)—
Antwerp, 5 t. 5 c., £1,975.
Switzerland, 1 qr., £15.

FERTILISER (*otherwise undescribed*)
Havana, 86 t. 2 c., £768.

GLYCERINE—
Antofagasta, 10 c., £45.; Amsterdam, 7 c. 2 qr., £15.; Buenos Ayres, 10 c., £34.; Cape Town, 1 t., £84.; Christiania, 4 t. 16 c., £332.; Copenhagen, 2 qr., £9.; East London, 1 t., £89.; Hong Kong, 16 t. 18 c., £1,420.; Kobe, 50 t., £3,689.; Madrid, 9 t. 17 c., £743.; Madras, 64 t. 13 c., £4,685.; Rotterdam, 1 t. 18 c., £145.; Stockholm, 1 t. 19 c., £151.; Shanghai, 3 t., £268.

HYDROCHLORIC ACID—
Antofagasta, 10 c., £24.

IODOFORM—
Calabar, 22 lb., £30.

LACTIC ACID—
Melbourne, 3 t. 5 c., £145.

MAGNESIA (CALCINED)—
Buenos Ayres, 2 c., £15.

MAGNESIUM CARBONATE—
Rangoon, 5 c., £10.

MAGNESIUM SULPHATE—
Auckland, 2 t., £37.; Roma, 1 c., £1 10s.; Durban, 1 c., £1.; Lome, 2 c., £2. 10s.; Monrovia, 1 c., £1. 5 s.; Matadi, 2 c., £3.; St. Johns (N.F.), 2 qr., 10s.

MANGANESE SULPHATE—
Sydney, 10 c., £22.

POTASSIUM BICARBONATE—
Karachi, 10 c., £29.

POTASSIUM BICHROMATE—
Alexandria, 1 t. 16 c., £87.; Antwerp, 1 t. 2 c., £55.; Danzig, 10 t., £590.; Norrkoping, 19 c., £48.; Trieste, 6 t. 19 c., £335.

POTASSIUM IODIDE—
Opobo, 264 lb., £300.
Warri, 1 qr., £28.

POTASSIUM PRUSSIATE—
Buenos Ayres, 3 c. 2 qr., £27.
Kobe, 2 t., £467.
New York, 3 t. 1 c., £314.

SALAMMONIAC—
Marseilles, 6 c., £15.

SALTCAKE—
Christiania, 499 t. 17 c., £2,021.

SHEEP DIP—
Auckland, 2 t. 4 c., £125.; Buenos Ayres, 62 t. 2 c., £3,335.; Braila, 2 t. 10 c., £200.; Buenaventura, 16 c., £69,; Colon, 11 c., £51.; Durban, 2 t. 13 c., £231.; East London, 9 t. 7 c., £350.; Melbourne, 1 t. 2 c., £70.; Oamaru, 4 t. 6 c., £263.; Puerto Deseado, 6 t. 16 c., £262.; Rio Gallegos, 32 t. 7 c., £1,225.; Santa Cruz (Arg.), 14 t. 16 c., £874.; Timaru, 3 t. 7 c., £215.; Wellington, 12 t. 10 c., £459.

SILVER NITRATE—
Rosario, 1 qr., £35.

SODIUM HYDROSULPHITE—
Rio de Janeiro, 10 c., £112.

STANNOUS CHLORIDE—
Trinidad, 1 t. 10 c., £203.

SULPHURIC ACID—
Rosario, 4 t. 2 c., £133.

SUPERPHOSPHATE (BONE)—
Las Palmas, 12 t. 10 c., £84.
Teneriffe, 6 t., £38.

SUPERPHOSPHATE OF LIME—
Las Palmas, 15 t., £55.

TANNIC ACID—
Rio de Janeiro, 1 t. 5 c., £214.

TANNING MATERIALS—
Unspecified
Algoa Bay, 2 t. 17 c., £18.; Chriatiania, 7 t. 8 c., £114.; Durban, 1 t. 2 c., £20.; Rotterdam, 11 t., £131.; Sydney, 6 t. 3 c., £108.

TARTARIC ACID—
Adelaide, 4 t., £520.; Lyttleton, 10 c., £67.; Melbourne, 2 t., £255.; Madras, 4 c. 2 qr., £34.; New York, 1 t. 19 c., £244.; Sydney, 3 t. 15 c., £480.

TIN CRYSTALS—
Sydney, 4 c., £30.

VANADIC ACID—
Dunkirk, 16 c., £575.

WOOD PRESERVATIVE—
Singapore, 3 t., £82.

ZINC CHLORIDE—
Adelaide, 1 t. 5 c., £45.; Bombay, 8 t. 4 c., £203.; Melbourne, 3 t., £84.; Shanghai, 3 t. 1 c., £82.; Sydney, 1 t., £27.

ZINC OXIDE—
Colombo, 1 t. 7 c., £38.
Helsingfors, 1 t. 19 c., £91.
Puerto, Colombo, 11 c., £36.

Week ending October 5.

CAUSTIC SODA—
Adelaide, 136 drms.; Alexandria, 34 drms.; Algoa Bay, 37 drms.; Auckland, 82 drms.; Bahia, 15 drms.; Bari, 17 drms.; Beyrout, 20 drms.; Bombay, 200 drms.; Bourgas, 200 drms.; Bremen, 43 drms.; Brisbane, 12 drms.; Buenos Ayres, 450 drms., 130 pkgs.; Calicut, 22 drms.; Cabedello, 136 pkgs.; Calcutta, 40 drms.; Copenhagen, 50 drms.; Corral, 60 pkgs.; Desterro, 100 pkgs.; Dunedin, 110 drms.; Durban, 90 drms.; Hamburg, 281 drms.; Helsingfors, 373 drms.; Hong Kong, 84 drms.; Horsens, 14 drms.; Karachi, 100 drms.; Maceio, 41 drms.; Madras, 240 drms.; Montreal, 100 drms.; Melbourne, 112 drms.; Monte Video, 120 drms.; Nelson, 10 cs.; Oporto, 118 drms.; Pelotas, 300 cs.; Pernambuco, 235 drms.; Puerto Alegre, 1,000 drms.; Rio de Janeiro, 1,307 pkgs.; Rotterdam, 17 drms.; Rosario, 102 drms.; Shanghai, 317 drms.; Samarang, 317 drms.; Sekondi, 100 drms.; Stockholm, 36 drms.; Singapore, 150 drms.; Sydney, 121 drms.; Varna, 100 drms.; Volo, 60 drms.; Wellington, 29 cs.; Yokkaichi, 282 drms.

FERRO CARBON TITANIUM—
Antwerp, 24 cs.

FERRO MANGANESE—
Antwerp, 300 t.; Baltimore, 200 t.; Buenos Ayres, 30 t.; New Orleans, 284 t.; Singapore, 1 t.; Stockholm, 10 t.

FERRO VANADIUM—
Hamburg, 6 kgs.

GLUE, SIZE, AND GELATINE—
Allepey, 7 cks.; Batavia, 20 bgs.; Boston, 10 cks., 280 bgs.; Buenos Ayres, 40 pkgs.; Calcutta, 24 pkgs.; Colombo, 10 pkgs.; Durban, 15 pkgs.; East London, 50 pkgs.; Ferrol, 3 pkgs.; Habana, 30 pkgs.; Karachi, 10 pkgs.; Montreal, 8 c.; New York, 10 bxs.; Samarang, 20 bgs; Santiago de Cuba, 10 bgs.; Shanghai, 30 cks.

LEAD ORE—
Lagos, 15 c.

LITHOPONE—
Montreal, 2 t.; Rangoon, 2 cs.

MANGANESE ORE—
Baltimore, 318 t.

PARAFFIN WAX—
Barranquilla, 50 sks.

ROSIN OIL—
Singapore, 6 brls.

SALT—
Abonema, 40 t.; Accra, 9 t.; Antwerp, 200 t.; Amsterdam, 30 t.; Auckland, 30 t.; Belize, 22 t.; Brisbane, 1 t.; Duala, 25 t.; Durban, 20 t.; Ghent, 100 t.; Grand Lahou, 25 t.; Lagos, 295 t.; Helsingfors, 100 t.; Iddo, 900 t.; Lyttleton, 59 t.; Monte Video, 3 t.; Montreal, 395 t.; Melbourne, 25 t.; New York, 150 t.; Puerto Barrios, 25 t. 6 c.; Pt. Harcourt, 57 t.; Rio de Janeiro, 4 t.; Sekondi, 20 t.; Shanghai, 1 t.; Sierra Leone, 110 t.; Sourabaya, 4 t.; Stockholm, 800 t.; Sundsvall, 50 t.; Vejle, 10 t.; Wellington, 70 t.; Winnebah, 13 t.

SOAP—
Accra, 504 pkgs.; Alexandria, 486 pkgs.; Alicante, 5 pkgs.; Alleppey, 10 pkgs.; Antwerp, 50 pkgs.; Amboina, 35 pkgs.; Amsterdam, 120 pkgs.; Antigua, 19 pkgs.; Auckland, 349 pkgs.; Bangkok, 103 pkgs.; Barbados, 331 pkgs.; Barcelona, 4 pkgs.; Batavia, 100 cs.; Belize, 282 pkgs.; Beira, 315 pkgs.; Belawan, 135 pkgs.; Bombay, 3,769 pkgs.; Bermuda, 241 pkgs.; Bourgas, 20 pkgs.; Buenos Ayres, 210 pkgs.; Calcutta, 961 bxs.; Callao, 104 pkgs.; Calicut, 100 pkgs.; Cape Palmas, 27 pkgs.; Christchurch, 5 pkgs.; Cochin, 290 pkgs.; Colombo, 529 pkgs.; Colon, 344 pkgs.; Commodoro Rivadavia, 60 pkgs.; Corinto, 49 pkgs.; Curacao, 250 pkgs.; Durban, 119 pkgs.; Dunedin, 160 pkgs.; Grenada, 30 pkgs.; Gibraltar, 150 pkgs.; Hong Kong, 4 cs.; Hsin-Ho-Whauf, 35 pkgs.; Iddo, 210 bxs.; Invercargill, 160 bxs.; Iquitos, 1,621 bxs.; Karachi, 995 pkgs.; Kingston (Ja.), 667 bxs.; Kobe, 12 cs.; Lagos, 598 bxs.; Las Palmas, 539 bxs.; Langsa, 50 bxs.; Lho Seumaweb, 50 bxs.; Lome, 30 bxs.; Macassar, 505 pkgs.; Madras, 422 pkgs.; Malacca, 420 bxs.; Malta, 35 pkgs.; Mangalore, 4 bxs.; Menado, 565 bxs.; Matadi, 11 pkgs.; Mauritius, 3,705 pkgs.; Montego Bay, 30 pkgs.; Montserrat, 13 pkgs.; Melbourne, 1 cs.; Monrovia, 70 pkgs.; Mossamedes, 1 cs.; Nassau, 7 bxs.; Olehleh, 50 pkgs.; Padang, 155 pkgs.; Palembang, 3 cs.; Panama, 519 bxs.; Para, 5 cs.; Para (for Bolivia), 12 cs.; Penang, 105 cs.; Puerto Cortez, 2 cs.; Pt. Harcourt, 606 cs.; Pt. Louis, 20 cs.; Pt. Said, 156 pkgs.; Pt. Stanley, 1 cs.; Pt. Swettenham, 61 cs.; Punta Arenas, 3 cs.; Rangoon, 1,075 bxs., 1,953 cs.; Rio de Janeiro, 1 bx.; Rotterdam, 504 cs.; Sabang, 50 cs.; San Fernando, 261 bxs.; Shanghai, 1,532 pkgs.; Samarang, 250 cs.; Segli, 50 cs.; Sekondi, 7 cs.; Singapore, 3,402 pkgs.; Sierra Leone, 13 pkgs.; Sourabaya, 861 pkgs.; St. Johns (N.F.), 64 cs.; St. Kitts, 14 bxs.; St. Lucia, 39 bxs.; Sydney, 14 pkgs.; Tandjong Balei, 500 bxs.; Taihope, 15 pkgs.; Tampico, 1 pkg.; Teneriffe, 135 pkgs.; Timaru, 9 pkgs.; Trinidad, 1,464 pkgs.; Tientsin, 151 pkgs.; Vancouver, 5 pkgs.; Varna, 290 pkgs.; Vera Cruz, 2 pkgs.; Victoria (W.C.A.), 20 pkgs.; Wanganui, 160 pkgs.; Wellington, 10 pkgs.; Winnebah, 175 pkgs.

SODA ASH—
Algoa Bay, 209 pkgs.; Auckland, 38 pkgs., 100 bgs.; Batavia, 100 bgs.; Bluff, 55 kgs.

SODA ASH—
Blumenthal, 1,600 bgs.; Bolivia, 70 brls.; Bombay, 1,000 bgs.; Brisbane, 59 bgs.; Buenos Ayres, 166 pkgs.; Delagoa Bay, 500 pkgs.; Dunedin, 170 pkgs.; Durban, 500 bgs.; Gothenburg, 50 bgs.; Kingston (Ja.), 22 pkgs.; Kobe, 8,331 pkgs.; Melbourne, 236 pkgs., 59 bgs.; Moji, 4,004 bgs.; Monte Video, 250 cs., 50 pkgs.; Newcastle, 118 bgs.; Norrkoping, 50 pkgs.; Pelotas, 37 cks.; Rangoon, 2,000 pkgs.; Rio Grande do Sul, 20 cks.; Rio de Janeiro, 10 pkgs.; Rotterdam, 1,400 bgs.; Sekondi, 20 kgs. Shanghai, 6,832 bgs.; Stockholm, 250 bgs.; Suva, 20 cks.; Sydney, 488 cks., 477 bgs.; Vancouver, 100 pkgs.; Volo, 40 bgs.; Yokohama, 5,140 bgs.

SODA CRYSTALS—
Colombo, 100 pkgs.; Karachi, 50 pkgs.; Kingston (Ja.), 20 pkgs.; Pernambuco, 160 kgs.; Pt. Said, 51 pkgs.

SODIUM BICARBONATE—
Adelaide, 275 pkgs.; Auckland, 231 pkgs.; Bluff, 120 kgs., 27 pkgs.; Bombay, 1,600 pkgs.; Bourgas, 110 kgs.; Brisbane, 40 drms.; Calcutta, 1,850 pkgs.; Colombo, 320 pkgs.; Dunedin, 64 pkgs.; Durban, 50 pkgs.; Karachi, 800 pkgs.; Kobe, 646 pkgs.; Limassol, 60 kgs.; Launceston, 24 pkgs.; Lyttleton, 187 pkgs.; Melbourne, 40 pkgs., 7 kgs.; Norrkoping, 20 kgs.; Pernambuco, 75 pkgs.; Rio Grande do Sul, 20 pkgs.; Piraeus, 10 pkgs.; Puerto Barrios, 20 kgs.; Rangoon, 950 pkgs.; Shanghai, 493 pkgs.; Santos, 438 pkgs.; Stockholm, 20 kgs.; Sydney, 195 kgs., 134 pkgs.; Vera Cruz, 700 pkgs.; Wellington, 50 bgs.

SODIUM BISULPHITE—
Pt. Swettenham, 150 drms.
Singapore, 100 drms.

SODIUM FLUORIDE—
Sydney, 5 cks.

SODIUM HYDROSULPHITE—
Auckland, 40 kgs.
Sydney, 20 kgs.

SODIUM HYPOSULPHITE—
Lyttleton, 40 pkgs.

SODIUM SILICATE—
Adelaide, 103 pkgs.; Bombay, 13 pkgs.; Buenos Ayres, 54 drms.; Dunedin, 7 pkgs.; Fremantle, 57 pkgs.; Genoa, 250 pkgs.; Gothenburg, 17 pkgs.; Lyttleton, 32 pkgs.; Madras, 40 pkgs.; Melbourne, 581 pkgs.; Monte Video, 14 pkgs.; Rangoon, 15 pkgs.; Rio Grande do Sul, 12 drms.; Shanghai, 30 cs.; Sydney, 38 cks., 29 bgs.

SODIUM SULPHATE—
Monte Video, 3 cks.

SODIUM SULPHIDE—
Calicut, 50 drms.; Genoa, 88 drms.; Rio de Janeiro, 82 drms.; Sekondi, 103 drms.; Sydney, 41 drms.

STEARINE—
Helsingfors, 30 pkgs.

TALLOW—
Antwerp, 28 pkgs.; Danzig, 44 brls.; Helsingfors, 30 brls.; Rotterdam, 120 brls.; Singapore, 46 drms.

LONDON.

OFFICIAL AMENDMENT.

Deduct from Return for week ending June 27, 1923.

CARBONATE OF AMMONIA—
Kobe, 5 t., £154.

Week ending October 3.

ACETANILID—
Brisbane, 2 cs. (pt.), £7.

ACETIC ACID—
Adelaide, 2 cs., £6.; Beira, 18 cs., £31.; East London, 1 cs., £8.; Sekondi, 4 cs., £7.; Wellington, 5 cs., £18.

ACETONE—
Calcutta, 10 drms., £70.
Pt. Elizabeth (F.), 4 drms., £49.

ACETYL SALICYLIC ACID—
Brisbane, 2 cs. (pt.), £33.
Melbourne, 1 cs., £18.
Montreal, 3 cs. (pt.), £55.
Shanghai, 2 cs. (pt.), £8.

ALUM—
Pt. Elizabeth, 5 kgs., £5.

ALUMINIUM SULPHATE—
Jamaica, 8 kgs., £5.

AMMONIA—
Accra, 5 cs., £12.; Antwerp, 20 cks., £100.; Basra, 5 cs., £8.; Bermuda, 8 cs., £15.; Bombay, 8 cs., £14.; Calcutta, 12 cs., £43.; Cape Town, 9 cs., £16.; Colombo, 4 cs., £7.; Delagoa Bay, 3 cs., £5.; Demerara, 4 cs., £7.; Durban, 17 cs. (pt.), £33.; Gibraltar, 6 cs., £10.; Hong Kong, 4 cs., £10.; Karachi, 5 cs., £9.; Kilindini, 3 cs., £5.; Madras, 17 cs., £30.; Monte Video, 5 cs., £4.; Penang, 8 cs., £14.; Pt. Sudan, 3 cs., £6.

AMMONIA (ANHYDROUS)—
Iddo, 6 cylds., £285.; Santos, 3 cs., £31.; Sarawak, 1 cyld., £8.; Trinidad, 1 cyld., £7.

AMMONIUM BENZOATE—
Melbourne, 1 cs. (pt.), £36.

AMMONIUM BROMIDE—
Calcutta, 2 cks., £11.; East London (F.), 1 cs., £6.; Melbourne, 1 ck., £5.; Sydney, 1 ck., £7.

AMMONIUM CARBONATE—
Antwerp, 1 t., £33.; Bombay, 5 c., £23.; Calcutta, 3 c., £22.; Durban, 15 c., £27.; Hamburg, 1 t. £23.; Hong Kong, 10 c., £31.; Madras, 1 c., £6.; Melbourne, 1 t. 8 c., £46.; Paris, 2 t. 9 c., £71.; Pernambuco, 1 t., £40.; Pt. Elizabeth, 4 c., £8.; Santos, 3 c., £10.

AMMONIUM IODIDE—
Melbourne, 1 cs., £14.

AMMONIUM NITRATE—
Adelaide, 2 cs., £7.; Antwerp, 30 t., £780.; Bilbao, 25 t., £650.; Rouen, 20 t., £200.

AMMONIUM SULPHATE—
Amsterdam, 97 t. 5 c., £1,264.; Belewan Deli, 830 t., £12,243.; Cologne, 100 t., £1,425.; Demerara, 20 t., £293.; Jamaica, 102 t. 5 c., £1,475.; Kobe, 449 t. 14 c., £7,558.; Mauritius, 200 t., £3,400.

ANTIMONY SULPHIDE—
Brussels, 2 cks., £32.
Ghent, 4 cks., £44.
Kobe, 67 cks., £528.
New York, 7 cks., £138.
Santos, 25 cks., £33.

ARSENIC—
Colombo (F.), 3 drms., £28.
Santos, 120 drms., £533.

ARSENIC SULPHIDE—
New York, 10 kgs., £56.

ARSENIOUS ACID—
East London, 1 cs., £7.

BARIUM NITRATE—
Santos, 10 cks., £19.

BARIUM PEROXIDE—
Montreal, 21 drms., £373.

BARIUM SULPHATE—
Melbourne, 1 ck., £9.

BENZOIC ACID—
New York, 1 cs., £48.

BISMUTH—
Melbourne, 2 cs., £143.

BISMUTH CARBONATE—
Auckland, 1 cs. (pt.), £36.; Calcutta, 5 cs. (pt.), £20.; Durban, 3 cs. (pt.), £56.; New Plymouth, 1 cs., £13.; Santos, 1 cs. (pt.), £9.

BISMUTH SALTS (*otherwise undes.*)
Calcutaa, 1 cs., £50.

BISMUTH SUBNITRATE—
Calcutta, 5 cs. (pt.), 1 ck. (pt.), £25.
Melbourne, 1 cs., £60.

BISMUTH SUBNITRATE—
Santos, 1 cs. (pt.), £18.

BITUMEN—
Rangoon, 70 cks., £171.
Sydney, 18 cks., £40.

BLEACHING POWDER—
Singapore, 1 cs., £5.

BONE MEAL—
Beira, 4 t. 13 c., £47.
Channel Islands, 5 t., £40.

BORAX—
Buenos Ayres, 15 c., £20.; Durban, 3 c., £6.; Kolmar (F.), 1 t., £26.; Malmo (F.), 1 t., £26.; Shanghai, 3 c., £7.; Victoria (B.C.), 3 c., £8.

BORIC ACID—
Bangalore, 2 c., £5.; Calcutta, 10 c., £38.; Colombo, 2 c., £7.; East London, 3 c., £12.; Hankow, 2 c., £7.; Melbourne, 1 c., £11.; New Plymouth, 5 c., £14.; Panama, 1 c., £5.; Pt. Sudan, 2 c., £7.; Wellington, 4 c., £26.

BROMINE—
Melbourne, 1 cs., £12.

CADMIUM IODIDE—
Melbourne, 1 cs. (pt.), £6.

CALCIUM CARBIDE—
Bermuda, 1 t., £16.; Cape Town, 2 c., £6.; Channel Islands (F.). 10 c., £9.; Colombo (F.), 10 c., £8.; Iddo, 12 c., £49.; Madras, 7 c., £14.; Mombasa, 15 c., £25.

CALCIUM CHLORIDE—
Calcutta, 1 cs. (pt.), £14.
East London, 3 cs., £7.

CALCIUM ACETYL SALICYLATE
Melbourne, 1 cs. (pt.), £6.

CARBON BISULPHIDE—
Pt. Elizabeth, 3 cs., £8.
Pt. Said, 7 drms., £17.

CARBON TETRACHLORIDE—
Shanghai, 5 cks., £14.

CAUSTIC POTASH—
Melbourne (F.), 1 cs., £11.

CAUSTIC SODA—
Jamaica, 4 c., £7.
New Plymouth, 3 c., £6.
Timaru, 4 c., £6.

CHEMICALS (*otherwise undescribed*)
Adelaide, 3 pkgs. (pt.), £108.; Alicante, 40 pkgs., £100.; Amoy, 17 cs. (pt.), £16.; Antwerp, 8 pkgs., £27.; Switzerland (*via* Antwerp), 70 pkgs., £179.; Switzerland (*via* Antwerp) (F.), 35 pkgs., £103.; Auckland, 6 cs., £21.; Beira, 3 cs., £5.; Bombay, 5 pkgs. (F.), £13.; Bombay, 12 pkgs. (pt.), £26.; Brisbane, 13 pkgs., £228.; Calcutta, 22 pkgs. (pt.), £75.; Callao, 20 pkgs. £60.; Canterbury, 3 kgs., £15.; Cape Town (F.), 20 pkgs., £96.; Cape Town, 19 pkgs., £70.; Constanza, 348 pkgs., £600.; Dar-es-Salaam, 16 cs. (pt.), £5.; Demerara (F.), 2 pkgs., £7.; Demerara, 1 cs., £10.; Durban, 14 pkgs. (pt.), £38.; East London, 20 cs., £5.; Italy (*via* Ghent), 2 cs. (pt.), £18.; Gijon, 40 pkgs., £51.; Gothenburg, 50 pkgs. (F.), £240.; Hankow, 7 cs. (pt.), £9.; Iddo, 5 pkgs., £5.; Jamaica, 11 kgs., £7.; Kilindini, 11 cs., £34.; Madras, 10 cs. (pt.), £48.; Malta, 20 cs., £13.; Mauritius, 1 cs. (pt.), £19.; Melbourne, 89 pkgs. (pt.), £1,312.; Montreal, 6 cs. (pt.), £146.; Mossel Bay, 4 pkgs., £25.; New Plymouth (F.), 4 pkgs. (pt.), £6.; New Plymouth, 3 pkgs. (pt.), £8.; Ostend, 3 bgs., £20.; Panama, 3 cs., £8.; Penang (F.), 1 cs., £25.; Perth, 5 cs. (pt.), £9.; Pt. Elizabeth, 6 pkgs., £9.; Pt. Swettenham, 1 cs., £9.; Rangoon, 7 cs., £10.; Rockhampton, 50 pkgs., £77.; Salaverry, 10 pkgs., £30.; Santander, 1 cs., £8.; Santos, 6 pkgs. (pt.), £22.; Shanghai, 15 cs. (pt.), £273.; Singapore, 25 pkgs., £8.; Stockholm (F.), 10 pkgs., £50.; Sydney, 8 cs. (pt.), £357.; Vera Cruz, 100 cs., £355.; Wellington, 9 pkgs. (pt.), £46.; Winnipeg, 5 cs. (pt.), £22.; Zanzibar, 2 cs. (pt.), £15.

CHROME ALUM—
Hamburg, 80 kgs., £90.
Riga, 5 cks., £22.

CITRIC ACID—
Adelaide, 5 c., £42.; Auckland, 2 c., £17.; Barbados, 1 c., £8.; Bombay, 2 c., £21.; Brisbane, 2 t., £332.; Calcutta, 2 c., £26.; Cartagena, 5 c., £42.; Durban. 13 c., £111.; Fremantle, 10 c., £83.; Jamaica, 1 c., £8.; Melbourne, 1 t., £166.; Pt. Elizabeth, 2 c., £15.; Sourabaya, 1 c., £5.; Sydney, 2 t., £332.; Tarragona, 10 c., £83.

COAL TAR PRODUCTS—
Benzol
Pt. Elizabeth, 40 drms., £49.
Carbolic Acid
Cape Town, 1 cs. (pt.), £5.; Karachi, 1 cs., £6.; Santos, 1 ck., £6.; Sydney, 3 cks., £17.
Creosote
Adelaide, 200 drms., £164.; Amsterdam, 58 cks., £221.; Galveston (bulk), 320,836 galls., £13,668.
Naphtha
Cape Town, 20 drms., £31.
Naphthalene
Antwerp, 1,168 bgs., £1,430.
Santos, 2 cs., £6.
Pitch
Aviles, 1,500 t., £8,625.; Dunkirk, 277 t., £1,835.; France, 390 t., £2,535.; Pt. Sudan, 10 brls., £21.; Rochefort, 1,150 t., £7,315.
Pyridine
Cape Town, 20 drms., £94.
Tar
Dominica, 4 brls., £9.; Durban, 257 pkgs., £52.; East London, 290 drms., £34.; Pt. Elizabeth, 55 brls., £8.; St. Kitts, 6 brls., £20.

COBALT ACETATE—
Copenhagen, 2 cs., £50.
Paris (F.), 1 cs., £25.

COBALT OXIDE—
Genoa (F.), 3 cks., £473.; Paris, 11 cs., £810.; Sydney, 1 cs., £50.

COBALT SULPHATE—
Brussels (F.), 1 cs., £33.

COPPER SALTS (*otherwise undes.*)
Calcutta, 5 drms., £61.

COPPER SUBACETATE—
Melbourne (F.), 1 kg., £7.

COPPER SUBOXIDE—
Barcelona, 1 ck., £13.

COPPER SULPHATE—
Pt. Elizabeth, 11 c., £19.
Singapore, 1 t., £31.

CREAM OF TARTAR—
Adelaide, 3 t., £260.; Auckland, 1 t. 10 c., £130.; Brisbane, 1 t. 10 c., £130.; Cape Town, 5 c., £21.; Christiania, 12 c., £52.; Cologne, 1 c., £5.; Cristobal (F.), 1 c., £6.; Durban, 2 c., £13.; East London (F.) 1 c., £7.; Fremantle, 1 t., £87.; Jamaica 1 c. (F.), £5.; Melbourne, 1 t. 10 c., £130.; Mossel Bay (F.), 6 c., £41.; Newcastle, 1 t. 5 c., £121.; Pt. Elizabeth (F.), 1 c., £7.; Rangoon (F.), 1 c., £5.; Santos, 5 c., £29.; Stavanger, 2 c., £9.; Sydney, 15 t., £1,302.; Tientsin (F.), 1 c., £8.; Trondhjem, 2 c., £9.

DISINFECTANTS (*otherwise undes.*)
Abadan, 1 t., £8.; Aden, 12 c., £18.; Alleppey, 8 c., £30.; Auckland, 2 c., £19.; Barbados, 4 c., £9.; Bombay, 2 c., £7.; Brisbane, 1 t. 3 c., £55.; Calcutta, 4 c., £26.; Canton, 18 c., £29.; Christchurch, 1 t. 15 c., £85.; Demerara, 1 t., £28.; Jamaica, 18 c., £40.; Jesselton, 6 c., £11.; Kilindini, 4 c., £12.; Limon, 18 c., £49.; Melbourne, 5 c., £16.; Pt. Elizabeth, 1 t. 7 c., £77.; Shanghai, 2 t. 4 c., £54.; Singapore, 2 t. 18 c., £90.; Sydney, 18 c., £140.; Tanga, 5 c., £10.; Valparaiso, 5 c., £17.; Wellington, 1 t. 14 c., £81.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 57 kgs., £386.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Adelaide, 1 cs., £48.; Boulogne, 10 kgs., £150.; Brisbane, 1 cs., £8.; Calcutta, 3 cs., £15.; Dunedin, 2 pkgs., £37.; Durban, 2 cs., £28.; Melbourne, 23 pkgs., £540.; Ostend, 1 kg., £18.; Pt. Elizabeth, 2 cs., £24.; Sydney, 2 pkgs., £25.

ETHER—
Alleppey, 1 cs. (pt.), £6.; Durban, 2 cs., £11.; Italy, 1 cs. (pt.), £12.; Jamaica, 15 cs., £25.; Kilindini, 5 cs., £27.

ETHYL CHLORIDE—
Durban, 1 cs., £10.
Pt. Elizabeth, 2 cs., £20.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 2 t., £16.
Gothenburg, 1 t., £25.
Shanghai (F.), 10 c., £10.

FORMALDEHYDE—
Barbados, 1 ck., £18.
Bermuda, 1 drm., £7.

GALLIC ACID—
Brisbane, 1 cs., £8.

GLYCERINE—
Antwerp, 1 t. 19 c., £136.; Bangkok, 10 c., £53.; Bombay, 1 c., £12.; Buenos Ayres, 1 c., £13.; Calcutta, 3 c., £12.; Canton, 1 c., £6.; Cape Town (crude), 50 t. 19 c., £2,519.; Habana, 3 c., £27.; Kobe, 29 t. 9 c., £2,432.; Malta, 4 c., £20.; New York (crude), 25 t. 12 c., £1,193.

GOLD CHLORIDE—
Calcutta, 1 cs. (pt.), £5.
Santos, 1 cs. (pt.), £6.
Wellington, 3 cs. (pt.), £8.

GUANO—
Demerara (F.), 50 t., £813.
Yokohama, 50 t., £650.

HYDROCHLORIC ACID—
Alleppey, 1 c., £5.; Colombo, 3 c., £18.; Demerara, 10 c., £20.; Durban, 4 c., £15.; Kilindini, 3 c., £8.

HYDROFLUORIC ACID—
Pt. Elizabeth, 1 cs., £6.

HYDROGEN PEROXIDE—
Durban, 20 cs., £44.
Kilindini, 4 cs., £27.
Malta, 2 cs., £8.
New Plymouth, 2 cs., £6.

HYPOPHOSPHOROUS ACID—
Melbourne, 1 cs., £16.

IODIDES (*otherwise undescribed*)—
Calcutta, 4 pkgs. (pt.), £296.; Jamaica, 2 cs. (pt.), £40.; Leghorn, 1 cs., £36.; Melbourne, 1 cs., £81.; Rangoon, 1 cs. (pt.), £10.

IODINE—
Alexandria, 1 cs., £62.; Bombay, 3 cs. (pt.), £26.; Genoa, 5 cs., £516.; Leghorn, 1 cs., £103.; Sydney, 1 cs. (pt.), £13.

IODINE (RESUBLIMED)—
Barcelona, 1 cs., £105.; Bilbao, 2 cs., £207.; Calcutta, 5 cs. (pt.), £7.; Melbourne, 1 cs. (pt.), £53.; New Plymouth, 1 cs. (pt.), £7.

IRON AMMONIUM CITRATE—
Calcutta, 1 cs., £9.
Perth, 1 cs. (pt.), £6.
Sydney, 5 cs. (pt.), £84.

IRON PERCHLORIDE—
Melbourne, 5 drms., £6.

IRON SULPHATE—
Melbourne, 1 cs., £6.

LACTIC ACID—
Mossel Bay (F.), 20 cks., £148.

LEAD ACETATE—
Adelaide, 1 ck., £7.
Brisbane, 5 kgs., £11.

LEAD ARSENATE—
Melbourne, 27 cks., £96.

MAGNESIA—
Auckland, 10 cs., £24.; Barcelona, 3 cs., £33.; Boulogne, 2 cs., £10.; Brisbane, 2 cs., £5.; Brussels, 8 cs., £22.; Colombo, 2 cs., £5.; Hong Kong, 2 cs., £5.; New Plymouth, 8 cs., £19.; Nelson, 5 cs., £12.; Pt. Elizabeth, 2 cs., £5.

MAGNESIA (CALCINED)—
Brisbane, 2 cs., £12.
Panama, 1 cs., £9.

MAGNESIUM CARBONATE—
Bombay, 5 cs., £22.; Melbourne, 11 cs., £41.; Santos, 10 cs., £10.; Sydney, 2 cs., £7.

MAGNESIUM CITRATE—
Havana, 4 cs., £30.

MAGNESIUM GLYCEROPHOSPHATE—
Melbourne, 1 cs. (pt.), £6.

MAGNESIUM SULPHATE—
Accra, 5 c., £6.; Bombay, 12 c., £15.; Buenos Ayres, 2 c., £6.; Colon, 5 c., £7.; Durban, 12 c., £22.; East London, 4 c., £5.; Karachi, 5 c., £5.; Melbourne, 7 t. 4 c., £184.; Mossel Bay, 10 c., £13.; Panama, 10 c., £13.; Pt. Elizabeth, 16 c., £21.; St. Lucia, 10 c., £8.; San Francisco, 8 c., £11.; Sekondi, 4 c., £5.; Sydney, 4 t., £112.; Wellington, 5 c., £9.

MERCURIALS (*otherwise undes.*)—
Trinidad, 1 cs. (pt.), £5.

MERCURY AMMONIUM CHLORIDE—
Adelaide, 1 cs. (pt.), £7.
Melbourne, 1 cs. (pt.), £7.

MERCURY BICHLORIDE—
Mombasa, 1 cs. (pt.), £5.
N. Plymouth, 1 cs. (pt.) 1cs.£15.

MERCURY SULPHOCYANIDE—
Sydney, 2 cs. (pt.), £15.

METHYL ACETATE—
Paris (F.), 13 drms., £110.

METHYL SALICYLATE—
Sydney, 2 drms., £29.

NICKEL SALTS (*otherwise undes.*)—
Sydney, 10 cs. (pt.), £21.

NITRIC ACID—
Durban, 5 c., £22.
East London, 2 c., £7.

OXALIC ACID—
Calcutta, 1 cs., £11.

PHOSPHORIC ACID—
Channel Islands, 1 ck., £6.
Perth, 2 cs., £5.
Sydney, 14 cs., £70.

POTASSIUM CARBONATE—
Antwerp (F.), 168 cks., £1,500.
Brussels (F.), 100 cks., £890.
Sydney (F.), 1 ck., £16.

POTASSIUM CHLORATE—
Durban (F.), 1 cs., £6.

POTASSIUM CHLORIDE—
East London (F.), 5 bgs., £5.

POTASSIUM CITRATE—
Adelaide, 1 c., £10.; Auckland, 1 cs., £6.; Melbourne, 1 cs. (pt.), 1 cs., £18.; Perth, 1 cs., £12.

POTASSIUM CYANIDE—
Seremban, 10 cs., £80.

POTASSIUM FERROCYANIDE—
Adelaide, 1 kg., £13.

POTASSIUM IODIDE—
Auckland, 1 cs., £66.; Amoy, 9 cs. (pt.), £6.; Bombay, 2 cs., £178.; Calcutta, 2 cs., £133.; Dominica, 2 cs. (pt.), £9.; Genoa, 3 cs., £258.; Leghorn, 2 cs., £180.; Melbourne, 2 cs. (pt.) £132.; New Plymouth, 1 cs. (pt.), £23.; Rangoon, 1 cs., £22.; Rio de Janeiro, 2 cs., £190.; Sydney, 1 cs. (pt.), £8.; Wellington, 1 cs. (pt.), £22.

POTASSIUM PERMANGANATE—
Auckland (F.), 1 cs., £6.; Colombo, 1 drm., £6.; Demerara, 1 drm. (F.), £6.; Madras, 1 drm., £6.

POTASSIUM PRUSSIATE—
Hamburg, 96 cks., £2,176.
Paris, 5 kgs., £58.

POTASSIUM TARTRATE—
Alleppey, 3 cs., £45.

PRUSSIAN BLUE—
Sydney, 10 cks., £280.

PYROGALLIC ACID—
Melbourne, 1 cs., £5.

ROCHELLE SALTS—
Cape Town, 1 c., £5.

SALAMMONIAC—
Adelaide, 10 pkgs., £45.; Auckland, 6 cks., £50.; Buenos Ayres, 10 cs., £30.; Calcutta, 2 cs., £15.; Madras, 7 cks., £60.; Melbourne, 1 ck., £14.; Pernambuco, 2 cks., £6.; Pt. Sudan, 1 ck., £6.; Singapore, 5 brls., £11.

SALICYLATES (*otherwise undes.*)—
Montreal, 3 cs. (pt.), £18.

SALTPETRE—
Cape Town, 18 c., £41.; Dunedin, 1 t., £42.; East London, 19 c., £41.; Lyttleton, 1 t. 10 c., £61.; Maceio, 19 c., £39.; Maranhao, 10 c., £20.; Melbourne, 17 t., £693.; Mombasa, 2 c., £6.; Pernambuco, 2 c., £6.; Pt. Elizabeth, 2 c., £5.; Santos, 5 c., £12.; Singapore, 2 c., £5.; Sydney, 14 t., £654.

SHEEP DIP—
Cape Town, 2 t. 17 c., £75.
Durban, 6 t. 17 c., £271.
Jamaica, 5 c., £10.

SILVER NITRATE—
Calcutta, 1 cs. (pt.), £11.; Durban, 1 cs., £26.; Monte Video, 1 cs. (pt.), £5.; Mombasa, 1 cs. (pt.), £46.; Para, 1 cs. (pt.), £8.

SODA CRYSTALS—
Hong Kong, 1 t. 1 c., £9.
Punta Arenas, 1 t., £10.

SODIUM ARSENITE—
Durban, 2 t. 5 c., £173.

SODIUM BENZOATE—
Cape Town, 3 c., £35.
Santos, 1 c., £14.

SODIUM BICARBONATE—
Alexandria, 3 c., £23.; Barcelona, 6 t., £84.; Calcutta, 8 c., £26.; Durban, 6 c., £18.; Hong Kong, 1 c., £5.; Mossel Bay, 12 c., £18.; Panama, 10 c., £16.; Pt. Elizabeth, 1 t. 11 c., £48.; Singapore, 10 c., £15.; Tientsin, 4 c., £12.

SODIUM BISULPHITE—
Madras, 1 t., £20.

SODIUM BROMIDE—
Melbourne, 2 cs., £8.

SODIUM CITRATE—
Adelaide, 1 c., £10.; Alexandria, 1 c., £12.; Calcutta, 1 c., £6.; Montreal, 2 t. 10 c., £490.

SODIUM GLYCEROPHOSPHATE—
Melbourne, 1 cs., £7.

SODIUM IODIDE—
Adelaide, 1 cs. (pt.), £12.; Calcutta, 3 cs. (pt.), £25.; Genoa, 5 c., £442.; Leghorn, 2 c., £247.; Melbourne, 1 cs. (pt.), £12.; Santos, 1 cs. (pt.), £23.

SODIUM SALICYLATE—
Melbourne, 2 c., £29.
Santos, 1 cs. (pt.), £9.

SODIUM SILICATE—
Antwerp, 4 c., £7.

SODIUM SULPHATE—
Demerara, 1 t. 1 c., £11.

SODIUM SULPHIDE—
Sydney, 2 t., £51.

SODIUM TARTRATE—
Calcutta, 1 c., £5.; Melbourne, 2 c., £8.; Winnipeg, 2 c., £8.

STRONTIUM CARBONATE—
Santos, 2 cks., £10.

SULPHUR—
Buenos Ayres (F.), 2 t., £30.

SULPHUR (FLOWERS)—
Melbourne, 2 t. 1 c., £32.

SULPHURIC ACID—
Aden, 13 c., £16.; Alleppey, 1 c., £8.; Antigua, 4 t., £67.; Barbados, 2 t., £33.; Berbice, 7 t. 10 c., £150.; Colombo, 4 t. 14 c., £103.; Durban, 6 c., £18.; East London, 1 c., £5.; Jamaica, 2 c., £36.; Kilindini, 1 c., £5.; Mombasa, 7 c., £9.; Tocopilla, 3 c., £13.

SUPERPHOSPHATES—
Durban, 299 t., £2,250.

TANNIC ACID—
Calcutta, 1 cs., £9.
Shanghai, 1 brl., £5.

TARTARIC ACID—
Adelaide, 10 c., £61.; Auckland, 10 c., £54.; Bombay (F.), 1 t. 5 c., £135.; Calcutta, 3 c., £27.; Cape Town, 3 c., £19.; Durban, 2 c., £15.; Fremantle, 1 t. 15 c., £214.; Jamaica (F.), 1 c., £10.; Melbourne, 1 t., £188.; Mossel Bay, 1 c., £10.; Newcastle, 1 t., £122.; New York, 2 t. 10 c., £305.; Pt. Elizabeth (F.), 1 c., £6.; Suva, 1 c., £8.; Sydney, 5 t., £610.; Trondhjem, 2 c., £12.

THEOBROMINE—
Switzerland (F.), 2 cs., £91.

TIN SALTS (*otherwise undescribed*)
Jamaica, 3 cs., £12.

TITANIUM POTASSIUM OXALATE—
Calcutta, 2 kgs., £13.

TURPENTINE—
Delagoa Bay, 3 cs., £9.

ZINC OXIDE—
Barcelona, 10 cks., £46.; Buenos Ayres, 4 cks., £14.; Calcutta, 480 kgs., 2 cks., £333.; Cape Town, 10 bgs., £23.; Copenhagen, 50 cks., £185.; Canton, 4 kgs., £14.; Madras, 480 kgs., £319.; Melbourne, 1 cs., £6.; Petrograd, 33 cks., £235.; San Francisco, 1 cs., £6.

ZINC SALTS (*otherwise undescribed*)
Calcutta, 2 drms., £23.

Week ending October 6.

ANTIMONY REGULUS—
Amsterdam, 2 t.
New York, 24 t. 18 c.

BEESWAX—
Melbourne, 10 c.; Sydney, 8 c.

FULLER'S EARTH—
Genoa, 15 t.; New Orleans, 230 t.; New York, 30 t.; Parnahyba, 10 t.; Rotterdam, 100 t.; Portland (Ore.), 20 t.; Toronto, 40 t.; Vancouver, 27 t.

GLUE, SIZE, AND GELATINE—
Amsterdam, 10 c.; Calcutta, 16 t. 17 c.; Delagoa Bay, 12 c.; Dunedin, 5 c.; Durban, 18 c.; East London, 7 c.; Madras, 2 t. 4 c.; Melbourne, 3 t. 4 c.; Montreal, 1 t. 10 c.; Newcastle, 2 t.; Panama, 2 c.; Paris, 11 t.; Pt. Elizabeth, 17 c.; Rotterdam, 1 c.; Singapore, 10 c.; Shanghai, 15 c.; Sydney, 5 t. 2 c.; Trinidad, 2 c.; Wellington, 2 t. 10 c.; Yokohama, 5 t.

ISINGLASS—
Fremantle, 1 c.; New York, 4 c.

LEAD ASHES—
Hamburg, 15 t.

MINERAL WAX—
Antwerp, 16 c.; Sydney, 2 t.; Trieste, 11 c.

PLUMBAGO—
Gothenburg, 1 t.; Stockholm, 2 t. 11 c.; Sydney, 1 t. 3 c.

QUININE—
Bombay, 10,424 oz.; Calcutta, 18,772 oz.; Colombo, 1,456 oz.; Hong Kong, 1,000 oz.; Mauritius, 240 oz.; Melbourne, 1,300 oz.; Mombasa, 1,088 oz.; Perth, 100 oz.; Shanghai, 1,161 oz.; Sydney, 2,266 oz.; Trinidad, 1,000 oz.

SALT—
Ahwaz, 3 c.; Basra, 3 c.; Dairen, 4 c.; Delagoa Bay, 13 c.; Demerara, 2 c.; East London, 8 c.; Gothenburg, 14 c.; Haiba, 1 t. 14 c.; Hong Kong, 9 c.; Jaffa, 6 t. 16 c.; Madras, 14 c.; Pt. Elizabeth, 5 c.; Panama, 3 c.; Pt. Sudan, 1 c.; Sydney, 1 c.; Tientsin, 3 c.; Timaru, 80 t.

SOAP—
Abadan, 3 c.; Adelaide, 1 c.; Ahwaz, 3 c.; Azores, 2 c.; Bombay, 3 t. 7 c.; Boston, 1 t. 15 c.; Brisbane, 3 c.; Buenos Ayres, 5 c.; Calabar, 1 t. 2 c.; Calcutta, 15 c.; Callao, 4 c.; Colombo, 17 c.; Curacao, 4 c.; Dar-es-Salaam, 1 c.

SOAP—
Delagoa Bay, 1 c.; Durban, 2 t. 14 c.; East London, 1 c.; Funchal, 19 c.; Gothenburg, 1 c.; Hamburg, 1 c.; Hong Kong, 11 c.; Iddo, 10 c.; Italy, 1 c.; Jaffa, 4 c.; Jamaica, 43 t. 19 c.; Karachi, 5 c.; Kilindini, 3 c.; Leghorn, 1 c.; Madras, 19 c.; Malaca, 4 c.; Malta, 9 c.; Mauritius, 1 t. 8 c.; Melbourne, 3 c.; Mombasa, 3 c.; Mollendo, 7 c.; Monte Video, 1 t. 5 c.; Montreal, 3 c.; New York, 5 c.; Paris, 3 c.; Penang, 3 c.; Piraeus, 4 c.; Pt. Said, 4 c.; Pt. Elizabeth, 2 c.; Pt. Sudan, 4 c.; Riga, 1 c.; Rotterdam, 1 c.; St. Lucia, 1 t.; Sekondi, 4 t. 1 c.; Shanghai, 1 c.; Singapore, 2 c.; Sydney, 2 t. 14 c.; Toronto, 6 c.; Trinidad, 8 c.; Vancouver, 6 c.; Wellington, 1 t. 2 c.

TALLOW—
Amsterdam, 2 t. 11 c.; Genoa, 50 t. 2 c.; Hamburg, 4 t.; Harlingen, 5 t. 8 c.; Nantes, 16 t. 9 c.; Riga, 20 t. 9 c.; Rotterdam, 25 t. 13 c.

TAR (STOCKHOLM)—
Durban, 19 c.
Fremantle, 2 t. 10 c.
Sydney, 5 t.

WHITE LEAD—
Auckland, £1,692.; Channel Is., £20.; Cape Town, £67.; Calcutta, £110.; Colombo, £116.; Dunedin, £112.; Durban, £44.; East London, £117.; Grenada, £31.; Hong Kong, £11.; Madras, £353.; Panama, £26.; Pt. Sudan, £5.; Rosario, £227.; St. Kitts, £124.; Singapore, £25.; Sydney, £1,393.; Timaru, £44.; Wellington, £1,518.

MANCHESTER.

Week ending October 5.

NIL.

NEWCASTLE-ON-TYNE

Week ending October 6.

ALUMINA—
Barcelona, 400 bgs.

AMMONIA—
Copenhagen, 10 brls.

ANTIMONY—
Christiania, 1 ck.
Gothenburg, 1 ck.
Montreal, 30 cks.
Rotterdam, 5 cks.

BARIUM SULPHATE (BLANC FIXE)—
Montreal, 1 ck.

BLEACHING POWDER—
Rotterdam, 39 cks.

CARBON (GAS)—
Antwerp, 10 t.

CARBON BLACK—
Rotterdam, 16 tres.

CAUSTIC SODA—
Bremen, 70 drms.; Christiania, 17 drms.; Rotterdam, 25 drms.

COAL TAR PRODUCTS—
Pitch
Antwerp, 29 t. 14 c.
Cette, 9 t.

LITHARGE—
Christiania, 20 cks.; Hamburg, 114 cks.; Rotterdam, 6 cks.

MAGNESIA—
Montreal, 5 cs.

RED LEAD—
Christiania, 45 cks.; Gothenburg, 128 cks.; Hamburg, 134 cks.; Rotterdam, 67 cks.

SPENT OXIDE—
Hamburg, 23 cks.

WHITE LEAD—
Hamburg, 14 cks.

ZINC OXIDE—
Hamburg, 4 cks.

N. & S. SHIELDS.

Week ending October 6.

NIL.

PRICES CURRENT.

WEDNESDAY, OCT. 10, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23- / &	46/-	
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	8½
Formic, 80/85%	*ton	51	0	0
Hydrofluoric. 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	2
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	18	0	0
Pitch (f.a.s. Liverpool)	ton	6	12	6
Pyridin	gallon	1	1	0
Tar, crude	ton	4	2	6
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	126	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	12	6
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	61	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	8
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	10	0
Formaldehyde, 40%	ton	65	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge (British)	ton	41	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	3
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	3
Potassium Bichromate	lb.	0	0	5½
Potassium Carbonate, 90%	ton	24	10	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	9
Potassium Prussiate (yellow)	lb.	0	1	0½
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/- &	57/-	
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	15	0	0
Sodium Prussiate	lb.	0	0	5¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	0	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	7	6
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	35	0	0
Copper	ton	60	7	6
Lead (Chemical Sheet), delivered	cwt.	1	16	6
Lead (Foreign Pig)	ton	25	10	0
Nickel	ton	130	0	0
Silver	oz.	0	2	7 7/16
Tin, English Ingots	ton	207	0	0
Zinc (Spelter)	ton	32	10	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	43	0	0
Linseed, Raw	*ton	47	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	14	0

* *Packages extra or returnable*; otherwise prices usually include
† Makers' prices for home consumption only (packages

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
Imperial Aspect of Research	449
A New Engineering Institution	450
The State of Trade	450
A Break with Tradition	450
Technology of Cellulose Derivatives	451
Shellac	453
The "Solubility Test" for Lead Compounds	456
The British Empire Exhibition	457
British Association of Chemists	458
Italian Laboratory Glass Industry	459
The Institute of Chemistry	459
The Directorate of the Dyestuffs Corporation	459
The Origin of Petroleum	460
Foreign Chemical Samples	461
Alkali Manufacturers and Gas Undertakings	461
Our Bookshelf	461
Items of Interest	462
Coming Events	463
British Overseas Chemical Trade	464
South Wales Notes	464
Company Dividends	464
Thirty-five Years Ago	464
Gazette News	465
Imports of Chemicals and Allied Products in September	466
Fertiliser News	467
Cumberland Coking and By-product Industries	467
Trade Inquiries	468
New Companies	468
The Patent List:—	
Applications for British Letters Patent	468
Complete Specifications Accepted	468
Complete Specifications Open to Public Inspection before Acceptance	469
Abstracts of Latest Complete Specifications	469
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	469
Publications Received	470
Market Reports:	
London "Open Market" Report	470
London Metal Market	472
Manchester Chemical Market	472
Swansea Market Report	472
Liverpool Chemical Market	472
West of Scotland Chemicals	473
Imports of Chemical Products	473
Exports of Chemical Products	476
Prices Current	480

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CURRENT TOPICS.

THE IMPERIAL ASPECT OF RESEARCH.

THE morning session of the Imperial Economic Conference, on Tuesday, was devoted to the question of the co-ordination and extension of Government-aided research throughout the Empire, and to the closely related question of the future of the Imperial Institute. Lord Salisbury, president of the Council, made a detailed statement on the work and progress of the Department of Scientific and Industrial Research, in which he pointed out the exact relationship in which Government research stands to private research, conducted either at academic institutes or by individual industrial firms. This statement, together with the recently issued annual report of the Department, should lead to complete understanding, on the part of the delegates, of the great value of the work the Department has already done, and particularly of its potentialities with regard to future Imperial development. It will be admitted that co-operation on matters of industrial research between all parts of the Empire is an essential step, both to prevent overlapping and to add one further link in the chain of mutual service, which, under present world conditions, must bind the Imperial partners more closely together. It is gratifying to note, therefore, that the general feeling displayed at the Conference was strongly in favour of such co-ordination and extension, and that as a definite preliminary step a committee has been set up to inquire into the best method of pooling information and making it available Imperially. This committee will probably not overlook the fact that in the Imperial Institute itself we have already an Empire co-ordinating body, which has accomplished work of exceptional importance, more particularly on the development of the raw materials occurring within the confines of the Empire. As a nucleus for the greater extensions that must take place in the future, the Institute would appear uniquely adapted. There is one point in Lord Salisbury's statement, however, which if allowed to go unchallenged may quite conceivably lead to unfortunate consequences from the scientific workers' point of view. Speaking on the advantages possessed by the Government over private enterprises in the matter of fundamental research, Lord Salisbury—we are quoting from the *Times'* report—made the point that "A very large number of scientific men are willing to work for the Government at far less than

would be the true remuneration of their great talents, and are willing, through the Government, to place their knowledge at the service of the community." We are convinced that any Government undertaking the organisation of research, and adopting a policy of comparatively low remuneration to the heads of its research staffs—and a precedent for such a policy would certainly appear established from Lord Salisbury's remarks—would be acting in a manner inimical not only to the interests of the scientific workers, but to those of the Government research organisation itself. In the United States, where Government research is developed at present to a considerably greater extent than elsewhere, the past two years have witnessed a steady exodus of distinguished investigators from the Government service to the direct service of industrial undertakings. Of course, industry in America is to-day more prosperous than it is here, and can thus offer greater inducements to its scientific experts; but it is not logical to suppose that even in this country any but a small minority of eminent investigators can afford to adopt the altruistic attitude ascribed to them by Lord Salisbury.

A NEW ENGINEERING INSTITUTION.

The art of welding involves chemical, electro-chemical, and metallurgical problems of first-rate importance, and for this reason the inauguration of an Institution of Welding Engineers is an event of considerable note to both the chemical and the engineering industries. Hitherto there has been no one association or institution which could be said to be the authoritative technical body dealing with welding. There is, of course, the British Acetylene and Welding Association, and also the Electric Welders' Association, but both these bodies have dealt with the problems associated with their own particular view points, and have thus been more or less partisan. The new Institution of Welding Engineers, however, which held its first ordinary general meeting last week, and has for president Sir Peter Rylands, has been constituted by the leading men in the welding industry generally, and takes its place on a par—*qua* welding—with the large engineering institutions, in that its aim is to foster welding as a whole irrespective of any particular process, and to give welding the status which its importance undoubtedly warrants, but which hitherto it has not secured. It will be all to the good if the other two bodies mentioned above can be brought to see the wisdom of joining forces with the Institution of Welding Engineers, and having one comprehensive institution, and thus the obvious criticism that yet another technical institution has been formed might well be refuted in this case by one institution coming into active existence instead of three, and thus improving the position materially. Until we reach the day of one engineering institution sub-divided into the various sections, which are comprised in the generic term engineering, we must keep to present lines; but the best immediate step is affiliation of the smaller institutions to the original parent ones, such as the large chemical and engineering institutions and societies, and this, probably, will be the next step in development.

THE STATE OF TRADE.

The overseas trade returns for July and August were so unsatisfactory in most respects that a moderate improvement upon them in September is not an occasion that calls for much rejoicing. It may, however, be said of the figures now published that they encourage the hope that the worst of the depression has passed. The adverse trade balance is reduced from £22,500,000. in August to £11,300,000., and the reduction is accounted for by a decline in imports and a rise in total exports. Imports during September amounted to £83,266,000., against £88,743,000. in August. British exports, however, at £63,836,000., show an increase of £3,733,000. on comparison with the previous month, while re-exports are up by some £2,000,000. Leaving the aggregate figures, imports of raw materials show a further small improvement, which suggests that trade prospects are considered sufficiently encouraging to justify larger purchases in certain directions. Under exports, manufactured articles show a healthy increase, the increase being fairly well spread over numerous headings, so that the expansion is not due to special activity in any particular trade. Turning to the figures for the nine months, however, it is a little disquieting to find that imports of manufactured articles are much larger during this year than last. This increase in imported manufactures, of which a large proportion at least could be made at home, doubly hits British labour, since we are buying articles from abroad which we ourselves could produce, at a time when unemployment is more serious than it has ever been.

A BREAK WITH TRADITION.

The proposal of the British Empire Exhibition authorities to do away altogether with gradated awards at Wembley next spring has met with almost unanimous approval from the various sections of exhibitors to which it has already been submitted, and we have little doubt that the representatives of the British Dominions and Colonies also will see the desirability of adopting the proposal. Judged from the absence of precedent, the step is certainly drastic, but is justified in the first place by the unique character of the Exhibition, and in the second place by the fact that the awards made at past Exhibitions, other than those of a limited sectional character, have been made in a very perfunctory manner. This latter fact must not be ascribed to inefficient or unreliable juries, but to the manifest impossibility of fixing upon any basis of comparison by which widely divergent exhibits may be judged. The minority opposed to the new proposal have already raised the objection, amongst other points, that the absence of competitive awards is an invitation to exhibit at a minimum expense. We should think that, far from being a drawback, this is a decided advantage in favour of the scheme, and one destined to secure the co-operation of the greatest number of exhibitors.

THE TECHNOLOGY OF THE CELLULOSE DERIVATIVES.

THE NEWER ETHERS AND ESTERS.

By "Investigator."

In the search for technically valuable derivatives of cellulose, it was only natural that attention should be directed to the cellulose ethers, stability being the keynote of the behaviour of ethers as a class. Since 1912, an extensive patent literature concerning these products has been evolved, mainly by Lilienfeld, while still more recently, considerable interest appears to have been aroused in their applications, notably for photographic film-stock manufacture.

The preparation of cellulose butyrates is also receiving attention, since by the introduction of acid radicles of greater complexity than acetyl, it is hoped to mask the cellulose molecule and so endow it with useful solubility properties. Esters of fatty acids, such as the palmitate and stearate, should be of interest from the point of view of water-resistance, while esters containing chlorine should be of some service in the preparation of non-flaming celluloid and allied materials, provided they can be prepared without degradation of the cellulose.

Denham (*Chem. Soc. Trans.*, 1921) has utilised the formation of cellulose methyl ether in order to elucidate the structure of the cellulose molecule. Thus, by repeatedly methylating cellulose by treatment with caustic soda and dimethyl sulphate, only three methyl groups could be introduced. The product (44.6 per cent. methoxyl) was insoluble in Schweitzer's reagent solution, differing in this respect both from cellulose itself and from the mono and di-methyl ethers.

Ethylation of Cellulose with Diethyl Sulphate.

Starting with viscose, a water-soluble ether can be obtained as follows: A caustic soda solution of cellulose is first prepared by coagulating the material at 100° C. with alkali, washing, and then dissolving the residue in strong caustic soda (50 per cent.). To 1,200 parts of this solution, containing approximately 100 parts each of cellulose and alkali, 100 parts of 30 per cent. caustic soda are added, and the warm mixture ethylated by the gradual addition of diethyl sulphate (300 parts). The reaction product is then freed from by-products by washing, first with sulphuric acid (10 per cent.) and then with warm water. Finally it is purified by treating the water solution with alcohol, when the ethyl cellulose separates as a white powder.

To convert the water-soluble ether into the insoluble variety, it may be still further ethylated. For this purpose, the former product is mixed with about 4½ parts of alkali, added either as powder or as 50 per cent. solution, and etherified by heating to 100° C. with about 22 parts of diethyl sulphate (*Brit. Pat.*, 149,320, of 1920). Ethylating in presence of a large excess of alkali is also claimed to render the ether very resistant to water. Thus, in the case of the water-soluble preparation already described, the cellulose solution is treated with 250 parts of caustic soda, instead of with 30 parts, and the proportion of ethylating agent doubled. A similar principle underlies the procedure of H. Dreyfus (*Brit. Pats.*, 164,374-5 and 7, of 1919), who prepares cellulose ethers, giving solutions of high viscosity, by kneading a mixture of moist cellulose and alkylating agent with a high proportion of solid alkali. Thus, according to the Specifications, 100 parts of cellulose (1 molecule calculated as $C_6H_{10}O_5$), containing 100 parts of water, are incorporated with 650 parts of powdered alkali (14 molecules) and 115 parts of diethyl sulphate (6½ molecules). The reaction is carried out at about 50° C. and takes several hours. To promote the ethylation, finely divided copper and copper salts may be added.

Instead of alkali-soluble cellulose derived from viscose, hydrocellulose, prepared from cellulose itself, will serve as initial material. For this preparation, cellulose is warmed with highly concentrated alkali and the hydrocellulose precipitated by acid. Another method of preparing the cellulose for ethylation, is to mercerise it by soaking in alkali, to squeeze out the excess, and then to incorporate the finely-divided product with powdered caustic soda. In order to retard oxidation of the cellulose by the alkali during the grinding process, the latter is carried out in the presence of inert liquids such as benzol, carbon tetrachloride or ether, and in the absence of air.

With a view to utilising both ethyl groups in the ethylating agent, it is proposed to operate in the complete absence of water. To this end, the caustic soda is replaced by sodium oxide, when any water formed as a product of the reaction is eliminated by combination with the excess of the latter. Other "water-binding" agents may be added, such as the oxides of calcium, barium and magnesium, sodamide or calcium hydride. In an example, 100 parts of cellulose, containing 12½ parts of water, are ground with 70 parts of sodium oxide. In this way, ethylation can be carried out with the theoretical proportion of diethyl sulphate (*Brit. Pat.*, 187,639, of 1921).

Use of Halogen Derivatives as Etherifying Agents.

In general, the etherification of cellulose can be accomplished by heating cellulose with alkali and alkyl bromides or iodides in a closed vessel for several hours. The chlorides may be used instead of these comparatively expensive reagents. According to Young (*Brit. Pat.*, 184,825, of 1921), the reaction is carried out in a revolving autoclave and ethyl chloride pumped in under pressure. The published details of the process which yields a water-insoluble ether, are as follow: 100 parts cellulose (1 molecule) is soaked in caustic soda (40 per cent.) so that it absorbs 125 parts NaOH and 60 parts water. This material is then ethylated by heating at about 100° C. for several hours with 1,500 parts ethyl chloride (20 molecules) in the presence of finely-divided copper. Any unchanged ethyl chloride is recovered, and after washing away the excess alkali, the product is dissolved in glacial acetic acid and precipitated by water. Methyl, propyl and amyl chlorides are also applicable, the resulting products being soluble in glacial acetic acid, but insoluble in water, benzene, methyl or ethyl alcohol. Similarly, benzyl derivatives can be prepared, using benzyl chloride and aqueous caustic soda at 90° C. The products, unlike cellulose, are insoluble in Schweitzer's reagent solution, and, on account of their colloidal properties, should be valuable as plastic materials (Gomberg and Buchler, *J. Amer. Chem. Soc.*, 1921).

In this connection, the methylation of highly-dispersed cellulose in the colloid mill may be mentioned. For this preparation, cellulose (1 part) is dispersed with water (12 parts) in the presence of methyl alcohol (3 parts). To complete the reaction, hydrochloric-acid gas is introduced. Complex ethers may be prepared by etherifying cellulose with the halogen derivatives of glycol and other polyhydric alcohols and their ethers. According to the specification, such ethers can be utilised for artificial silk, capable of being readily dyed (*Brit. Pat.*, 166,707, of 1920). Technically-valuable derivatives, which are presumably glycol ethers, result from the action of ethylene oxide and its homologues on cellulose in the presence of palmitic acid (*Ger. Pat.*, 363,192, of 1920).

Properties and Solvents of Cellulose Ethers.

Many of these derivatives are soluble in water but become insoluble on warming the solution. On adding alcoholic soda, a sodium derivative insoluble in alcohol is precipitated. Because of these properties, it is advisable to wash the reaction product with warm water and with dilute sulphuric acid. As is to be expected from their nature and from their mode of preparation, the cellulose ethers are extremely stable, resisting for prolonged periods both the action of water (at 170° C.), and of alcoholic and aqueous caustic soda (25 per cent.). Further, the materials are non-flaming, and, in the presence of suitable "softeners," form strong, pliable films. They melt at about 160° C.

A wide range of low and high boiling-point solvents is available, many of these being comparatively inexpensive. Among the latter may be mentioned the xylene-alcohol, carbon tetrachloride-alcohol and carbon tetrachloride-benzol, binary mixtures. It is noteworthy that none of these are solvents at ordinary temperatures for cellulose acetate. The hydrogenation products of naphthalene constitute cheap high boiling-point solvents. During the last three years, a large number of patents have been granted to the American Kodak Company, covering numerous solvents and cellulose ether compositions. Among such solvents are many chlorhydrocarbons of both the paraffin and the aromatic series, and their binary mixtures with the simpler aliphatic alcohols. Many esters, alone and in admixture with the common alcohols, are useful solvents, particularly the simpler esters of acetic, butyric, benzoic and salicylic acids. Other solvents worthy of mention are pyridine, furfurol, phenol-alcohol and the toluene-methyl alcohol mixtures. Ether, phenol or toluol by themselves are non-solvents, but the binary mixtures with alcohol constitute excellent solvent media.

Among very high boiling-point solvents, suitable for use as "softeners," are phenyl phthalate, monochlornaphthalene, phenylpropyl alcohol, sulphones, and the sulphonamides of aromatic hydrocarbons and their hydrogenation products (*Ger. Pat.*, 368,362, of 1921).

Applications of the Cellulose Ethers.

As previously mentioned, the Kodak Company proposes to utilise cellulose ether solutions for the manufacture of photographic films. One such composition consists of ether dissolved in 6 parts of pyridine (*U.S. Pat.*, 1,429,153, of 1922). In the preparation of celluloid substitute, the ether is first made into a paste with a volatile solvent, and the paste is then passed through hot rollers. The dry, brittle product after powdering, is forced into moulds and fused at 160° C. to a homogeneous mass. Efficient insulating properties and stability to heating are claimed for these materials. To improve their resistance to water, the oily products resulting from the action of acetylene on xylol and other coal-tar hydrocarbons in the presence of aluminium chloride, may be incorporated (*Brit. Pat.*, 149,319, of 1920). Softeners producing similar effects are the condensation compounds of benzyl chloride and its analogues with aromatic hydrocarbons. The oil from the vacuum distillation of coumarone resin, is also recommended for this purpose (*Brit. Pat.*, 163,271, of 1921).

Cellulose ethers have been utilised, in a more or less tentative fashion, for the manufacture of artificial silk. For the precipitating bath, substances are used which will take up the solvent, without dissolving or "swelling" the filament. Suitable coagulating media comprise highly-concentrated solutions of zinc chloride, calcium chloride and urea; or the filament may be extruded into a molten bath of the crystals $CaCl_2.6H_2O$ at 70° C. (*Ger. Pat.*, 352,191-2, of 1919). It is asserted that, although as in the case of the cellulose acetates, the hydroxyl groups of the parent cellulose molecule are masked, yet, like cellulose but unlike the acetates, the methyl, ethyl and benzyl ethers can be dyed with direct cotton colours. Also, in spite of their neutral character, basic dyes are applicable, while on account of their stability, the ethers can be dyed with anthraquinone and indigoid vat dyes, in alkaline or acid baths (*Brit. Pats.*, 196,952-3 and 197,281, of 1921).

The Preparation of Diethyl Sulphate.

Interest in the cellulose ethers has naturally directed attention to new and improved methods for the manufacture of diethyl sulphate, a highly reactive product with a wide field of usefulness as a general reagent. The majority of these processes start with ethyl hydrogen sulphate or its salts. Thus, Lilienfeld claims a yield of about 90 per cent. of the sulphate by distilling the sodium derivative *in vacuo* with anhydrous sodium sulphate. A very similar method is that of Kuh (*Brit. Pat.*, 149,688, of 1920), who distils a mixture of ethyl hydrogen sulphate (2 mols.) with anhydrous sodium sulphate (1 mol.) or sodium ethyl sulphate (2 mols.), compounds which combine with sulphuric acid. In other processes, crude ethyl hydrogen sulphate is directly distilled *in vacuo*. For this purpose, the British Cellulose and Chemical Manufacturing Company propose to carry out the distillation in an electrically-heated, vertical tube-still, at 110° C. under 5mm. pressure. The raw material, prepared from ethyl alcohol (60 parts) and 70 per cent. fuming sulphuric acid (40 parts), is allowed to flow in a thin film into the heated zone, when the sulphate distils off, while the residue collects at the bottom of the still. Very volatile products, such as alcohol and ether, may be condensed at −80° C. or absorbed in oleum (*Brit. Pat.*, 175,077, of 1920).

According to Lilienfeld, ethyl sulphate is formed when ethyl hydrogen sulphate, prepared by the interaction of chlorsulphonic acid ($Cl.SO_2.OH$) and ethyl alcohol, is kept at 100° C. for some time. On adding ice to the reaction product, the ester is precipitated and this can then be separated off or extracted with solvents. The residual aqueous liquor is utilised for the preparation of sodium ethyl sulphate (*Ger. Pat*, 360,527, of 1918).

An interesting process is the preparation of dialkyl sulphates by the direct action of sulphur trioxide on aliphatic alcohols, in the presence of suitable dehydrating agents, such as phosphorus pentoxide. Inert solvents may act as reaction media (*Brit. Pat.*, 143,260, of 1920). Sidgwick treats pure sulphuric acid or a solution of ethyl hydrogen sulphate in this acid with a large excess of ethylene-containing gases at 70° C. The sulphate may be isolated from the reaction product by extraction with ligroin or benzene (*Brit. Pat.*, 157,578, of 1919). By the action of sulphuryl chloride on ethyl alcohol a mixture of ethyl chloride, ethyl sulphate and ethyl hydrogen sulphate is formed, in accordance with the following equations:—

$$2C_2H_5OH + SO_2Cl_2 = SO_2(OC_2H_5)_2 + 2HCl.$$
$$2C_2H_5OH + SO_2Cl_2 = C_2H_5O.SO_2.OH + C_2H_5Cl + HCl.$$

On distilling the reaction product, the last-named compound yields the normal ester. Instead of sulphuryl chloride added as such, equimolecular quantities of the constituent gases—namely sulphur dioxide and chlorine—may be passed into the alcohol (*Brit. Pat.*, 117,824, of 1917).

Cellulose Formates and Butyrates.

The reaction of formic acid with cellulose is not a simple ester formation. A diformate is the primary product, but this decomposes with the liberation of formic acid and modification of the cellulose complex. According to a very recent specification, Plauson claims to be able to prepare cellulose esters by esterification of very finely divided particles of dry cellulose (less than 0.01mm. in diameter) with gaseous reagents (*Brit. Pat.*, 200,160, of 1922). Hydrochloric acid gas (½-5 per cent.) and ultra-violet light serve to catalyse the reaction. Acetates, aceto-formates or aceto-propionates result, according to the composition of the acylating gases. With more than 10 per cent. of catalyst, the products are said to be ethers.

Cellulose butyrates have recently claimed some attention as possible substitutes for the acetates. The esterifying medium consists of a mixture of butyric acid and anhydride, while "butyration" is induced by pre-treating the cellulose with a dilute solution of sulphuric acid in acetic or butyric acid (*Brit. Pat.*, 167,143, of 1921, and *U.S. Pat.*, 1,425,580, of 1922). Benzene, containing as little as 10 per cent. by volume of methyl or ethyl alcohol, is stated to dissolve these esters in the cold. Other solvents are, chloroform, acetone, phenol, hot methylated spirit, hot benzol and hot solvent naphtha. Cellulose carbamates have also been suggested as useful esters. They can be prepared by heating cellulose with phenyl isocyanate in the presence of a tertiary base such as pyridine, and pouring the product into water.

Esters of the Higher Fatty Acids.

Esters of the higher fatty acids can readily be obtained by the action of the respective acid chlorides on cellulose in the presence of pyridine or quinoline. According to Grün and Wittka (*Z. angew. Chem.*, 1921), the distearate and dilaurate, prepared by acylating cellulose with a large excess of a benzene-solution of the chlorides, are fibrous substances, insoluble in the usual solvents for cellulose esters. They dissolve in fats and fatty acids at high temperatures. Very recently, however, Gault and Ehrmann (*Comptes. Rend.*, 177, 1923), have described the preparation of soluble esters by treating hydro-cellulose (1 part) with the acyl chloride (5 parts) at 115° C. for several hours, benzene and pyridine being present. Thus obtained, the fatty esters are amorphous substances, insoluble in alcohol, acetone and glacial acetic acid, but soluble in most other organic solvents to give colloidal solutions. By acylating cellulose, modified by solution in cuprammonium reagent, cellulose hexapalmitate has been obtained, a white, amorphous substance, fusing at 78° C., soluble in chloroform, but insoluble in alcohol.

Cellulose Esters of Aromatic Acids.

By the action of benzoyl chloride on unmodified cellulose in the presence of pyridine, a monobenzoate results, but with mercerised cotton, in the presence of 15 per cent. alkali, the product is a dibenzoate. The latter derivative is soluble in acetic acid and in chloroform. On nitrating these esters, they are converted into nitrobenzoate-nitrates. Cellulose will react with phthalic anhydride, in the presence of zinc chloride, especially if it has been modified by treatment with glacial acetic acid containing chlorine. Diethyl phthalate will serve as reaction medium, but the resulting phthalic ester is of no great value as a cellulose acetate substitute, as it is insoluble in all the common solvents (Levey, *J. Ind. Eng. Chem.*, 1920).

Cellulose Derivatives Containing Chlorine.

In an attempt to prepare cellulose derivatives with very definite physical characteristics, Barnett (*J. Soc. Chem. Ind.*, 1921), has studied the action of chloracetyl chloride on cellulose. The reaction is usually of a very drastic character, and if uncontrolled, leads to the formation of water-soluble

products. In any case, the cellulose complex undergoes resolution, as a result of the hydrochloric acid liberated during the process. In the presence of pyridine, benzene and acetic acid, the reaction product contains about one-fifth of a chloroform-soluble ester with a chlorine content of 3 per cent. This substance melts at 256° C., but is readily hydrolysed by water.

Non-inflammable cellulose compounds, soluble in water, result from the action of chlorine-substituted fatty acids on mercerised cellulose in the presence of caustic alkali. Thus, after mercerisation with alcoholic soda, the material may be treated with mono-chloracetic acid; or the mercerised cellulose may be kneaded with sodium mono-chloracetate in the presence of dilute alcoholic soda. Obtained in this way, the sodium salts dissolve in water to give clear, viscous solutions, but the copper, aluminium and lead derivatives are insoluble (*Brit. Pat.*, 138,116, of 1920).

The Chloro-Acetates.

Very recently, however, a water-insoluble chlorine derivative, which is presumably a chloro-acetate, has been described (Mardles, *J. Soc. Chem. Ind.*, March 29, 1923). This material has a chlorine-content of about 27 per cent., the empirical formula being $C_{12}H_{13}O_8Cl_3$. Compared with other esters, the maximum moisture absorption is much less, the water content, after exposure to a moist atmosphere, being. 6.6, 1.0, and 0.6 per cent., for the acetate, nitrate and chloro-acetate respectively. In its behaviour with solvents, this derivative closely resembles the acetate, as described in a previous article (*Chemical Trade Journal and Chemical Engineer*, August 10, 1923). Thus, there is an enormous increase in solubility within a very narrow temperature-range (two or three degrees). In the case of benzyl and tolyl alcohols, these temperatures were 25° C. and 47° C. for a cellulose acetate and 57° C. and 75° C. for the chloro-acetate. A much wider array of solvents is available in the case of the latter derivative, as instanced by its solubility in aromatic ethers. These liquids dissolve the chloro-ester at moderate temperatures, but only gelatinise the acetate. Aliphatic esters are, for the most part, good solvents, while only the simpler homologues are useful in the case of the acetate. A case in point is amyl acetate, a liquid without solvent action on the acetate even at moderately elevated temperatures, yet dissolving the chloro-compound at temperatures above −60° C.

In their resistance to precipitation by added non-solvents, the chloro-acetate sols resemble cellulose nitrate sols rather than those of the acetate. A measure of this resistance is given by the so-called "solvent numbers," values which denote the volume of liquid necessary to begin the precipitation from one c.c. of a 5 per cent. solution at 15° C. A selection of these numbers (taken from the paper already cited) is contained in the above table, the non-solvent in this case being petroleum spirit, boiling-point range 90-100° C.

5 Per Cent. Sols.	Chloro-acetate.	French Variety Acetate.	Nitrate.
Acetone	0.75	0.14	0.68
Methyl acetate	0.54	0.11	0.59
Ethyl acetate	0.53	Non-solvent	—
Butyl acetate	0.2	,,	—
Amyl acetate	0.08	,,	1.0
Tolyl acetate	—	,,	0.66
Ethyl formate	0.56	0.05	0.32
Acetic acid	0.22	0.2	0.63
Methyl alcohol	—	Non-solvent	Non-solvent

The Titration of Boric Acid.—According to M. G. Mellon and U. N. Morris, in a paper presented at the recent Milwaukee meeting of the American Chemical Society, mannitol, glycerol, etc., increase the degree of ionisation of boric acid in aqueous solution to such an extent that one may then determine it by titration with a base in the presence of a suitable indicator. Many polyhydroxy-organic compounds, such as polyalcohols, sugars, polyphenols and hydroxyacids, change the acidic properties of the acid; but the pH curves for its titration in the presence of these compounds show that when used in the proportion of four moles of organic compound to one of boric acid, only a few are of value for making volumetric determinations. Of the compounds used the polyalcohols are the most effective, while the hydroxy-acids are of no value. From the standpoint of effectiveness along with low cost, invert sugar seems to be the most desirable.

SHELLAC*

ITS PRODUCTION, USES, ADULTERATION, AND TESTING.

SHELLAC is a manufactured material produced from lac, the excretion of the East Indian insect "*Tachardia Lacca*." The young insects swarm twice a year, alight on the twigs of various species of trees on which they feed, and pierce the bark with their beaks. The assimilated sap excreted by the insect soon dries, and the multitude of tiny animals, becoming cemented to the twig, lay myriads of minute eggs and ultimately die. In a short time the eggs burst forth into life, and the swarm of young insects appear on the branches like blood-red dust. Generation after generation dwell upon the same twig, until the lac coating often attains a thickness of half an inch.

In May and June, and again in October and November, the incrusted twigs are gathered by natives and broken into short pieces These are the stick lac of commerce. Prior to the introduction of synthetic dyestuffs stick lac was collected, primarily, for the production of the red lac dye, and shellac was a by-product. Lac dye is now obsolete, and the stick lac is collected only for the manufacture of shellac.

The stick lac is crushed, washed to remove most of the dye, and dried, the so-called seed or grain lac resulting. The grains are ruby red and about the size of wheat. Shellac is usually made by melting dry seed lac with approximately 0.05 to 0.25 per cent. of arsenic sulphide (orpiment), with or without the addition of small amounts of rosin, in long narrow bags over a charcoal fire. The softened lac mixture is forced through the bag by twisting it. The material forced through the bag is then softened again and made into thin sheets, which are broken into the familiar flakes of the shellac of commerce.

Grading and Usual Adulterants.

The grading of shellac is based upon freedom from rosin and dirt and upon the colour of the flakes. Rosin has been the most common adulterant of shellac because of its low price, and especially because it greatly facilitates the melting of the seed lac. The best grades of shellac are free from rosin, but material containing from 3 to 5 per cent. of rosin is a common grade, and for many purposes serves as well as the pure material. Lower grades of shellac frequently contain even higher percentages of rosin.

The addition of orpiment to shellac seems to be regular practice, and some authorities have claimed that arsenic sulphide causes a vulcanising effect analogous to the action of red sulphide of antimony on rubber. A portion, at least, of the orpiment remains unchanged in the shellac, and tends to give the flakes a lighter appearance. This effect is apparent only in the flake shellac, because on dissolving the flakes in alcohol the orpiment settles out slowly, and its tinting power is thereby lost.

Garnet Lac, Button Lac, and Bleached Shellac.

Garnet lac is a product usually made from the residue of impure lac left in the bag after the squeezing process. The sand and other impurities are usually eliminated by dissolving this impure lac in alcohol or dilute sodium-carbonate solution, filtering, and then driving off the solvent or liberating the lac from the alkaline solution by acid respectively. The dark-coloured product is fused into lumps of various sizes. Button lac is essentially shellac fused into a mass the shape of a button. Bleached shellac is manufactured by dissolving orange shellac in dilute sodium-carbonate solution and bleaching with sodium-hypochlorite solution. The red lac dye is thereby destroyed, and the shellac is then precipitated by mineral acid as an amorphous yellowish-white mass. White shellac prepared in this way is quite sensitive to heat, and must be dried with care at rather low temperatures, or it may become partially or wholly insoluble in alcohol. Bleached shellac which has been stored for a time tends to become more or less insoluble in alcohol.

Properties of Orange Shellac.

The specific gravity of orange shellac varies from 1.08 to 1.13, owing to minute air bubbles inclosed during its manufacture. The melting point is indefinite, and decomposition commences if shellac be heated much above 100° C. It is

* From Technological Paper (No. 232) of the Bureau of Standards of the U.S. Department of Commerce (Government Printing Office, Washington, 5 cents). Compiled by P. H. Walker and L. L. Steele. The Paper also includes a method for determining the amount of alcohol-insoluble matter in shellac, and for determining the non-volatile matter in shellac varnish.—Ed. *C.T.J. and C.E.*

insoluble in dilute mineral acids, but dissolves readily in ammonia or solutions of sodium carbonate, borax, and other alkalies. It dissolves (with the exception of a small amount of natural wax and mineral matter) in cold methyl or ethyl alcohol or a mixture of these two (denatured alcohol). It should be noted that high-proof alcohol must be used. Ethyl or denatured alcohol much weaker than 95 per cent. by volume does not dissolve shellac perfectly. Shellac is also soluble in isopropyl and amyl alcohols (fusel oil), but is quite insoluble in petroleum hydrocarbons and turpentine, a property possessed to the same degree by no other common resin soluble in alcohol. Orange shellac is very stable, and does not depreciate in quality even during long storage.

Shellac Varnishes.

Shellac has a diversity of uses in the industries. Orange and bleached shellac are components of composition articles, such as buttons, phonograph records, imitation ivory, poker chips, sealing wax, and many similar products. Shellac is used in making electrical instruments, in various types of insulation, in fireworks and explosives, and as a binder in abrasive wheels. One of the largest single uses for shellac is in the vehicle of anti-corrosive and anti-fouling paints for the protection of the hulls of steel vessels.

Shellac varnish is very commonly used as a quick-drying coating for floors, furniture, interior decoration, musical instruments, toys, etc. It is extensively used for stiffening straw and hard felt hats, for insulating and waterproofing, in various leather dressings and polishes, and upon willow and rattan goods. The resistance of a dried film of shellac to turpentine and turpentine substitute (mineral spirits) is of great value where shellac is employed as a first coating to fill the pores of wood and cover resinous knots and streaks, because the varnish or wax polish applied afterwards does not soften the shellac. This valuable property is not possessed by most of the so-called shellac substitutes upon the market.

So-called standard shellac varnish is made by dissolving five pounds of the resin in one gallon of special denatured alcohol (U.S. Internal Revenue Bureau formula No. 1 for special denatured alcohol, used in making shellac varnish, consists of 100 gallons ethyl alcohol 190° proof and 5 gallons of approved methyl alcohol). Commercial shellac varnish usually contains a smaller percentage, 4 to 4½ pounds of shellac per gallon of alcohol being a common proportion. As already noted, shellac requires alcohol of high proof for its solution. The formulæ for completely denatured alcohol of the United States Internal Revenue Bureau in every case call for "100 gallons ethyl alcohol not less than 160° proof," mixed with small amounts of materials like kerosene or pyridine bases which render the mixture non-potable. Alcohol of 160° proof is not strong enough properly to dissolve shellac, and since the maker of completely denatured alcohol is not required to use ethyl alcohol stronger than 160° proof, it follows that the ordinary denatured alcohol purchased in the open market is generally unsuitable for mixing with shellac. The specially denatured alcohol (formula No. 1) should be used in shellac when it is obtainable, otherwise completely denatured alcohol, 190° proof, should be employed.

In making shellac varnish, the weighed resin in flake form should stand overnight in a closed vessel with the proper volume of 190° proof alcohol. The mixture should then be stirred at intervals until no more lumps are present. Mechanical-stirring devices are usually employed in factories.

Shellac varnish dries only through evaporation of the solvent. In humid weather it may happen that the rapid evaporation of alcohol from the film will sufficiently lower the temperature to cause condensation of moisture. This may turn the film white temporarily, but eventually the coating should dry to its normal colour. A shellac film does not possess the waterproof qualities and resistance to weather of a good long oil spar varnish, and hence is not suitable for outside exposure. If it were possible to prepare an oil varnish from shellac and linseed or tung oil, it should be an excellent product, owing to the hardness and permanence of this resin; but, unfortunately, shellac will not mix with such drying oils or with turpentine.

Qualitative Detection of Rosin in Shellac.

It has been recognised for some time that the regular methods in use for testing shellac are in many cases inadequate to show that given samples are unadulterated. Shellac varnishes have been more difficult to examine for adulterants than flake shellac.

For many years the purity of a given sample of shellac varnish has been decided upon the results of a qualitative test for rosin. The test commonly used is the familiar Liebermann-Storch reaction, in which a solution of a sample containing rosin in acetic anhydride should give a fugitive lavender colour with sulphuric acid of specific gravity 1.53. Livache and McIntosh (*Manufacture of Varnishes*, 3, p. 306) state that the Liebermann-Storch test gives a decided response when shellac contains as much as 10 per cent. of rosin, but only a doubtful test may result when 5 per cent. of this adulterant is present.

Some experimental work done at the U.S. Bureau of Standards indicates that powdered rosin, which has become partially oxidised through exposure to air, will not give a positive test by the Liebermann-Storch reaction. It was found that an oxidised sample of rosin will, however, give a purple colour by the Halphen-Hicks reaction.

The reagent consists of two solutions: (A) 1 part by volume of phenol dissolved in 2 parts of carbon tetrachloride, and (B) 1 part by volume of bromine in 4 parts of carbon tetrachloride. The most convenient procedure is the following: Dissolve a small quantity of the substance to be tested in 1 to 2 c.c. of solution A. Pour this solution into one of the cavities of an ordinary porcelain colour-reaction plate and fill an adjacent cavity with solution B. Cover the plate with a watch-glass, and note whether the bromine vapours develop a purple or blue colour in the solution of the sample to be tested.

Quantitative Estimation of Rosin.

The quantitative estimation of rosin in dry orange shellac by a determination of the Wijs iodine number was recommended in 1907 by a sub-committee on shellac of the American Chemical Society. This method was made a tentative standard by the American Society for Testing Materials in 1914, and was adopted as standard in 1917. (*See* A.S.T.M. Standards, 1921, p. 663). It has been extensively used, but is open to a number of criticisms. The method depends upon the fact that pure shellac resin normally shows a very low iodine absorption value (18 is arbitrarily taken as the maximum figure), while rosin shows an abnormally high value (arbitrarily taken as 228). When a sample of shellac is found to have an iodine value greater than 18, a calculation by a simple proportion is made to estimate the percentage of rosin present

One of the most serious objections to the method is the fact that it is not applicable to shellac varnishes. The presence of alcohol interferes with the iodine number determination, while removal of all traces of alcohol by heating a sample of shellac varnish tends to change the iodine value of the shellac. The determination of the Wijs iodine value of shellac requires unusual care and skill in order to obtain reliable results. There are samples of shellac with an iodine number as low as 14, and it is conceivable that an addition of as much as 2 per cent. of rosin could be made to such a sample without increasing the iodine value above the allowable limit for pure shellac. At the same time, this small percentage of rosin might be undetectable by a qualitative test of the sample. There is evidence that the rosin used to adulterate shellac tends to decrease in iodine value with increased age, due to partial oxidation. A sample of T. N. shellac containing rosin, which showed a Wijs iodine value of 30.4 in 1912, altered in a sealed bottle so that its iodine value in 1921 was found to be 26.8. F. P. Veitch, of the Bureau of Chemistry, U.S. Department of Agriculture, has noted recently that the change in iodine number of rosin exposed to the air in powdered form is more rapid than commonly supposed, and that marked changes often take place in less than a month's time.

It can also be shown that the iodine numbers of rosin and of manila gum (a resin sometimes used to adulterate shellac) are dependent upon the weight of sample taken for the test. In one case when the iodine number of a rosin (W. W. Grade) was determined by the A.S.T.M. Wijs method, as the weight of sample decreased from 0.1446 to 0.0476 gramme, the iodine value obtained increased from 185.0 to 255.0.

A New Improved Method Applicable Also to Shellac Varnishes.

It is apparent that some new method is needed which can be applied to both flake shellac and shellac varnish for the

detection and estimation of adulterants like rosin and manila gum. Some years ago Langmuir made the observation that pure shellac is very nearly insoluble in petroleum ether, while rosin dissolves readily in this solvent. McIlhiney (*J. Am. Chem., Soc.*, 30, p. 867, 1908) developed a method for the quantitative estimation of rosin in shellac, based on the above observation, but apparently the method has not been used to any extent. A study of McIlhiney's method led to certain changes which shortened and simplified the procedure, and finally resulted in a modified method by which it is believed to be possible to detect adulteration and give quality ratings for both dry shellac and shellac varnish.

Manipulative Details of the New Method.

Pètroleum ether distilling between 55 and 75° C.* was obtained by the distillation on the steam bath of commercial petroleum ether. Glacial acetic acid was diluted with water until its solidification point was between 13 and 14° C.

Method. — Accurately weigh 2 grammes of flake shellac (± 0.1 g) and transfer to a 2-litre Florence flask, the neck of which has a volume somewhat over 100 c.c. In case of a shellac varnish, determine the percentage of non-volatile matter first. Place a portion of the well-mixed sample in a stoppered container. Weigh the container and sample. Transfer a weight of the sample corresponding as closely as practicable to 2 grammes of non-volatile matter to the flask already described and restopper the container. Weigh the container again, and by difference calculate the exact weight of the portion transferred to the flask. Calculate the exact weight of shellac in the sample taken from the percentage of non-volatile matter in the varnish.

The procedure from this point is the same for dry and cut shellac. Add 20 c.c. of the special acetic acid, and heat the flask until the shellac, resin, and wax are dissolved. With certain shellac adulterants there may be a small amount of resin which cannot be dissolved. Cool the flask to room temperature (19-21° C.), whereupon a part of the natural shellac wax usually separates. Add slowly from a pipette 50 c.c. of the petroleum ether cooled to 19-21° C., with constant shaking of the flask, allowing one to two minutes for the addition. Add all at once from a graduated flask 100 c.c. more of the petroleum ether kept at 19-21° C., stopper the flask, and shake vigorously. While shaking the flask, slowly add tap water kept at 19-21° C., until the shellac has separated as an amorphous mass. Half fill the flask with water and agitate, so as to wash thoroughly the ether layer. Add water until the petroleum ether layer nearly fills the neck of the flask, cork, and let the flask stand until the ether layer is free from suspended particles. Transfer 100 c.c. of the ether layer to a 100 c.c. graduated flask. It is convenient to fit the large flask with a two-hole stopper with tubes arranged like a wash bottle, so that the ether solution can be blown into the graduated flask.

Evaporate the 100 c.c. of petroleum ether solution, portion wise if necessary, in a small weighed Erlenmeyer flask on a hot plate. When the dry point is reached, suck out the residual solvent vapours, cool the flask, and weigh. The weight of the residue multiplied by 150 and divided by the weight of shellac taken is the percentage of "matter soluble in petroleum ether." Dissolve this residue in 25 c.c. of a mixture of equal volumes of 95 per cent. denatured alcohol and benzol (the mixture should be previously titrated to a faint pink colour with dilute alkali, using phenolphthalein as an indicator), and titrate in the cold with 0.1 *N* alcoholic sodium hydroxide with phenolphthalein as an indicator. Calculate the acid number of the "matter soluble in petroleum ether" (milligrammes of KOH required for 1 gramme of petroleum ether residue). Transfer most of the petroleum ether layer remaining in the Florence flask to a small beaker or flask, and evaporate to dryness. Test this residue for rosin by means of the Halphen-Hicks test already referred to. Report a faint purple or blue colouration as "faint test for rosin" and a deep purple or blue as "decided test for rosin."

A series of orange shellac samples was examined by the modified McIlhiney method as outlined, and the analytical data are given in the report. The iodine value of each sample by the Wijs method, a qualitative test for rosin on the original sample and on the petroleum ether residue, and a calculation of the percentage of rosin from the Wijs iodine value of the adulterated samples are also given.

* A fraction with initial boiling point of 40° C. should be satisfactory, provided it is not used in extremely hot weather.

General Conclusions on the Interpretation of the Results.

An examination of the results indicated that a large number of the samples of shellac were free from rosin, as shown by a qualitative test and by an iodine value below the arbitrary accepted limit of 18. Such samples can probably be safely considered as unadulterated shellacs. These samples of pure shellac, with few exceptions, yielded values between the limits of 6.0 and 7.0 per cent. for material soluble in petroleum ether and acid values for this residue between the limits of 60 and 90. This material soluble in petroleum ether is believed to be chiefly a natural shellac wax, which is stated by Livache and McIntosh to be present to the extent of approximately 6 per cent. in shellac, and is composed of ceryl and myricyl alcohols, partly in combination with fatty and resinous acids. These limiting values are believed to be characteristic of pure shellac.

From a consideration of all the data obtained, it was concluded that if a sample of shellac contains unoxidised rosin as an adulterant, the material soluble in petroleum ether of the sample will exceed the percentage 7.0 by a figure closely approximating the percentage of adulterant present. If a sample of shellac is appreciably adulterated by partially-oxidised rosin or by manila resin, the difference between the percentage of material soluble in petroleum ether found and 7.0 per cent. will represent a minimum figure for adulteration, and in many cases the real adulteration may be twice or, in extreme cases, three times this minimum figure. The consideration of the acid value of the residue soluble in petroleum ether of samples of shellac under examination may give valuable information. This value for a normal pure shellac lies between 60 and 90. Any marked departure from these limits should place a sample under suspicion. In general, adulteration with acid resins like rosin or manila gum should tend to increase this value above the normal, while neutral resins or waxes, or resins of low acid value like coumarone, paraffin, and ester gum (rosin glyceride), respectively, would tend to lower the acid value of the petroleum ether residue below the normal for pure shellac.

Valuation of Samples of Shellac.

The following table will be found a suggested method for rating samples of shellac from the data of the modified McIlhiney method: —

Suggested Method for Rating Samples of Shellac.

Petroleum Ether Soluble Percentage.	Rosin Test.	Acid Number of Residue.	Purity.
7.0 or less	Negative	60—90.....	Pure.
7.0—8.0.....	Positive.....	May be greater or less than 90.	Slightly adulterated; probably 1—2 per cent. rosin, as in "Superfine."
7.0—8.0.....	Negative	do.	Suspicious; no adulteration proved.
8.0—12.0.....	Positive.....	Generally, but not always over 90.	Somewhat adulterated: probably a "T.N." shellac.
8.0—12.0.....	Negative	do.	Somewhat adulterated with an adulterant other than rosin.
12.0—20.0.....	Positive or negative.	do.	Badly adulterated; possibly as high as 40 per cent. adulteration.
Over 20.0	do.	do.	Grossly adulterated; possibly no shellac present.

The Colour of Orange Shellac.

Normal samples of orange shellac contain small percentages of mineral matter, wax, and inclosed bubbles of air. As previously mentioned, a small amount of orpiment is usually added in the manufacture of shellac. The shellac flakes are therefore not transparent to light, and for this reason colour standards for comparison with the flakes are not practicable. The apparent light colour of some samples of orange shellac may be misleading where such effect is caused by air bubbles or the use of orpiment. When such a sample is dissolved in alcohol, the orpiment tends slowly to settle, the inclosed air bubbles are released, and the resulting solution may be darker than the solution of a flake shellac containing less inclosed air and orpiment and apparently of a darker shade when in flake form.

In the following table are some data on samples of white shellac, garnet, button, stick, and seed lac, and several commercial orange shellac varnishes.

Data on Shellac Varnishes, Bleached Shellac, Garnet Lac, Etc.

Trade Name of Sample.	Matter Soluble in Petroleum Ether.	Acid Number of Petroleum Ether Residue.	Iodine Number of Shellac.	Qualitative Test for Rosin on Original Sample.	Qualitative Test for Rosin on Petrol'm Ether Residue.	Classification According to preceding Table.
	Per cent.					
V. S. O. cut-in alcohol	6.1, 6.2 — 6.2	64.0, 68.0 — 66.0	—	Negative	Negative	Pure
Orange shellac varnish	24.5, 25.4 — 25.0	136.5, 136.0 — 136.5	—	Positive	Positive	Grossly adulterated
Do.	8.8, 9.0 — 8.9	33.0, 32.0 — 32.5	—	Negative	do.	Somewhat adulterated
Do.	10.8, 10.9 — 10.9	90.0, 91.5 — 91.0	—	—	do.	Do.
Do.	12.6, 13.0 — 12.8	95.0, 94.5 — 95.0	—	Positive	do.	Badly adulterated
White shellac varnish ...	13.3, 14.0 — 13.7	24.5, 23.0 — 24.0	—	—	do.	Do.
Dry white shellac ...	7.6, 7.9 — 7.8	87.0, 88.0 — 87.5	11.3, 10.9 — 11.1	Negative	do.	Slightly adulterated
Garnet Lac .	13.5, 12.9 — 13.2	150.5, 147.0 — 149.0	39.8, 40.1 — 40.0	Positive	do.	Badly adulterated
"C" Garnet Lac.	5.8, 5.6 — 5.7	111.5, 114.0 — 113.0	18.9, 18.7 — 18.8	Negative	do.	Very sl'tly adulterated
Button Lac .	7.8, 7.7 — 7.8	83.5, 79.0 — 81.0	13.8, 15.5 — 14.7	do.	Negative	
Stick Lac ..	11.9, 12.1 — 12.0	99.0, 97.5 — 98.0	16.9, 18.2 — 17.6	do.	do.	
Seed Lac ...	7.4, 7.3 — 7.4	81.5, 78.5 — 80.0	14.4, 15.0 — 14.7	do.	do.	

The modified McIlhiney petroleum-ether method has been used recently by H. A. Gardner, of the Institute of Paint and Varnish Research, Washington, D.C., in the examination of a series of orange shellac varnishes, and the data obtained are given fully in the report.

THE "SOLUBILITY TEST" FOR LEAD COMPOUNDS.

VALUE IN THE PAINTS INDUSTRY.

THE possibility of the paint industry having a solubility test imposed upon it by Statute, was the *raison d'être* a paper by Dr. Fox delivered to the Oil and Colour Chemists' Association on Thursday, October 11. It will be remembered that the Departmental Committee on House Painting and Coach Building adopted in 1915 the "solubility test" in respect of the pottery industry. Although this recommendation has not yet been acted upon, certain Government Departments have attempted to enforce it, and the test has been incorporated to some extent in legislation in other directions. The whole question was re-examined by another Committee specially appointed to inquire into the difficulties left by the previous Committee, and a report was published in February of this year. The findings of this second Committee, however, did not include a recommendation as to a solubility test, nor was any opinion expressed as to the desirability or otherwise of one being imposed upon the paint industry, but it was recommended that some authoritative body should carry out further research work, particularly in the matter of durable substitutes for white lead.

Statutory Definitions of "Lead Compounds."

In 1920 the Act of Parliament prohibiting the employment of women and young persons in certain industries using or manufacturing lead compounds was passed, and for the purpose of the Act, the term "lead compound" was defined to include any soluble lead compound, or mixture containing lead compound, declared to be such by Order of the Secretary of State. Two Orders have been issued in this connection, the first on October 1, 1921, under Section 79 of the Factory and Workshops Act of 1901, and the second on November 8, 1921, and these have particular reference to glazes used in the pottery industry. The decision to place a statutory limit upon the quantity of lead was the result of the extensive researches by Professors Thorpe and Oliver in 1898. The first Order referred to, states that "lead compounds" means any carbonate, sulphate, nitrate or acetate of lead or any material used in the manufacture of such compounds and containing 5 per cent. or more of lead, but excluding lead or ores which contain lead only in the form of sulphide. The second Order states that "lead compound" shall mean any compound of lead, other than galena which, when treated in the manner prescribed, yields to an aqueous solution of hydrochloric acid, a quantity of soluble lead compound exceeding, when calculated as lead monoxide, 5 per cent. of the dry weight of the portion taken for analysis. The prescribed manner is the following:—A weighed quantity of the material which has been dried at 100° C. and thoroughly mixed, is to be shaken continuously for one hour, at the common temperature, with 1,000 times its weight of an aqueous solution of hydrochloric acid containing 0.25 per cent. by weight of hydrogen chloride. This solution is then to be allowed to stand for one hour and filtered. The lead salt contained in the clear filtrate is then to be precipitated as lead sulphide and weighed as lead sulphate.

The Solubility Test on Commercial Lead Pigments.

After pointing to the possibility of such a test being made compulsorily upon the paint industry, Dr. Fox gave a number of results of tests upon coloured paints, which demonstrated that many of them contain less than the prescribed 5 per cent. of soluble lead, the tests having been carried out on samples obtained in commerce and not specially prepared samples. An important consideration in the solubility of lead compounds, he continued, is the undoubted effect of fine grinding, which had also been gone into by Professor Thorpe, and it was added that with lead compounds used with paints in the experiments at the Government Laboratory, it was found that the degree of fineness is usually such as to secure the maximum solubility under the conditions of the 5 per cent. test. Discussing the results obtained with various lead pigments, it was stated that white lead, litharge, and red lead are entirely soluble in 0.25 per cent. hydrochloric acid. The lead in basic lead silicates and lead monosilicates is completely dissolved. Lead sulphate differs from white lead in its behaviour in the solubility test inasmuch as the acid solution obtained contains presumably also sulphuric acid, which means that the solubility of the lead, expressed as a percentage of the solid matter taken, becomes constant so long as excess of lead sulphate is present.

Misleading Results with Basic Lead Chromates.

Similar remarks apply to certain other lead salts, such as lead chromate, molybdate and sulphide, derived from acids which precipitate lead from faintly acid solutions. In all these cases, depression of the solubility of the lead oxide dissolved by hydrochloric acid may occur. For this reason, no marked increase in the solubility is found with mixtures containing lead sulphate in excess of a certain value. The importance of the knowledge of the solubility of lead sulphate for the present purpose arose from the occurrence of this compound in certain lemon and middle chromes. Normal lead sulphate itself has a solubility of 2.8 per cent. calculated as lead monoxide, but basic lead chromate has a much higher solubility since all the basic lead oxide is dissolved. The solubility of mixtures of lead chromate with lead-free pigments remains nearly constant at 2.6 per cent., while a mixture of 50 per cent. lead chromate and 50 per cent. lead sulphate gives a higher solubility, exceeding 16 per cent.

Mr. C. A. Klein (Brimsdown Lead Co.), speaking in the discussion, said he regarded the test more as a question of physiology than physical chemistry. It was a moot question whether solubility in gastric juice was of the prime importance which was given to it in the so-called Government test. He looked upon this as a wholely empirical test, and admittedly one that had proved its value in practice, but beyond that, one could not go very far.

Influence of Fineness of Grinding.

Mr. J. Parrish (Brimsdown Lead Co.), speaking on the question of fineness of grinding, said a great deal depended upon the manner in which the material was ground. In one case, material intended to pass a 150 mesh might be so finely ground as to pass a very large percentage through a 200 mesh. On the other hand, similar material might be so ground that the whole of it only just went through the 150 mesh, and there would be a difference in the solubility of material ground presumably to the same degree of fineness.

Dr. T. M. Legge (H.M. Chief Medical Inspector of Factories) said he was perfectly satisfied, in the case of the pottery industry, that whether the lead entered the body through the lungs or by the stomach, low-solubility glaze

was perfectly innocuous and should be encouraged in every possible way.

Mr. J. A. F. Wilkinson (Woolwich) said he had made many experiments upon commercial pigments, and the results agreed very well with those of Dr. Fox. He had investigated a number of lead and zinc oxides and found, as Dr. Fox had done, that the lead sulphate was completely dissolved under the test referred to. There were many cases where the insoluble lead was less than 5 per cent., and it seemed possible to produce a lead chrome, for instance, which would come within the regulations.

The Test Quite Empirical.

Dr. H. H. Morgan said it seemed to him that the solubility test had very little justification apart from the statistics put forward by Dr. Legge. It was quite an empirical test, and he had not gathered from Dr. Fox why the limit had been put at 5 per cent. There was no correlation between the physiological effects of lead poisoning and this solubility test.

Dr. Legge added that with the possible exception of Holland, he did not think any other nation than Great Britain had a standard of solubility, and when the German proposal of a standard of 2 per cent. metallic lead was made, it was strongly supported and it was impossible to argue that our 5 per cent. solubility was better and would be much better if it were adopted.

Dr. Fox, in a brief reply to the discussion, said this whole question had to be considered on broad lines and be regarded as a works test. If a limit of 5 per cent. were imposed and it was found in certain cases to be 5.5 or 6 per cent., he did not suppose anyone would worry much about it. It would have to be treated as a matter of practical politics.

THE BRITISH EMPIRE EXHIBITION.

ORGANISATION AND PROGRESS.

TO those of us who have been privileged to peep behind the scenes and to gain first-hand impressions of the work being done towards next year's gigantic undertaking at Wembley, it is obvious that a very great constructive effort is being made. This effort is backed up with vast sums of money and by keen brains on a scale which we think no other country, either in the Old World or in the New, could undertake at the present time. This is all to the good as there is every indication that our Home and Empire trade will derive impetus from the Exhibition in direct proportion to the amount of concentrated effort and co-operation put into the work of organisation and preparation. In view of the natural interest of all our readers, and particularly of our overseas readers, in the progress of the Exhibition, it is our intention to place before them from time to time the latest information on such progress. In this way, by knowing exactly and well in advance what they will see when they visit Wembley next year, our readers will be able to derive the maximum benefit from their visit.

It is encouraging to know that, as we have pointed out on several occasions previously, the Chemical Section of the Exhibition will be the last word in efficiency. This indeed is only as it ought to be, but so many things in this world fall short of what they should be, and what with energetic, informed and enthusiastic leadership they easily could be, that the credit to be accorded to the organisers of the Section cannot be withheld.

Exhibitors in the Chemical Section.

The following list of exhibitors in the Chemical Hall is approximately complete and will be seen to include the names of our most prominent manufacturers in the domains of heavy chemicals, fine chemicals, dyestuffs and intermediates, soaps, pharmaceutical products, and other branches.

Ajax Aniline Dye Manufacturing Co., Ltd.
Albright and Wilson, Ltd.
Stafford, Allen and Sons, Ltd.
J. and E. Atkinson, Ltd.
F. W. Berk and Co., Ltd.
A. Boake, Roberts and Co., Ltd.
Boots Pure Drug Co., Ltd.
J. C. Bottomley and Emerson, Ltd.
British Alizarine Co., Ltd.
British Cyanides Co., Ltd.
British Drug Houses, Ltd.
British Dyestuffs Corporation, Ltd.
The British Soap Co.
Brunner, Mond and Co., Ltd.
Bryant and May, Ltd.
Burgoyne, Burbidges and Co., Ltd.
Burroughs, Wellcome and Co.
Burt, Boulton and Haywood, Ltd.
W. J. Bush and Co., Ltd.
Carnegie Bros.
J. M. Collett and Co., Ltd.
The Colne Vale Dye and Chemical Co., Ltd.
Clayton Aniline Co., Ltd.
Joseph Crosfield and Sons, Ltd.
Cussons Sons and Co., Ltd.
James H. Dennis and Co., Ltd.
Joseph Dixon Crucible Co.
Dolly and Drummer Dyes.
Wm. Edge and Sons, Ltd.
Duncan Flockhart and Co., Ltd.
The Erasmic Co., Ltd.
Fairy Dyes, Ltd.
Gas Light and Coke Co.
D. and W. Gibbs, Ltd.
Wm. Gossage and Sons, Ltd.
Grays Dyes and Colours, Ltd.
J. Grossmith and Son, Ltd.
The Graesser-Monsanto Chemical Works, Ltd.
Herbert Green and Co., Ltd.
Grout and Co.
Hardman and Holden, Ltd.
C. R. Harker, Stagg and Morgan, Ltd.
Hickson and Partners, Ltd.
Thos. Hill-Jones, Ltd.
L. B. Holliday and Co., Ltd.
Hopkin and Williams, Ltd.
Howards and Sons, Ltd.
Robt. Ingham Clark and Co., Ltd.
Jeyes' Sanitary Compounds Co., Ltd.
Johnson and Sons Manufacturing Chemists, Ltd.
H. and T. Kirby and Co., Ltd.
B. Laporte, Ltd.
The Leeds and Bradford Boiler Co., Ltd.
Lever Bros., Ltd.
T. Lye and Sons.
J. F. Macfarlan and Co.
McDougall and Robertson, Ltd.
May and Baker, Ltd.
The Midland Tar Distillers.
Murgatroyd's Salt Works, Ltd.
Naylor Bros. (London) Ltd.
Newton, Chambers and Co., Ltd.
Orr's Zinc White, Ltd.
J. C. Oxley's Dyes and Chemicals, Ltd.
A. and F. Pears, Ltd.
Price's Patent Candle Co., Ltd.
Wm. Ransom and Son, Ltd.
J. J. Rigby, Ltd.
Eugene Rimmel, Ltd.
J. L. Rose.
The Salt Union, Ltd.
Scottish Dyes, Ltd.
T. and H. Smith, Ltd.
The South Metropolitan Gas Co.
Spencer, Chapman and Messel, Ltd.
Peter Spence and Sons, Ltd.
J. and E. Sturge, Ltd.
Silk's Toilet Co.
Taylor Bros. and Cox, Ltd.
Thos. Tyrer and Co., Ltd.
"Thamar."
The United Alkali Co., Ltd.
The Washington Chemical Co.
Joseph Watson and Sons, Ltd.
Whiffen and Sons, Ltd.
Oliver Wilkins and Co., Ltd.
J. B. Wilkinson.
Williams Bros. and Co.
J. and J. White, Ltd.
Yardley and Co., Ltd.
The Zee-Kol Manufacturing Co.

The position of the Chemical Hall is an ideal one. Visitors to the exhibition arriving at Wembley Park Station enter at the North Entrance, and the Palace of Industry is on the right hand side of the Main Avenue which runs straight to the Stadium—north to south. The Chemical Hall is in the north-east corner of the Palace of Industry; it is surrounded

by two of the 75-foot gangways; there are three main entrances to it.

Members of the Various Chemical Committees.

Members of the various Committees are:—

Publication Committee.—Dr. E. F. Armstrong, F.R.S. (chairman); Mr. E. V. Evans (secretary); Professor J. W. Hinchley, Dr. H. Levinstein, Dr. Stephen Miall, Mr. R. B. Pilcher, Dr. Plimmer, Professor J. Thorpe, and Mr. W. J. U. Woolcock. *Executive Sub-Committee.*—Mr. H. Barrett, Mr. Guyton Butler, Mr. E. V. Evans, Mr. C. Gibbs, Mr. C. A. Hill, Mr. E. Linstead, Sir Max Muspratt, Bart., General N. W. Webber, and Mr. W. J. U. Woolcock (chairman). *Scientific Committee.*—Mr. J. Baker, Mr. F. H. Carr, Mr. E. V. Evans, Dr. J. T. Hewitt, Mr. J. B. Atkinson, Dr. Herbert Levinstein (chairman), Mr. T. Marns, Dr. Stephen Miall (secretary), Mr. E. T. Neathercoat, Mr. R. Pilcher, Commander R. E. Stokes-Rees, R.N., Professor J. F. Thorpe, Professor J. W. Hinchley, and Mr. W. J. U. Woolcock.

Visit to Wembley.

At the invitation of Mr. W. J. U. Woolcock (Association of British Chemical Manufacturers) we were afforded the privilege of a visit to the exhibition grounds on Tuesday, a meeting of exhibitors in the Chemical Hall constituting the occasion.

About 150 chemical and allied exhibitors made the journey to the exhibition where they were met by Sir Lawrence Weaver, K.B.E., Mr. W. J. U. Woolcock (British Chemical Manufacturers Association), and Mr. Clough Williams Ellis (architect). The exact position and area of all spaces allotted were carefully pointed out by these gentlemen, and various helpful suggestions and hints were added with a view to aiding all the firms concerned in the effective design of their exhibits. Construction has reached a very advanced stage, many visitors expressing satisfaction and surprise at the rapid progress achieved. There is no doubt possible now about the absolute completion of the whole work before the exhibition opens, and this rather unusual attainment is most satisfactory. It could only be done by the concentrated energy and organisation of the expert direction which the exhibition has very fortunately secured. The buildings, terraces, bridges, etc., are of the most excellent design and solid construction, ferro-concrete and concrete blocks being the main materials employed.

At a meeting of the exhibitors addressed by Sir Lawrence Weaver and Mr. Woolcock, announcements were made concerning various important incidental details. It has been arranged that exceptionally favourable insurance policy terms will be possible at reduced rates through the combined insurance companies covering buildings, exhibits, and all incidental risks. Fire extinguishers will be provided from a levied fund.

Discussion on Competitive Awards.

A very important and interesting discussion took place on the question of competitive awards. There is a surprisingly widespread feeling against the usual Grand Prix, Award of Honour and Gold Medal arrangement. It is common knowledge that the bulk of desire and opinion in all sections of the exhibition is against gradation. On the other hand there is a sparse minority, consisting for the most part of very famous concerns, who for the past sixty or seventy years have won Grand Prix and medals all over the world, and have regarded them as very formidable and almost indispensable business assets. Two very famous pharmaceutical manufacturers moved that the gradated award system be continued and their arguments seemed extremely reasonable in the case they put forward, but this very large meeting which consisted of practically the whole of the chemical, pharmaceutical, dyestuffs, soap, and perfumery exhibitors voted solidly against them.

This corresponds exactly with what has happened in the Engineering and other groups. It is almost a revolutionary change in exhibition practice, and various reasons may be given to explain it. There is a strong feeling that award committees are not always competent, and that even when competent they are more influenced, unconsciously perhaps, by a costly stand display than by the merit of the goods. Firms who cannot afford a costly display have in the past failed to "catch the judge's eye" as it were.

Another point put forward very strongly was the fact that many people are exhibiting chiefly in the national interest and all would deserve a record or souvenir in return. It was also put forward, and this is a very cogent point, that this is a vast exhibition of the British Empire, and although a Grand Prix or gold medal might be very desirable if won against foreign competition there was no object in pitting themselves one against the other especially against the young developing industries of our Dominions.

Sir Lawrence Weaver announced, that although no definite decision has been reached, yet there is little doubt that a general award of honour or something similar is the overwhelming desire of exhibitors and that this will inevitably be the result. He related very humourously a case where the British exhibitors at a famous Continental exhibition were all awarded a Grand Prix (the time of the award committee being short and it was getting dark!) and they were all very contented and happy about it except one man who called at his London office and said he did not quite understand why he had won the honour as his exhibit had been lost in transit on its way to the exhibition!

Mr. W. J. U. Woolcock proposed a vote of thanks to Sir Lawrence Weaver for inviting them to Wembley, for so ably presiding and for refreshing the assembly with tea. Following this, the visitors were conducted to the huge Stadium which, apart from its wonderful stretch of perfect turf and general accommodation which makes it the finest sports ground in the world, provides from its surrounding terraces a bird's-eye view of the mammoth proportions of the whole of the buildings and grounds.

BRITISH ASSOCIATION OF CHEMISTS.

REPORT OF COUNCIL FOR YEAR 1922-23.

In the report for the year 1922-23 to be presented to the members at the sixth annual general meeting on October 27, the Council of the British Association of Chemists state, amongst other matters, that a decrease is again reported in the membership as at the end of the year. This is due mainly to the economic situation in the chemical and allied industries, particularly in the heavy chemical industry where reductions in salaries have taken place, and further, to the withdrawal of those members who were opposed in principle to the inauguration of the Unemployment Benefit Fund. 42 new members have been elected, 221 have resigned or have been removed from the Register under the operation of the Rules, and losses due to death number 4. The effective membership is thus 912, compared with 1,095 at the commencement of the year.

The Council recommend that no increase be made in the annual subscription for the coming year, and that the system of voluntary donations be continued.

The outstanding feature of the year's work has been the operation of the Unemployment Benefit Fund. In this the economic aspect of the Association has been brought to the forefront, and the results achieved fully justify the optimistic forecasts of the originators of the scheme. This function of the Association is one which can be undertaken by no other chemical organisation. Figures representing a normal year's working are not yet available, but the data acquired allow an approximate estimate to be made of the liabilities during the next few years, and show the Fund to be financially sound.

The Appointments Bureau has been extremely active throughout the year, an average of nearly 10 per cent. of the Full Membership having received the weekly circular continuously. A careful watch is also kept for advertisements of appointments under conditions not consonant with the status of the chemist as a professional man. There are at present 72 members on the Active Register, of whom 46 are returned as unemployed. These figures represent decreases of 1 and 20, respectively on last year.

The relations between the Association and the various other scientific organisations have been uniformly of a harmonious character.

Negotiations with the National Union of Scientific Workers are being proceeded with.

Co-operation between the various chemical organisations, coupled with the education of the general public by chemists themselves, would seem to be the solution of the problem of legal re-definition of the term "Chemist." The Council are of the opinion that until this has progressed to a much greater degree no useful purpose would be served by an active attempt to obtain a statutory right to the title, and that any such action would serve only to antagonise the pharmaceutical profession. Two changes in the Rules are being submitted at the annual meeting.

A fresh Propaganda Campaign is to be opened at the commencement of the Winter Session, and endeavours are to be made to secure the assimilation in industry of a greater number of scientifically trained men and to bring before the public to a greater degree the intrinsic value of applied

science as a national asset. Arrangements have been made for securing the loan of a number of industrial films of great interest to the general body of members. The showing of these films will form part of the Winter Programme of the Sections, and local announcements may be expected in due course.

Although for various reasons the Association has been unable to make as much use of the privilege as in former years, its thanks are again tendered to the proprietors of the *Chemical Trade Journal and Chemical Engineer* for the use of its valuable space for the publication of official matter concerning the Association.

Looking forward to the coming year it must be realised, however, that the successful issue of any action taken by the B.A.C. must in large measure depend on the numerical strength of its membership, and to this end the Council appeal to the general body of members to concentrate on propaganda work, thereby to consolidate the position of the Association both in the industrial and the professional life of the country.

ITALIAN LABORATORY GLASS INDUSTRY.

GREAT EXPANSION IN OUTPUT.

ON the outbreak of war Italy found herself cut off from her foreign source of supply for scientific glassware, and with no home industry to take its place; before the end of 1915 her stocks were exhausted, and it became urgently necessary to provide the Army hospitals with glass phials for hypodermic injections, etc., and with the laboratory glassware required for preparing sera. The Murano glass factories, famous for their artistic production, took up the challenge, and, after an experimental period, succeeded in producing a "neutral" glass tube which complied with the requirements of the Army Authorities. Other kinds of laboratory glass were also perfected, special attention being given to the manufacture of X-ray globes, which must be of glass possessing special qualities of transparency, readily malleable by flame, etc. Glass tubes for boiler levels were needed by the State railways, and these also were produced of satisfactory quality, resistant to extremes of heat and cold.

To-day the Italian output of such glass not only fully supplies the home market, states the Board of Trade *Journal*, but is exported in considerable quantities, neutral glass tubes being in demand in countries such as Spain, France, and Belgium, where they are converted by the home glass-blowing industry into the finished product. In countries where the glass industry is undeveloped, the finished product, glass phials, and other laboratory requisites are in demand. In such goods it is quality rather than price which counts, and the Italian firms are securing a reputation even in competition with the world-famous products of Jena. The output of neutral glass tubes varies from 1,500 to 2,000kilogs. per day; of the small phials for hypodermic injections, etc., about one and a half million are produced daily, and from one to two thousand pieces of laboratory glassware (globes, retorts, beakers, test tubes, mortars, filters, funnels, etc.). The industry employs about 800 men.

INSTITUTE OF CHEMISTRY.

HUDDERSFIELD SECTION.

THE annual general meeting of the Huddersfield Section of the Institute of Chemistry was held on Thursday, October 11, at the Queen's Hotel, Huddersfield.

The report for Session 1922-23 was presented by the Chairman, Dr. H. H. Hodgson. The balance-sheet was approved, and the income of the Section having proved sufficient for present needs, it was decided unanimously to reduce the balance outstanding from Session 1921-22 by making a donation of five guineas to the Benevolent Fund of the Institute. Of the two members of committee who retired this year, Dr. Pollock did not wish to serve again, whilst Mr. J. H. Wilson was willing to do so. Dr. J. Bruce was elected in the place of Dr. Pollock, the committee of the Section now being: Chairman, Dr. H. H. Hodgson; treasurer, Mr. S. Robson; committee, Dr. A. E. Everest, Dr. L. G. Paul, Dr. J. Bruce, Mr. J. H. Wilson; secretary, Mr. T. A. Simmons. The programme for the coming session includes addresses by Professor R. Robinson, F.R.S., in November; Professor R. V. Wheeler, in January; and Dr. L. G. Paul, in February. It is intended to hold, in addition, at least two meetings for discussion. There are now 55 members of the Institute in Huddersfield and district, and of these from 30—40 take some part in the activities of the Section.

THE DIRECTORATE OF THE DYESTUFFS CORPORATION.

IN our last week's issue (page 430) we published the letters written to the *Morning Post* by Sir William J. Pope and by Sir William Alexander respectively concerning the constitution of the directorate of the British Dyestuffs Corporation and the resignation of Professor A. G Green, we now publish below the further correspondence that has occurred—namely, the statement of Professor Green himself and the refutation of Sir William Pope's charges by Mr. J. M. Robertson:—

Statement by Professor Green.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—My attention has been drawn to a letter by Sir William Alexander in the issue of the *Morning Post* of the 10th inst. I do not desire to enter here upon polemical matters, but to correct certain inexactitudes in Sir William's statement.

He says in effect that my retirement (or was it dismissal?) followed upon a peremptory refusal on my part to carry out the decision of the Board with regard to curtailment of research expenditure. The facts are that my resignation was already in the hands of the Board three weeks before I received intimation of their decision to reduce the staff, and this decision was conveyed to me by the managing director at the same time that he accepted my resignation. In my letter of resignation I did not allude to curtailment of staff or expenditure, though I was actuated by the conviction that the present constitution of the Board rendered it incompetent to deal with this or any other technical question.

Sir William Alexander also infers that the decision of the Board to pursue a policy of curtailment was taken with the concurrence of "scientific men" within the Corporation's organisation. I think we are entitled to know who these were. So far as my information goes, the entire scientific and technical staff, and also our outside scientific advisers, were strongly opposed to any further curtailment of the essential chemical services of the Corporation. Such so-called "economies" can only lead to the enfeeblement of the national effort and ultimate return to the pre-war conditions of dependence on Germany.—Yours, etc.,

Oct. 13. A. G. Green.

Mr. J. M. Robertson and "Political Amateurs."

The following letter has appeared in the *Morning Post*:—

Sir,—My attention has been called to the letter of Sir William Pope in your issue of 8th inst., on the subject of the British Dyestuffs Corporation. Its object appears to be, in the main, to impute to Mr. Walter Runciman the responsibility for the management of "Dyestuffs, Limited," in a period extending some seven years after he had ceased to have any control of it. To this proposition Sir William adds an attack upon me, who vacated the Parliamentary Secretaryship of the Board of Trade in May, 1915. In my case his gravamen is a misreported remark made by me as to cases in which business concerns had been ruined by the control of gifted scientific men. Of Mr. Runciman and myself he affirms that "each possessed that certainty and precision of judgment concerning intricate problems of which he knows nothing, so characteristic of the amateur."

Sir William is visibly the amateur of his own definition, for he knows absolutely nothing of my relation to the Dyestuffs concern beyond the fact that I was connected with the Board of Trade at its inception. I never expected to see so striking a confirmation of my (misreported) remark about the unfitness of many scientific men for business functions. But Sir William's infirmity exceeds that of the type in question. The attempt to assign responsibility for the policy of "Dyestuffs" since 1916 to Mr. Runciman is quite—or nearly—the most unscrupulous performance in public life that has come under my notice in the period. Sir William can have few rivals among the politicians in his faculty for false theory and inaccuracy. In this case the bare statement of the dates suffices to expose him. Of course that has been known to happen in the case of a distinguished politician. But the greater the shame of the man of science who, ignorantly meddling with politics, selects for rivalry the most discredited models.—Yours, etc.,

Oct. 15. J. M. Robertson.

THE ORIGIN OF PETROLEUM.

GENESIS FROM VEGETABLE MATTER.

THAT there is still a wide difference of opinion as to the origin of petroleum was manifested at the meeting of the Institution of Petroleum Technologists, held on Tuesday week, when Mr. E. H. Cunningham Craig presented a paper in which he dealt with recent researches bearing upon this question. The subject has been a fruitful source of discussion, and even controversy, but of late years, by what seems to be general consent, there has been a cessation of polemics, and writers on the subject have been content to give bald, and not always accurate, statements of theories put forward, without leaning to one side or the other upon controversial points. The consideration of these theories, of course, should prove valuable, but the avoidance of controversial problems does not appear likely to lead very far towards a definite conclusion. The difficulty is, however, that there are many varieties of petroleum, and, as was pointed out by more than one speaker, it seems impossible to imagine that all these varieties should have been produced by one series of conditions.

Theories of Inorganic Origin Abandoned.

The genesis of petroleum has been variously considered to be inorganic and organic. The two inorganic theories,—which attribute the origin of petroleum to hypogene causes and to vulcanicity respectively—Mr. Cunningham Craig dismissed, the first as being a speculative idea, and not seriously considered nowadays, and the second as not having found acceptance among scientific workers. This narrowed the problem down to the consideration of the two organic theories—namely, that petroleum originated from animal or from vegetable matter. The animal-origin theory is supported chiefly by chemists, whilst that of vegetable origin is held largely by geologists.

Light Shed by the Researches of Dr. Bergius.

Mr. Cunningham Craig favours the vegetable origin theory, and his paper reviewed recent work which throws light on this theory. He called attention to the evidence existing that oil and coal have a definite relation to each other, and dealt with the research work which has been done on the hydrogenation of coal. By treating any coal containing a fair percentage of volatile matter with hydrogen under very high pressure and at temperatures up to 850° F., a remarkable exothermic action is induced, and a portion of the solid fuel becomes liquefied, giving as a result a product indistinguishible from heavy crude petroleum. Similar effects can be obtained by hydrogenating heavy crude oils, lighter oils being formed. The importance of the researches of Dr. Bergius in this connection lie in the attempt to reproduce conditions similar to those that must have occurred in nature during the formation of oil. Oils cannot be formed from coal, except by distillation—the carbon-hydrogen ratio in coal is too high,—so that, in treating a coal to make oil, hydrogen must be supplied, and Dr. Bergius has done this successfully. Before the vegetable matter has reached the coal stage, however, it is still sufficiently rich in hydrogen—*i.e.*, the carbon-hydrogen ratio has not risen too far. Therefore, in an autoclave under sufficient pressure, and at not too high a temperature, we should expect petroleum to be formed from vegetable matter that has not reached the coal stage. It would be interesting, said Mr. Cunningham Craig, if some supporter of the animal theory would conduct the same hydrogenation experiments with deposits containing, or supposed to contain, animal matter, to learn whether liquids indistinguishable from petroleum could be formed from them. The difficulty might be in finding deposits rich enough in animal matter, but there must have been such deposits if there be any truth in the animal origin theory. Different classes of crude petroleum may be formed from the same raw vegetable material, according to the varying conditions of temperature and pressure.

The stage of alteration of the vegetable matter must, however, have some effect upon the final result. Mr. Cunningham Craig discussed research work in connection with torbanite deposits which have been found in Great Britain and the Dominions, and yield oil; they show a stage in the formation of oil from vegetable deposits, checked and arrested owing to the particular environment in each case, and this, he said, is as clear a case of the origin of oil from vegetable matter as can be desired.

A Definition of Petroleum Required.

As was pointed out at the meeting, what is really wanted is a definition of petroleum, owing to the innumerable types that exist. There are many who favour the animal-origin theory, and they put some pertinent questions. For instance, it was suggested that the hydrogenation theory pre-supposed a tremendous quantity of hydrogen in the earth before vegetable matter reached the coal stage. In summing up the points raised, however, Mr. Cunningham Craig said that the animal matter in the earth, in the sea, and on the surface of the earth is so infinitesimal, compared with the amount of vegetable matter, that it would be very difficult for any exponent of the animal-origin theory to bring a good case for it.

Need for a Petroleum Research Association.

The more this question is investigated, the more does it become apparent that there are greater complications than appear at first sight. A great deal has to be done by investigation of the relative chemical constitution, the amount of aromatics, etc., and each petroleum has to be regarded in the light of the geological conditions obtaining in its particular field. Therefore, there does not seem to be any research which so clearly needs co-operation as this, and, as was to be expected, a plea was made for the formation of a petroleum research association, which should try to arrive at a satisfactory solution of the problem. If this were done, the chemist, geologist, physicist and others who are concerned with it could tackle each type of oil scientifically. Even without this, however, much could be done by greater co-operation between the scientific societies into whose sphere this problem enters.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE WORLD POWER CONFERENCE.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—The public mind has many things to divert it from events which, though they may not stir the emotions, have a vital relation to human welfare. Nevertheless, one is a little surprised that so scanty notice has been given to the decision to hold next year a conference of the leading experts in the world to consider how the industrial and scientific sources of power—our very life-force as a community—may be nationally and internationally adjusted. In America, in Canada, and on the Continent, far greater interest is being manifested in the project than here.

Although we have made less use than some countries of our power resources, other than coal, it is our honour to have conceived and put into execution this idea of a world-conference; and when it meets I believe that a foregathering of the scientific and technical experts of sixteen nations, together with their Government delegates, will appeal to the imagination of the public. We in this country are behind the newer lands in our exploitation for domestic and industrial purposes of the energies pent up in earth and water. We have much to learn, even in mechanical devices and inventions for their common use. It is therefore of some moment to us that at Wembley next year, from June 30 to July 12, the world's chief authorities on these matters are for the first time in history, on our invitation, to place their accumulated wisdom at each other's service. If no other advantage results than an international standardisation of the commoner power devices, thus simplifying and cheapening production, the calling of this First World Power Conference will be a notable achievement for British initiative.

—Yours, etc.,
George A. Touche.

London, E.C. 2, October 12, 1923.

German Industrial Magnate Sentenced.—It is reported from Berlin that Dr. F. Raschig, head of the Chemische Fabrik Dr. Raschig, has been sentenced, in absence, to five years' imprisonment by the French occupation authorities. It appears that his firm had hired two locomotives from the German railway authorities before the French occupation of the Ruhr, and had not notified the French of the fact, but had continued to use the locomotives.

ALKALI MANUFACTURERS AND GAS UNDERTAKINGS.

DISPUTE AT BRENTFORD.

MR. H. C. HONEY (Director of Gas Administration), during the course of consideration of a draft Order made by the Board of Trade under the Gas Regulation Act of 1920, on the application of the Brentford Gas Company, on Wednesday, October 17, again had before him the question of the insertion of the Model Bill Clause known as the residuals clause. An application for the insertion of this clause, which restricts the gas undertaking from purchasing more than one-third of the amount of residual products which it produces itself, in order to prevent undue competition with chemical manufacturers, was made on behalf of the Alkali Manufacturers Association. The object of the Order in question is to authorise the Brentford Gas Company to purchase the adjoining undertakings of the Harrow and Richmond Companies, and also to erect large new gasworks upon land at Greenford. It is in respect of these new works that the application for the insertion of the residuals clause was made.

Strong Opposition to the "Model Clause."

Mr. Tyldesley Jones, K.C., the leading counsel for the Brentford Gas Company, strongly opposed the application, stating that the company did not now operate under that restriction, and that as recently as 1919, when the company was in Parliament, the restriction was not put upon them.

Mr. Honey asked why it was that the Alkali Manufacturers Association did not ask for the insertion of this clause in 1919.

Mr. W. A. Clark (Messrs. John Kennedy and Co., Parliamentary Agents) said that the 1919 Act was in fact promoted in 1918 whilst the war was still on, and it was not thought patriotic then to do anything to hamper the supply of munitions. The result was that the Alkali Manufacturers Association left it to the authorities of the House to do as they pleased. There were, however, he contended, very special reasons why the clause should be inserted in the present case. The Brentford Gas Company was now becoming one of the very large gas companies of the country, and it was to restrain the large gas companies from embarking upon extensive chemical manufacturing operations that the Model Clause had been drafted and inserted in so many Acts of Parliament. He, therefore, strongly urged the Director of Gas Administration to insert the residuals clause in this Order.

Unfair Monopoly Alleged Against Alkali Manufacturers.

Mr. Tyldesley Jones, K.C., said the reason why the clause was not inserted during the war was that it was found that the manufacture of high explosives was being seriously retarded by the protection which the alkali people had succeeded in getting during times of peace, when nobody foresaw the war. This country was in very great peril for a long time on account of the insertion of this clause in various gas Acts. He was going to ask the Director of Gas Administration definitely to refuse to insert this clause, and he invited the Association of Alkali Manufacturers to raise this matter on the floor of the House of Commons in order that Parliament might have an opportunity of expressing an opinion upon it. It was about time that this protection for the Alkali Manufacturers Association, which nearly produced irreparable injury to this country during the war, was removed. It was perfectly monstrous; the public interests had been absolutely sacrificed to a ring of alkali manufacturers, and it was time Parliament had an opportunity of altering this state of affairs.

OUR BOOKSHELF.

Bulletin of the Imperial Institute. Vol. XXI., No. 1, 1923. Report on the operations of the Imperial Institute. London: John Murray, Albemarle Street, W.; price 3s. 6d. net (3s. 10d. post free).

Prior to the war reports on the work of the Imperial Institute were issued yearly, but the general dislocation caused by the war made the temporary cessation of publication advisable. The present comprehensive volume makes up this lost ground, and deals partly with work accomplished during the war period, but chiefly with the operations of the Imperial Institute in its several branches during the past three years. Its publication is particularly opportune, since one of the matters upon which the Imperial Economic Conference must come to a decision is the future of the Imperial Institute. The present constitution of the Institute dates from 1916, when an Act was passed transferring the property and management to the Secretary of State for the Colonies, with provision for an Executive Council of twenty-five members nominated by the Board of Trade, the Secretary of State for India, the Ministry of Agriculture and Fisheries, the Government of India, the Governments of the Dominions, and the Secretary of State for the Colonies. The work is now concerned entirely with the development of the commercial and industrial use of the raw materials of the Empire. This task is divided between three departments—Investigation, Intelligence, Exhibition. A feature of the organisation is the system of advisory committees, of which there is one for India and each of the Dominions, in addition to five technical committees dealing with raw materials, silk production, timbers, mineral resources, and rubber respectively. The volume just published gives a complete account of the internal organisation of the Imperial Institute. Much of the work accomplished by the Institute during the past nine years has already been referred to in our columns, but the collected results form so striking a reminder of the positive services rendered by the Institute that the possibility of decreasing the scope of its activities would appear a decidedly retrograde step.

Journal of Scientific Instruments. October, 1923; Vol. I., No. 1. (A monthly publication dealing with their principles, construction, and use.) Published by the Institute of Physics (with the co-operation of the National Physical Laboratory). London: 10, Essex Street, Strand, W.C.; price 2s. 6d. net.

This is the first regular number. It is the first publication of its kind in England, and the favourable reception accorded to a preliminary number issued last year has led to the belief that it will have real value as an aid to research and manufacture. The journal will be published on the 15th of each month, and the annual subscription is 30s., post free. The present issue contains articles on "The Measurement of True Height by Aneroid," by L. N. G. Filon, M.A., D.Sc., F.R.S.; "Two New Methods of Measuring the Internal Diameters of Transparent Tubes," by J. S. Anderson, M.A., D.Sc., Ph.D., and Guy Barr, B.A., D.Sc.; "On An Improved Temperature Control for the Pulfrich Refractometer," by T. M. Lowry, D.Sc., F.R.S., and R. G. Parker, B.Sc.; "A New Relay and Its Application to Sustaining Pendulum Vibrations," by H. A. Thomas, M.Sc.; "A General Purpose Recording Drum," by C. V. Boys, F.R.S.; "The Chain Balance," by Professor S. Flinders Petrie, LL.D., F.R.S.; and, "A New Recording Thermometer," by E. H. J. Schuster, D.Sc.

FOREIGN CHEMICAL SAMPLES.

ADVICE TO IMPORTERS.

IN their Bulletin of October 12, the British Chemical and Dyestuffs Traders' Association point out that samples of goods liable to K.I.D. or other *ad valorem* import duties should be despatched by the foreign firm by:—(1) Foreign and Colonial Parcel Post, or (2) Insured Box Post; and the contents and value declared. They will then come through without interruption.

If posted abroad by sample or letter post they will on arrival in this country be seized by Customs and will be held up. Members receiving "Notice of Seizure" from Customs, Mount Pleasant, E.C., of samples of dutiable goods sent by sample or letter post should forward a declaration stating the value of the samples in question. Although Customs have the power to confiscate such packets they will generally agree to deliver same on payment of the duty together with a nominal fine of about one shilling. The above remarks also apply to samples of goods that come under the Dyestuffs (Import Regulation) Act, 1920, and in such instances members will have to obtain and forward to Customs an import licence to obtain delivery of the sample.

ITEMS OF INTEREST.

South Wales Mining Exhibition.—Among the exhibitors are Meldrums, Ltd., who are showing forced-draught furnaces, mechanical stokers, various types of chemical plant, and samples of Meldrum acid-resisting metals.

Change of Address.—Wm. A. Shetliff and Co. have removed from Waterloo Street to more convenient premises, their new address being Lion Mill, Wincolmlee, Hull. Telegrams: "Chromatic, Hull"; and telephone: "Central 1433."

Sulphuric Acid in America. — According to the United States census returns, the production of sulphuric acid by fertiliser manufacturers during the first six months of 1923 amounted to 946,089 tons, compared with 574,013 tons in the same period of 1922. The consumption figures for the same period were 933,824 tons and 657,062 tons respectively.

Streatfeild Memorial Lecture. — The sixth annual Streatfeild Memorial Lecture will be delivered in the Chemical Lecture Theatre of the Finsbury Technical College, Leonard Street, E.C. 2, at 4 p.m. on Thursday, October, 25, by Mr. E. M. Hawkins. The subject will be "Analytical Chemistry," and admission will be free.

Cyanogen Chloride for Fumigating.—Cyanogen chloride is to be substituted for hydrocyanic acid gas in the United States Quarantine regulations relating to fumigation procedure. The change is due to the fact that cyanogen chloride is highly lachrymatory, even in non-lethal quantities, and for this reason it gives ample warning of its presence before it becomes concentrated in sufficient quantities to prove fatal.

Oxygen Research Committee Report.—A report has been published by H.M. Stationery Office, price 8s. 6d. net, for the Department of Scientific and Industrial Research, describing certain aspects of the work of the Committee since its appointment in 1919. The report deals chiefly with the technical difficulties which have hitherto restricted the commercial utilisation of liquid oxygen and liquid air.

Tariff Notes.—The Tunisian import duty on crude iodine has been reduced to 150 francs per 100 kilogs. Iodine from Germany is excepted, and is subject to a duty of 1,600 francs per 100 kilogs.—The importation into Mexico of opium and certain other dangerous drugs is prohibited.—Certain regulations affecting the importation and sale of quinine in Greece may be seen by persons interested on application to the Department of Overseas Trade.

Deodourisation of Benzine and Benzol. — In a process described in the *Giornale di Chimica Industriale ed Applicata* (April, 1923) benzine is deodourised by treatment successively with an acid and then an alkaline solution of potassium permanganate. The first solution is made with 10 grammes of $KMnO_4$, 500 c.c. of water and 80 grammes of H_2SO_4, and the second with 10 grammes of $KMnO_4$, 1,000 c.c. of water and 20 grammes of KOH. In the case of benzol, the odour is due to traces of thiophene, which can be eliminated by boiling the benzol with mercury acetate solution under a reflux condenser. Formaldehyde or acetaldehyde may be used in place of the mercury compound.

The Estimation of Cobalt by Dinitroso-Resorcinol.—According to W. R. Orndorff and M. L. Nichols (*J. Amer. Chem. Soc.*, 1923, 45, 1439), cobalt is quantitatively precipitated by dinitroso-resorcinol when applied in the following manner. To 50 c.c. of a warm solution containing 0.2 gramme of cobalt and 2 per cent. of hydrochloric acid are added 300 c.c. of a hot 0.1 per cent. aqueous solution of the reagent. The mixture is well stirred, and 10 c.c. of a 10 per cent. solution of sodium acetate are added; then the mixture is heated gently for about 15 minutes, stirred, and the precipitate allowed to settle, filtered off on a Gooch crucible, washed with 1 per cent. hydrochloric acid, dried at 125° C., and weighed. The composition of the dried precipitate is $(C_6H_3N_2O_4)_2CO$. The method is applicable without modification in the presence of manganese or zinc, but iron or copper, if present, must be removed. Large quantities of nickel interfere with the estimation, but in the presence of small amounts of this element the method is accurate if the supernatant liquor from the precipitate is filtered off and the precipitate digested for half an hour with warm 0.1 *N* hydrochloric acid, then filtered off and dried as before. The method is applicable to the estimation of cobalt in steel, but the iron must be first removed.—*The Analyst.*

Petrol Prices.—It is generally stated that there is every possibility of a further fall in the price of petrol, and the Press Association has been informed by a leading firm that a small reduction in price is extremely likely before the end of the year.

Marple Gasworks Extension.—It is proposed to carry out important extensions at the Marple Gasworks, which will mean an outlay of £43,000. More land is to be taken up, and the new schemes also include the purchase of properties belonging to the Calico Printers' Association.

Pig-iron Production.—The production of pig iron in September amounted to 558,600 tons, compared with 599,800 tons in August and 430,300 tons in September, 1922. The number of furnaces in blast at the end of the month was 190, a decrease of six during the month, and a decline of 33 since the end of May last.

Fuel Economy and Smoke Abatement.—We are informed by Meldrums, Ltd., that they will be pleased to lend to societies and other institutions, a set of lantern slides dealing with fuel combustion, smoke cure, etc., and containing illustrations of various types of chemical plant, for lecture purposes. Arrangements may also be made for a paper to be read on the subject.

Sugar Beet in Canada.—Experiments in the growing of sugar beet in Manitoba are reported to be eminently satisfactory so far, and strengthen the belief that the United States company which is behind them will next year go ahead with its plans for planting from 10,000 to 12,000 acres to sugar beet and establishing a plant for the manufacture of sugar in the Winnipeg district.

World Raw-silk Production. — The total production of silk in Western Europe, Eastern Europe, the Levant, Central Asia, and the extreme Orient is, according to statistics from L'Associazione Serica Italiana, Milan, equal to 32,235,000 kilos of raw silk for the year 1922, which represents a fairly steady gain over the previous two years, the totals being 29,295,000 kilos for 1921 and 20,830,000 for 1920.

Personal.—Mr. Frederick Charles Lea, Professor of Civil Engineering in the University of Birmingham since 1913, has been appointed to the Chair of Engineering at Sheffield University in succession to Professor Ripper, who is retiring, having reached the age limit.—The Council of the National Institute of Agricultural Botany have appointed Mr. Alfred Eastham, to be Chief Officer of the Official Seed Testing Station for England and Wales.

Rubber Proofers' Expanding Business. — J. Mandleberg and Company, Ltd., Manchester, propose extending their business by the absorption of Harbens, Limited, who built and equipped extensive works at Golborne, at a cost of £160,000., for the manufacture of artificial silk, but work was never started owing to the death of the founder. Mandlebergs propose to transfer the issued capital of Harbens of 111,300 shares of £1. each and £60,000. debentures, and to elect a new board to conduct the business.

Carbon Black in Canada.—To encourage the manufacture of carbon black the Canadian Dominion Government has authorised its production from the surplus quantities of natural gas obtained from isolated fields held under lease for the production of gas. Permits to so use the gas will however only be granted where there is no market for the sale of the gas. The lessee must construct a plant at a cost of 30,000 dollars within two years, capable of producing 90 tons of carbon black per annum, and must pay a royalty of 5 per cent. of the value of the gas at the point of production.

The Baku Oil Industry.—The Baku oil industry, which has now for over three years been in the possession of the Soviet, is being resuscitated. During the early months after the transfer the production receded very materially, from various reasons, such as lack of organisation, wilful sabotage, etc. An improvement set in with the beginning of 1921. For the year from May, 1921 to 1922, the production amounted to 2,799,000 tons, and the output for the corresponding period 1922-1923 is stated to have been 3,340,000 tons. In November, 1920, only 618 wells were being worked. In May, 1923, the number of wells working had reached 1,650. The feet bored between May, 1920, and May, 1921, aggregated 9,100; for the next twelve months the total was 37,900; and for the period May, 1922, to May, 1923, 105,000ft. The number of men employed in this industry had risen to 45,687 hands at the end of May, 1923. Apart from the productive work proper, extensive repair work has been proceeding on factories, railways and workmen's dwellings.—*Engineering.*

Explosives in Coal Mines.—The Secretary for Mines gives notice that on October 5 he made an order under Section 61 of the Coal Mines Act, 1911, extending until December 31, 1925, the period during which the non-detonating explosives named and defined in the second schedule to the Explosives in Coal Mines Order of September 1, 1913, are included in the term "permitted explosives." The only explosive at present included in the second schedule is "bobbinite."

Business Notices.—Mr. G. D. Greenhough states that the partnership existing between himself and Mr. L. G. Boor has been terminated as from October 1, 1923, on the retirement of the latter from business. The two businesses, George Boor and Co., and D. W. Greenhough and Son, will be carried on as before by Mr. Greenhough.—Mr. Frank Kay, lately of the Emerson Chemical Corporation, U.S.A., has entered into business on his own account under the name of the Barclay Chemical Corporation, at 154, Chambers Street, New York.

The Estimation of Glycerine.—In the *Chemical Trade Journal and Chemical Engineer*, of August 3, page 127, there appeared an article on a new direct Italian method for the estimation of glycerine, based upon a paper presented by Professor S. Fachini to the Italian Congress of Chemistry in June last. We now learn that S. Somazzi was joint author of the method with Professor Fachini, and that the Italian verbatim and illustrated account of the paper appeared in the *Bollettino dell'Industria degli Olie e dei Grassi* of June, 1923.

British Association of Chemists.—The sixth annual general meeting of the Association will be held at the Chemical Department, University of Birmingham, Bournbrook, at 3 p.m. on Saturday, October 27, 1923. Prior to the meeting, at about 2.30 p.m., a Chemical Exhibit, arranged by Professor G. T. Morgan, may be visited. The annual dinner will be served at the Queen's Hotel, Birmingham, at 6.30 p.m. Applications for tickets, the price of which is 12s. 6d., should be made not later than Thursday, October 25, 1923. Morning dress.

Obituary.—We regret to record the death, in London, on October 4, of Lieutenant-Colonel Alfred Conway Bishop, chairman of Kemball, Bishop and Co., Ltd., manufacturers of cream of tartar, tartaric and citric acid, Bromley-by-Bow.—We also regret to learn of the death of Mr. James Pain, head of the firm of firework manufacturers, who died on Friday last, aged 85. He was seventh in descent from the founder of the business in the reign of Charles II. The business will be carried on by Mr. Pain's sons, Philip in England, and Henry in America.

Pig-iron Specification for International Trade.—The following recommendations are contained in a letter sent on behalf of the American Society for Testing Materials to the National Federation of Iron and Steel Manufacturers. The recommendations are only meant to apply to international business:—I.—Manufacture: The pig iron shall be clean, as free as possible from an excessive amount of dross and sand, and may be either sand or machine cast. II.—Chemical properties: (*a*) The pig iron shall conform to the chemical requirements specified by the purchaser at the time of purchase, with the following permissible variations from the specified percentages in the case of pig iron intended for the manufacture of grey iron castings: Silicon, 0.25 above and below; sulphur, not over specified percentage; phosphorus, 0.15 above and below; manganese, 0.20 above and below; total carbon, not less than specified percentage. (*b*) In the case of pig iron for making steel, malleable iron or special castings, a maximum percentage of phosphorus and either a maximum or minimum percentage of manganese may be specified. III.—Sampling and analysis: (*a*) In sampling, each truckload (or its equivalent) shall be considered as a unit; (*b*) one pig shall be taken to every four tons in the car, and they shall be chosen from different parts of the car so as to secure, as nearly as possible, a sample representing the average quality of the iron; (*c*) the pigs thus taken shall be sampled by drilling, so as to represent fairly the composition of the pigs as cast; (*d*) an equal weight of the drillings from each pig shall be thoroughly mixed to make up the sample for analysis. IV.—Inspection and rejection: In case of dispute, the sampling and analysis shall be made by an independent chemist, mutually agreed upon (if practicable, at the time the contract is made), whose decision shall be final; the cost of such re-sampling and re-analysis shall be borne by the party in error. All pig iron which fails to conform to these specifications shall be subject to rejection.—*Colliery Guardian.*

Coke By-Products in America.—The following table gives the total production of by-products from coke during the year 1922:

Tar	gallons	327,779,734
Ammonium sulphate	lb.	695,543,349
Ammonia liquor (NH_3 content)	,,	50,036,646
Ammonia, other forms (NH_3 content)	,,	693,782
Crude light oil	gallons	101,437,555
Benzol, crude	,,	2,666,177
Benzol, refined	,,	10,419,504
Motor benzol	,,	57,025,699
Toluol, crude	,,	38,159
Toluol, refined	,,	1,955,119
Solvent naphtha	,,	2,983,858
Crude naphthalene	lb.	6,107,742
Refined naphthalene	,,	1,810,972

Stainless Steel in France.—Some French firms having put stainless steel cutlery on the market, proceedings were taken against them a year ago by the owners of the Brearley patents, who obtained judgment against them first at Havre and then at Rouen. The verdict aroused great indignation amongst the steel firms, which could not understand why a national industry should be made tributary to a foreign patent. Numerous protests have been made from time to time, and it is now stated that several of the leading steel concerns have combined to fight the Brearley patents and decide, once and for all, whether the home industry is to be shackled by a foreign monopoly. They have collected all possible data with a view of proving anticipations, particularly by publications in the technical Press, and it is evident that the struggle will be carried out to the bitter end. Meanwhile, they are giving a guarantee to their customers indemnifying them against any action for damages that may be taken by the holders of the stainless steel patents.—*Engineer.*

COMING EVENTS.

Society of Dyers and Colourists (Manchester Section).—Meeting, **Friday, October 19,** at **7 p.m.,** at 36, George Street. Paper: "Some Aspects of the Theory of Quinones," by Professor R. Robinson.

Society of Chemical Industry (South Wales Section).—Meeting, **Friday, October 19,** at **6.30 p.m.,** at Thomas's Café, Swansea. Joint meeting with South Wales Section of the Institute of Chemistry. Discussion: "Short Cuts in Analysis."

Institute of Physics.—Meeting, **Monday, October 22,** at the Institution of Electrical Engineers, Victoria Embankment, London, W.C. 2. Paper: "The Physicist in the Textile Industries," by Dr. A. E. Oxley.

Institute of Chemistry (Manchester Section).—Annual general meeting, **Wednesday, October 24,** at **7 p.m.,** at the Textile Institute, St. Mary's Parsonage. Discussion: "Some Aspects of Water Right Cases," to be introduced by S. E. Melling.—**(Glasgow Section):** Annual general meeting, **Thursday, October 25.**

Streatfeild Memorial Lecture.—On Thursday, **October 25,** at **4 p.m.,** at the Finsbury Technical College, Leonard Street, London, E.C. 2. Subject: "Analytical Chemistry," by E. M. Hawkins.

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, October 26,** at **7 p.m.,** at 36, George Street.

British Association of Chemists.—Annual meeting, **Saturday, October 27,** at **3 p.m.,** at the University, Bournbrook, Birmingham. Annual dinner at Queen's Hotel, at **6.30 p.m.**

Society of Chemical Industry.—Joint Societies' dinner, on **Wednesday, October 31,** at **7.30 p.m.,** at Hotel Victoria, Northumberland Avenue, W.C. 2. Application for tickets (limited to 300) to be made to the General Secretary of the Society of Chemical Industry.

Hull Chemical and Engineering Society.—Meeting, **Tuesday, October 30,** at **7.45 p.m.,** at the Hull Photographic Society's Rooms, Grey Street. Paper: "British-made Dyes for Paints and Distempers," by G. B. Shaw.

Society of Chemical Industry (Bristol Section).—Meeting, **Thursday, November 1,** at **7.30 p.m.,** at the University, Woodland Road. Paper: "Some Aspects of the Paint Trade: Fine-colour and Lake Making," by A. H. Bridges.

Society of Chemical Industry (Manchester Section).—Joint meeting, **Friday, November 2,** at **7 p.m.,** at the Textile Institute, St. Mary's Parsonage. Address: "Electrometric Methods in Analytical Chemistry," by Professor W. D. Treadwell, of Zurich.

BRITISH OVERSEAS CHEMICAL TRADE.

SEPTEMBER IMPORTS AND EXPORTS.

IMPORTS of chemicals and allied products were considerably less during September than in August, the figure being, with the exception of July, the lowest this year. On the other hand, exports rose in value by nearly £700,000. on the August total. According to the Board of Trade returns, imports of chemicals, drugs, etc., were valued at £1,023,552. in September, against £1,315,824. in August and £1,032,511. in September, 1922. Exports totalled £2,341,761., against £1,645,856. in August, and £1,733,883. last year. The quantity figures of imports and exports of selected products are given in the table below:—

IMPORTS—Increases on August Quantities.

		1923. September.	August.
Acetic acid (including acetic anhydride)	tons	475	316
Barytes, ground	cwts.	52,900	46,008
Bleaching materials	,,	3,907	1,290
Calcium carbide	,,	65,526	50,896
Cream of tartar	,,	2,912	2,646
Glycerine, crude and distilled	,,	6,902	286
Indigo, natural	,,	74	70
Paraffin wax	,,	66,034	65,389
Petroleum, crude mineral	galls.	35,995,347	34,310,667
Phosphate of lime	tons	32,373	31,584
Potassium c'p'ds (except nitrate)	cwts.	251,714	138,923
Potassium nitrate	,,	27,119	6,263
Tanning extracts	,,	90,299	57,378

Decreases on August Quantities.

Borax	cwts.	3,878	4,150
Boron minerals	tons	259	3,561
Dyeing extracts	cwts.	8,610	8,629
Gums and resins (except rosin)	,,	19,761	21,154
Manganese ore	tons	36,709	61,844
Mercury	lb.	44,459	93,711
Nickel oxide	cwts.	1,500	7,129
Pyrites	tons	15,260	34,551
Rosin	cwts.	123,307	123,624
Sodium nitrate	,,	91,408	262,313
Sodium c'p'ds (except nitrate)	,,	16,661	17,517
Sulphur	tons	9,861	10,065
Tartaric acid (including tartrates not elsewhere specified)	cwts.	915	1,237
Turpentine	,,	49,203	59,048
White Lead	,,	7,574	11,349
Zinc oxide	tons	522	626

EXPORTS—Increases on August Quantities.

Ammonium chloride	tons	402	204
Ammonium sulphate	,,	23,858	17,002
Barytes, ground	cwts.	2,735	427
Bleaching powder	,,	28,028	12,622
Carbolic acid	,,	12,656	11,581
Caustic soda	,,	116,180	110,042
Cement	tons	48,454	25,963
Disinfectants, insecticides, etc.	cwts.	43,273	28,976
Dyestuffs, coal-tar	,,	14,313	12,830
Glue and size	,,	11,534	7,276
Glycerine, distilled	,,	8,195	2,922
Naphtha, coal-tar	galls.	14,583	8,840
Naphthalene	cwts.	18,122	11,168
Pitch, coal-tar	tons	8,695	1,074
Potassium c'p'ds (except chromate and bichromate)	cwts.	4,053	1,601
Salt (other than table)	tons	30,287	28,881
Sodium carbonate	cwts.	473,801	411,306
Sodium sulphate	,,	157,456	101,846
Sulphuric acid	,,	2,983	693
Tar, coal	tons	452	384
Tar oil, creosote, etc.	galls.	4,580,427	2,627,301
Tartaric acid (including tartrates not elsewhere specified)	cwts.	2,003	706
White lead	,,	16,944	7,398
Zinc oxide	tons	247	53

Decreases on August Quantities.

Benzol and toluol	galls.	142,603	366,562
Copper sulphate	tons	116	522
Paraffin wax	cwts.	20,567	28,020
Potassium chromate and bichromate	,,	3,604	3,746

SOUTH WALES NOTES.

[Specially Contributed.]

Further improvement in the tinplate business is reported. The inquiry undertaken by the Indian Tariff Commission on a request of the tinplate industry in India, who are asking that the Indian Government should put into force a protective duty of 45 per cent. *ad valorem* on tinplates and blackplates is arousing much interest among Welsh tinplate manufacturers. The Indian tinplate works are situated at Jamshedpur, and are a subsidiary of the Tata Steelworks Co., Ltd., the bulk of whose capital is in the hands of the Burma Oil Company. A request is also made for freedom of duty on raw tin, palm oil and other commodities used in the process of manufacture of tinplates, including sulphur. The Burma Oil Company is connected with the National Oil Refineries, and have been formerly good customers of ours for tin, terne, and black plates, and if the suggestions are to be carried into effect it will be, without doubt, a great blow to the South Wales tinplate makers. The report of the commission is expected to be made public at the beginning of the New Year.

Among the imports for the week were 10 tons ferro silicon, 31 tons calcium carbide from Gothenburg, 93 tons zinc ashes from Montreal, 1,220 tons pyrites from Seville, 2,923cwt. of nickel oxide from Montreal; 4,261 tons pyrites from Huelva to Newport. Among the exports from Cardiff were 494 tons sulphate of ammonia to Dunkirk; and 30 tons zinc white to Calcutta from Newport.

COMPANY DIVIDENDS.

Sadler and Co., Ltd.—Profit for year to June 30 last, after charging income-tax, interest on pre-paid shares, etc., and providing for corporation profits tax, amounts to £25,002.; brought in, £6,592.; total, £31,594.; to depreciation, £15,000.; further dividend of 4 per cent., less tax, making 7 per cent. for year; forward £7,551.

Alianza Nitrate Company, Ltd.—In addition to an interim dividend of 20 per cent., the directors have declared a bonus of 60 per cent. (less tax) out of surplus funds.

Borax Consolidated, Ltd.—Dividend at rate of 6 per cent. per annum, less tax at 4s. 6d., on preferred ordinary for half-year ending September 30.

Burmah Oil Company, Ltd.—Interim dividend of 2s. per share, free of tax, on the ordinary shares on account of the current year, payable November 7. Last year the interim payment was the same.

Callender's Cable and Construction Company, Ltd.—The directors announce a dividend of 1s. per share, less tax, payable November 2.

Miami Copper Company.—Quarterly dividend of 50 cents per share on the capital stock.

Anglo-Greek Magnesite Company, Ltd. — Interim dividend of 2½ per cent on the ordinary shares.

Rosario Nitrate Company, Ltd.—Interim dividend of 5 per cent., less tax, on account of the profits for the current year, payable on November 16. No interim dividend was paid a year ago.

British Portland Cement Manufacturers, Ltd.—Interim dividend on the ordinary shares of 5 per cent., actual, less tax, in respect of the year 1923. The interim dividend for 1922 was the same.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," October 20, 1888.)

Smoke and Fogs.—A fog is bearable and breatheable; town smoke, *alias* fog, is neither the one or the other. And the grim joke of all this is that the greater portion of it is preventible, and we are persuaded that all the nuisance arises from cheap fuel. Coal being cheap, it is wasted in a most barbarous manner. At several exhibitions it has been shown that with an ordinary Lancashire steam boiler over 11lb. of water can be evaporated per pound of fuel, and yet the majority of our best works are not evaporating more than 6lb. Is not this waste? It is more; it is doing direct injury to the country, inasmuch as it results in sending out into the air nearly double the quantity of noxious gases and many times the amount of carbon that need be.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Clement and Johnson, Ltd., London, W.C., chemists.—Registered September 25, £100., £100., £100., and £300. debs., part of £60,000.

Forster's Glass Company, Ltd., St. Helens.—Registered September 26, Trust Deed dated September 21, 1923, securing £200,000. deb. stock.

Hightensite and Ebonite Manufacturing Company, Ltd., London, W.—Registered October 1, £10,000. debs.

Jones Bi-Metals Company, Ltd., Birmingham.—Registered September 12, £1,500. debs.

Morris (P.) and Co., Ltd., Liverpool, oil and paint manufacturers.—Registered September 24, £3,500 mort., to J. L. Williams, 25, Water Street, Liverpool, solicitor, and another.

Neolyte, Ltd., London, S.W.—Registered October 1, £5,000. second deb., to United Dairies, Ltd., 31, St. Petersburgh Place, London, W.

Yetta Soap and Oil Company, Ltd., Twickenham.—Registered September 25, £200. deb., to H. Duckworth, Cromwell House, Twickenham, manager.

SATISFACTIONS.

Marley Hill Chemical Company, Ltd.—Satisfaction registered October 1, £500., part of amount registered January 4, 1921.

Tomlinson and Co., Ltd., Stairfoot, flint glass manufacturers.—Satisfactions registered October 2, £2,000., registered June 2, 1906; and £1,000., registered January 18, 1909.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Boroid, Ltd., London, E., manufacturers of films, artificial silk, etc.—L. C. Bullock, 7, Devonshire Square, London, E.C., solicitor, appointed receiver.

Shaka Salt Company, Ltd., Middlewich.—E. O. Mosley, 16, Bolton Street, Bury, appointed receiver. September 21.

New Cross Glass Works, Ltd.—Resolved September 25, that the company be voluntarily wound up. C. S. Steel, 34/36, Gresham Street, London, E.C., liquidator.

Oxide, Ltd.—Resolved September 26, that the company be voluntarily wound up. R. Carpenter, Midland Bank Chambers, North Street, Brighton, C.A., liquidator.

S. D. Q. Manufacturing Company, Ltd., Shardlow, chemists.—S. Blythen ceased to act as receiver. September 27.

Clemmons Aluminium, Ltd.—Resolved September 28, that the company be voluntarily wound up. C. T. Appleby, 26, Corporation Street, Birmingham, liquidator.

BANKRUPTCY INFORMATION.

Clemmons, Albert John, Ingleside, 134, Alcester Road South, King's Heath, aluminium manufacturer, trading as **Midland Aluminium,** 42, Great Francis Street, Birmingham. R.O., October 6. Adj., October 6.

Stansfield, John Lord, Boothfold, Waterfoot, Bacup, chemical manufacturer. R.O., October 2.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Dean, Wm. Edward, 7, Wellington Street, Macclesfield; dyer; £39. 9s. 5d. September 6.

Hogan, T. C., and Sons, 75, Oswald Street, Blackburn; manufacturers of medical preparations; £10. 5s. 5d. September 13.

Radium and Chemical Company, Ltd., 145, Moorgate, London, E.C.; £21. 18s. 6d. July 27.

Thomson, J., Saint Saviour's Street, Nottingham; soap manufacturer; £10. 1s. 4d. August 15

SOUTH METROPOLITAN GAS COY.

709, OLD KENT ROAD, S.E. 15.

Telephone: NEW CROSS 2000.

Telegrams: "METROGAS, PECK, LONDON."

AMMONIUM SULPHITE

(GUARANTEED TO CONTAIN 90 PER CENT. $(NH_4)_2 SO_3 H_2O$)

LARGELY USED FOR THE AMINATION OF NITRO-ORGANIC COMPOUNDS.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN SEPTEMBER.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of September, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended September 30.			Value. Month ended September 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):						
Acids:						
Acetic (including Acetic Anhydride tons	422	528	475	13,045	18,668	21,667
Tartaric, including tartrates, not elsewhere specified.. cwts.	3,882	3,821	915	24,058	32,803	4,164
Bleaching Materials ,,	5,981	4,815	3,907	43,701	7,174	10,240
Borax ..... ,,	1,380	3,003	3,878	2,748	4,052	4,723
Calcium Carbide . ,,	66,825	59,043	65,526	58,386	40,459	44,434
Coal Tar Products not elsewhere specified ..... val.	—	—	—	7,069	35,380	10,872
Glycerine:						
Crude ..... cwts.	309	6,346	6,750	1,041	14,660	17,263
Distilled ..... ,,	511	593	152	2,641	2,041	622
Lead Compounds:						
Red Lead and Orange Lead.... ,,	3,832	3,629	1,891	6,769	5,745	3,350
Nickel Oxide .... ,,	2,136	—	1,500	12,840	—	6,993
Potassium Compounds:						
Nitrate (Saltpetre) ..... ,,	16,004	24,343	27,119	22,182	27,943	29,764
Other C'pounds ,,	149,815	361,446	251,714	65,110	81,961	48,476
Sodium Compounds:						
Nitrate ..... ,,	57,412	106,755	91,408	38,215	63,569	57,101
Other Compounds ,,	15,276	16,108	16,661	32,929	16,900	13,684
Tartar, Cream of ,,	2,251	3,081	2,912	13,197	14,059	12,173
Zinc Oxide ..... tons	474	501	522	14,483	15,787	18,013
All other Sorts .. val.	—	—	—	261,446	160,838	212,354
DRUGS, MEDICINES, AND MEDICINAL PREPARATIONS containing no Dutiable Ingredient:						
Quinine and Quinine Salts ..... oz.	4,752	104,856	115,273	864	11,659	11,784
Bark, Cinchona (Bark, Peruvian, etc.) ..... cwts.	1,230	3,488	2,151	9,343	22,582	12,400
Other Sorts ..... val.	—	—	—	148,843	99,927	138,671
DYES and DYE STUFFS (except Dye Woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning:						
Intermediate Coal Tar Products used in the manufacture of Dyes (including Aniline Oil and Salt, and Phenyl-Glycine) ..... cwts.	—	6	—	—	106	—
Finished Dye Stuffs obtained from Coal Tar:						
Alizarine ..... cwts.	31	1,059	171	1,811	5,728	8,917
Indigo, synthetic ,,	2	—	—	27	—	—
Other Sorts .... ,,	763	5,071	2,807	40,023	117,306	56,039
Extracts for Dyeing:						
Cutch ..... ,,	2,093	2,214	2,935	3,410	2,701	4,121
All other Sorts .. ,,	4,623	7,940	5,675	23,746	33,659	25,798
Indigo, natural .. ,,	18	80	74	870	3,483	1,791
Extracts for Tanning (solid or liquid) ,,	47,727	92,934	90,299	52,542	99,987	91,690
PAINTERS' COLOURS and MATERIALS, not elsewhere specified:						
Barytes, ground (including Blanc Fixe) ..... cwts.	32,891	63,237	52,900	9,047	12,940	13,019
White Lead (basic carbonate) .... ,,	4,344	9,835	7,574	9,283	16,425	13,444
Other Sorts ..... ,,	46,468	49,044	70,192	64,361	72,968	129,976
OILS, REFINED:						
Essential (other than Turpentine):						
Natural ..... lb.	167,640	409,710	373,923	39,956	90,098	81,984
Petroleum:						
Lamp Oil ..... galls.	8,668,040	5,549,537	12,702,760	322,861	132,913	268,613
Motor Spirit .... ,,	20,024,380	17,743,294	12,337,324	1,437,640	1,181,645	562,704
Spirit other than Motor Spirit ... ,,	—	—	281,897	—	—	9,500
Lubricating Oil .. ,,	1,239,582	6,464,467	5,196,146	157,741	346,217	322,181
Gas Oil ..... ,,	7,530,440	1,513,088	7,229,609	170,370	28,878	109,291
Fuel Oil ..... ,,	46,421 748	26,268 789	25,293 672	1,075 087	342,673	350,328
Other Sorts ..... ,,	—	1,121	17,692	—	124	3,095
Total ..... ,,	83,884 190	57,540 296	63,059 100	3,163 699	2,032 450	1,625 712

Articles.	Quantities. Month ended September 30.			Value. Month ended September 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
SOAP, not containing Spirit:						
Soft ..... cwts.	36	124	94	81	250	336
Hard, Household and Laundry, in bars and tablets ..... cwts.	10,766	9,259	9,893	32,545	18,543	21,382
Polishing and Scouring ..... ,,	4,873	6,143	2,220	5,562	8,344	3,253
Hard, Toilet Soap and Shaving Soap ,,	2,253	2,840	9,207	23,564	16,302	36,316
Soap not elsewhere specified ..... ,,	372	71	619	591	103	742
Total ..... ,,	18,300	18,437	22,033	62,343	43,542	62,029
TURPENTINE..... ,,	15,638	25,921	49,203	46,781	112,582	160,489
WAX:						
Paraffin Wax... ,,	37,556	95,647	66,034	52,649	80,585	61,083
OILS and FATS, refined edible:						
Animal (except Marine Animal), refined:						
Lard:						
From U.S.A. .... tons	4,841	7,067	6,389	389,662	461,083	425,876
,, Other C'tries ,,	701	1,215	1,777	51,156	82,472	119,561
Total ..... ,,	5,542	8,282	8,166	440,818	543,555	545,437
Lard, Imitation . ,,	646	290	307	47,421	15,610	18,512
Oleo - margarine and Oleo-oil and Refined Tallow . ,,	2,009	2,650	2,419	116,177	131,505	116,354
Vegetable, other than Essential, Refined:						
Coconut Oil, Refined ..... ,,	780	636	688	50,179	30,523	32,860
Cotton-seed Oil, Refined ..... ,,	599	156	56	32,795	7,029	2,996
Olive Oil, Refined ,,	149	251	165	17,077	18,351	12,186
Palm and Palm-Kernel Oil, Refined ,,	54	8	13	2,764	451	807
All other Sorts, Refined ..... ,,	181	406	727	12,277	27,851	39,719
Total ..... ,,	9,960	12,679	12,541	719,508	774,875	768,871
SEEDS for expressing Oil:						
Castor ..... tons	1,463	2,762	703	21,700	47,216	14,251
Cotton:						
From Egypt .... ,,	29,064	23,589	5,841	381,351	240,554	62,161
,, Brit. India ,,	2,471	10,507	3,521	27,365	96,164	32,279
,, Other C'tries ,,	10,902	4,221	7,819	106,047	39,666	69,442
Total ..... ,,	42,437	38,317	17,181	514,741	376,384	163,882
Flax or Linseed:						
From Russia .... ,,	—	151	500	—	2,929	8,500
,, U.S.A. .... ,,	—	—	—	—	—	—
,, Argentine Republic ,,	72,444	26,820	2,812	1,350 666	493,016	54,599
,, British East Indies .... ,,	6,170	24,438	19,340	127,658	492,831	392,938
,, Canada ... ,,	—	—	—	—	—	—
,, Other C'tries ,,	9,767	799	349	196,003	15,781	6,920
Total ..... ,,	88,381	52,208	23,001	1,674,327	1,004,557	462,957
Rape:						
From B. East Indies ,,	2,625	2,838	2,548	56,879	48,906	36,205
,, Other C'tries ,,	2,610	92	69	39,464	3,116	1,903
Total ..... ,,	5,235	2,930	2,617	96,343	52,022	38,108
Sesame (or Sesamum, Benni, Gingelly or Teel):						
From China ..... tons	—	—	—	—	—	—
,, Other C'tries ,,	108	—	240	2,547	—	5,451
Total ..... ,,	108	—	240	2,547	—	5,451
Soya Beans:						
From Russia .... ,,	4,000	637	5,427	50,500	7,929	58,552
,, China ..... ,,	1,000	1,468	8	17,163	18,316	81
,, Japan .... ,,	5,347	—	—	83,672	—	—
,, Other C'tries ,,	—	—	2	—	—	16
Total ..... ,,	10,347	2,105	5,437	151,335	26,245	58,649
Other Sorts, including Sunflower ..... tons	1,511	2,340	1,164	21,990	30,135	19,870
NUTS and KERNELS for expressing Oil therefrom:						
Copra ..... tons	4,200	10,317	10,219	136,749	255,128	270,690
Ground Nuts (Arachide, Pea, or Monkey Nuts) .. ,,	3,401	350	1,991	73,434	7,178	43,413
Palm Kernels ... ,,	29,173	9,987	31,987	651,101	155,416	575,658
Other Sorts ..... ,,	401	362	1,808	11,327	7,576	49,838
Total ..... ,,	37,175	21,016	46,005	872,611	425,298	939,599

FERTILISER NEWS.

Nitrate of Soda.—The various investigations into the state of the Chilean nitrate industry which have been conducted on behalf of the United States Government from time to time afford much interesting information. While the greater portion of this information is similar in each case, there is much which appears contradictory and uncertain. Three such inquiries have taken place recently under the ægis of three different departments, the Department of Commerce, the Department of Agriculture, and the Federal Trade Commission. On such points as the exact percentage of the selling price handed over to the Chilean Government in export duties, and the proportion of the revenue of the country contributed by the nitrate industry, there is much disagreement. On the question, also, of the situation of the controlling interests in the industry, opinion is divided, Dr. Brand, of the Ministry of Agriculture asserting that policy and prices are dominated by a London group. Dr. H. Foster Bain, on the other hand, maintains that the nitrate industry is not controlled by the London committee, but Chilean interests have the last word in all important matters, the function of the former being merely advisory, and limited in action to propaganda work. Dr. Bain goes further in his report, however, and denies the existence of a trust at all, his reason being that the Association does not own property or make profit, but merely acts as a general sales agency. In considering these two points of view, it is well to remember that while the former drafted his report in London, and based it on information received on this side of the Atlantic, Dr. Bain spent two or three weeks in Chile, and apparently saw enough, or read enough, to justify making a comprehensive and controversial report to Dr. Curtis, his chief at the U.S. Department of Commerce. Yet another aspect, and the most probable one, is presented in the report by Mr. H. L. Anderson, of the Federal Trade Commission. In his opinion, the Nitrate Producers' Association is a trust of the most extreme type, definitely controlling 96 per cent. of the capacity output. As he says, the Association fixes the production quota of each plant, establishes the prices, effects all sales, with absolutely no competitive conditions. Its powers of intimidation were demonstrated recently in its treatment of certain recalcitrant producers who objected to its continuance after the date fixed for its dissolution in January next. There is no doubt that the control of the industry has been gradually passing during the past few years from English into Chilean hands, this change having been encouraged by the Chilean Government. The latest proposal of the Government, to insist on the employment by foreign commercial organisations of a staff which shall be composed of 85 per cent. Chilean and 15 per cent. foreign has concerned several of the British nitrate companies.

Sulphate of Ammonia.—It is gratifying to note from the statistics just published by the Board of Trade, that the reduction in the exports of sulphate during August was only temporary, 23,858 tons going abroad in September, against 17,002 tons in the previous month. All the separately specified importing countries registered an increase in imports of the British commodity; and the only figure dropping below the August amount was the total sent to "other countries." France is a very interesting market at the present time, exports having risen from 972 tons in August to 3,727 tons in September. The gradual recovery of this country as a buyer is an indication of confidence on the part of French merchants, who are laying in stocks, for very little is going inland for consumption. The temporary cessation of imports from this country was probably due to the belief that large quantites of nitrogen fertilisers would be available in the Ruhr, but the policy of the Germans defeated this expectation. Such comparatively small quantities of sulphate as were obtained have proved insufficient to meet the demand. The export figures for the nine months, however, show a considerable falling off when compared with 1922, 21,211 tons against 37,508 tons. Shipments to Japan were also increased, and this country again heads the list, with 9,571 tons, compared with 7,450, and nil a year ago. It would appear from these figures, and especially from the totals for the first nine months of 1923 and 1922, that the effects of the extremely heavy buying in the United States in 1921, and consequent glut on the Japanese market, have finally been dispersed. The market at the present time is in rather a depressed state, nevertheless, apart from the recent disaster, and there is a possibility that large stocks may be left on merchants' hands. Absence of offers of American material, and exceptionally cheap supplies from the United Kingdom have mainly been the reasons for quickened interest and inquiry in this direction. Exports to Spain were very much better than in August, 5,821 tons being shipped in September, compared with 2,204 in the previous month. The figure for the nine months ending September 30, 1923, is thus raised to 52,636 tons, against 21,660 for the corresponding period of 1922. Spain thus takes the place of France, which last year was, up to the end of September, our best customer. The Dutch East Indies, at 700 tons in September and 205 tons in August, did not maintain their average importation, which, on the basis of 19,636 tons for the nine months, works out at about 2,180 tons per month. The British West Indies took 680 tons, and Italy 75 tons, compared with 479 tons and 15 tons respectively in August. Total exports since January 1, 1923, thus amount to 185,006 tons, valued at £3,051,371., against 103,621 tons, worth £1,687,420. for the corresponding period of 1922.

The Dutch Superphosphate Industry. — Most superphosphate factories in Europe are running at a loss at the present time. Only one factory in Holland reported the financial results of its operations last year as satisfactory, states the American Consul at Rotterdam, and this was a co-operative concern with a most modern plant, and so situated as to dispose of its product without expensive transportation or other distribution costs. The situation in Holland is indicated by the fact that while the fertiliser factories of the country have a total capacity of about 450,000 metric tons of superphosphate a year, they have been able to secure a market for only about two-thirds of their possible production, including about 150,000 metric tons of superphosphates consumed in the country itself. This consumption also includes a considerable and increasing net importation of superphosphates, Belgium furnishing practically the whole of the superphosphates imported. Exports of superphosphate increased, on the other hand, from 81,331 metric tons in the first five months of last year to 117,777 metric tons in the same period of the current year. Nevertheless, there seems to be considerable uncertainty as to the immediate prospects for the industry in the Netherlands. The gist of the matter is that the entire industry in Europe is suffering from overproduction, or, perhaps, stated more correctly, from underconsumption, which is due to the economic depression. The large fertiliser factories in France, Belgium, and Germany are struggling for a market in other countries denied them in their own, and it is this fact, incidentally, which is largely responsible for the present difficult situation in the United Kingdom.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(Specially Contributed.)

Production in the coking industry in West Cumberland has almost reached its maximum, and is being fully absorbed in spite of the fact that the output in the hematite pig-iron industry is considerably below normal. Even in times when the number of furnaces blowing between Workington and Carnforth was twice as great as it is now, the coking trade was scarcely any busier. The outlook may be described on the whole as very encouraging. Already ordinary iron is being bought so much more freely than was the case five weeks ago, that no iron is going into stock. It cannot be doubted that as the Government plans for relieving unemployment develop there will be a vigorous demand for iron and steel, and West Cumberland must naturally participate in the larger volume of business that will then be at command. It has to be remembered, too, that activity in the Furness district is not without a beneficial effect upon the Cumberland coal and coking industries. A not inconsiderable part of the make of coke is reserved for the furnaces at the southern end of the hematite pig-iron producing district. At present nearly the whole of the make is going to the local furnaces, the shipments to the Continent having been very slight during the past two or three weeks. Coke to the iron smelters here is from 28s. to 33s. per ton according to carbon content, and to the Continent from 32s. to 35s. per ton, f.o.b. There are no other alterations in prices. Until there are more iron ore pits working, the demand for industrial fuel will be slow. Best steam is 30s. and washed steam 29s. per ton deliveries. East Coast coke supplies to West Cumberland and to the Furness district are below 7,900 tons this week. Residuals are moving away quickly.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Canada.

A firm of manufacturers' agents in Winnipeg, who have been for some considerable time manufacturing their own toilet preparations which are sold throughout Western Canada, desire to secure the representation, on a commission basis, of British manufacturers of drug sundries, toilet preparations, and perfumes. (Ref. No. 384.)

New Zealand.

An old-established New Zealand wholesale firm, with an extensive organisation throughout the Dominion, wish to obtain the agencies of British manufacturers of drugs, Patent medicines, and photographic goods. Goods on consignment are preferred until trade is established. (Ref. No. 389.)

Finland.

A firm of commission agents in Helsingfors desires to secure the representation for Finland of British exporters of spices, saccharin, isinglass (agar agar), vanillin, coumarin, and dulcin. (Ref. No. 394.)

Italy.

A firm in Naples desire to secure the representation of British firms for the sale of heavy chemicals, including caustic soda, potassium and sodium bichromates, chrome alum, bicarbonate of soda, ammonium carbonate, ammonium sulphate, also whale and fish oils, tallow, castor oil seeds, shellac, and gambier. (Ref. No. 397.)

Norway.

A firm of commission agents in Christiania desire to secure the representation for Norway of British manufacturers of asbestos and rubber goods, such as packings, hoses, and also aluminium foil for packing confectionery, etc. (Ref. No. 399).

Spain.

A commission agent of Barcelona is desirous of securing the representation of British exporters of ammonium sulphate, etc. (Ref. No. 402.)

A British subject resident in Funchal wishes to get into touch with British exporters of cement, tinplates, etc., with a view to acting as their representative. (Ref. No. 405.)

South Africa.

The South African Railway Administration are calling for tenders for the supply of disinfectant fluid during the period January 1, 1924, to June 30, 1924. (Ref. No. 12,337 E.D./C.C. (2).)

The South African Railway and Harbours are calling for tenders, to be presented by November 12, 1923, for the supply of red oxide paint in paste during the period January 1 to June 30, 1924. (Ref. 12,338/E.D./C.C./2).

The Rand Water Board are calling for tenders (Contract No. 249) for the supply and delivery of 150 short tons—or, alternatively, 300 short tons—aluminium sulphate or aluminoferric on or before November 9, 1923. (Ref. 12,342/E.D./C.C./2).

NEW COMPANIES.

Leicester Paper Staining Company, Ltd. — Private company. Capital £5,000. Office: The Mills, Birstall, Leics.

Linium Products Synd., Ltd.—Private company. Capital £6,000., £1. shares (5,990 ordinary and 10 founders'). To acquire any invention relating to cellulose or products therefrom, etc. Office: 20, Fletcher Gate, Nottingham.

Marsdens (Clayton), Ltd.—Private company. Capital £40,000. Dyers and finishers, etc. Office: Clayton Lane, Clayton, near Manchester.

Robert Rigby, Ltd.—Private company. Capital £30,000., £1. shares (10,000 6 per cent. cumulative preference). Manufacturers of non-ferrous metals, etc. Office: New John Street Metal Works, Birmingham.

Warren Row Whiting Works, Ltd.—Private company. Capital £3,000., in £1. shares (2,700 A. and 300 B.). Office: Warren Row, Henley-on-Thames.

Samuel Ward and Co., Ltd.—Private company. Capital £25,000., £1. shares (15,000 6 per cent. cumulative preference). Manufacturers and merchants of paints, varnishes, etc. Office: 30 and 32, Great Guildford Street, Southwark, London, S.E.

Wyld, Crowther and Barrow, Ltd.—Private company. Capital £4,000. Manufacturing chemists, druggists, etc. Office: Lyons Road, Trafford Park, Manchester.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 1 to 6 (inclusive).

Manufacture of Table Salt in Conjunction with Electrolysis of salt Solutions. Angel, E. G. R. 24,911.
Electrolytic Cells with Mercury Electrodes. Beilby, G. T 24,566.
Temperature-sensitive Devices. Bishop, H. S. 24,605.
Controlling Flow of Liquid in Pipe Lines. Blakeborough, R. A. 24,657.
Rotary Drying-apparatus. Bodman, W. L.; and Gettings, S. S. 24,850.
Mixing-apparatus. Bodman, W. L.; and Gettings, S. S. 24,851.
Apparatus for Making Emulsions. Boothroyd, H. T.; and Dance, H. E. 24,803.
Insulating-material. British Thomson-Houston Co., Ltd. (*General Electric Co.*). 24,613.
Making Drying Oils from Mineral Oils. Calderwood, W.; Reihl, C. A.; and Webb, A. E. 24,853.
Removal of Impurities from Manganese Ores. Dutt, W. 24,558.
Silicio Acid Gels. Farbenfabriken vorm. F. Bayer and Co. 24,495.
Heating Carbon-dioxide Gas Flasks. Ferguson and Timpson, Ltd.; and Timpson, F. M. 24,590.
Quick-drying solutions. Frew, H. K.; and Wilkins and Co., Ltd., D. 24,811.
Alumina and Glass-making Salts. Frink, R. L. 24,711.
Fire-bricks. Gibbs, F. 24,692.
Water Gas Manufacture. Glasgow, A. G. 24,778.
Carburetted Water Gas. Glasgow, A. G. 24,833.
Bunsen Burners. Graham, W. A. 24,822.
Retarding Oxidisation in Gums and Resins. King, E. H.; and Wright, C. H. 24,367.
Disintegrating Artificial Fertilisers. Malmsten, N. K. E. 24,403.
Low-temperature Fuel distillation. Merz and McLellan; and Weeks, E. G. 24,632.
Magnesia Hydrate. Monterumci, R. 24,477.
Oxidising Materials. Moseley, J. F. 24,342.
Sewage Purification. Perry, G. E. 24,377.
Casein Solid. Polden, D. C. 24,573.
Hypochlorite Compositions. Rushen, P. C. (*Mathieson Alkali Works, Inc.*). 24,387.
Quinizarine. Scottish Dyes, Ltd.; and Thomas, J. 24,609.
Gasification of Coke Breeze. Wollaston, T. R. 24,440.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. *in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.*

1922.

Cellulose Ester. Phillips, A. W. 8,492. **177,536**
Disintegrating and Emulsifying Materials. Povey, H., and Hallas, H. O. 9,015. **204,349**
Protecting Animal Fibre Treated with Alkaline Liquids. Akt.-Ges. für Anilin Fabrikation. 14,641. **181,698**
Separation of Gases from Liquids. Wade, H. (*Elliott, W. S.*). 15,085. **204,363**
Detinning Scrap Tinplate. John, A. S. 17,684. **204,387**
Mordant-dyeing Colouring Matters. Durand et Huguenin Soc. Anon. 17,699. **183,123**
Pigments. Jackson, W. J. Mellersh- 17,728. (*American Cotton Oil Co.*). **204,393**
Solutions of Cellulose Esters. Nitrogen Corporation. 18,149. **182,488**
Treating Cellulose Esters. Nitrogen Corporation. 18,151. **190,694**
Separating Ammonia and Benzol Hydrocarbons from Coal Distillation. Ges für Kohlentechnik. 18,489. **182,803**
Hydraulic Cement. Kontzler, H. 21,007. **193,372**
Catalytic Cracking of Heavy Hydrocarbons. Erdöl-und Kohle-Verwertung Akt.-Ges; and Erlenbach, Dr. E. 21,048. **204,458**
Continuous Pressure Filter. Hurrell, G. C. 22,282. **204,472**
Ore Flotation Processes. Vivian, A. C. 23,784. **204,495**
New Intermediate Products for Producing Fast Dyeings on the Fibre. Carpmael, W. (*Farbenfabriken vorm. F. Bayer and Co.*). 25,120. **204,514**
Para-di-chlor-benzene and Chloranthraquinone. Dodd, H.; Sprent, Dr. W. C.; and United Alkali Co., Ltd. 26,343. **204,528**
Hydrogen Sulphide. Howard, H. 26,759. **187,592**
Ascertaining the Percentage of Air Present in Carbon Dioxide. Bratby and Hinchliffe, Ltd.; and Smith, A. W. 27,875. **204,542**
Electric Apparatus for the Production of Peroxides of Nitrogen. Stacey, F. 27,895. **204,543**
Safety Guards of Hydroextractors. Manlove, Alliott, and Co., Ltd.; and Philps, A. M. 28,530. **204,555**

Obtaining Large and Uniform Crystals from Solutions. Passburg, E.; and Griffiths, H. 29,064. **204,559**
Continuous Process for Large Quantities of Absolute Alcohol. Barbet et Fils et Cie, E. 31,258. **189,136**
Apparatus for Testing the Effect of Light on Paints, Dyes, and Textiles. Lorilleux and Bolton, Ltd.; and Bertault, M. 31,713. **204,587**
Drying-apparatus. Wood, H. S. 31,785. **204,588**
P-nitrophenetole from P-nitrochlorbenzene. Lewcock, W.; and Gas Light and Coke Co. 32,969. **204,594**

1923.

Urea from Cyanamide. Soc. d'Etudes Chimiques pour l'Industrie. 3,001. **192,703**
Inks. Hunt, M. J. 3,850. **204,637**
Explosives. Nobel Industries, Ltd. (*Du Pont de Nemours and Co., E. I.*). 5,355. **204,646**
Depositing Simultaneously Galvanic Metal Coatings of Different Thicknesses. Wurttembergische Metallwarenfabrik. 10,118. **201,141**
Borneol and Isoborneol. Schindelmeiser, J. 14,798. **204,662**
Prisms for Dipping Refractometers. Zeiss, C. (firm of). 20,794. **204,666**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1922.

Combined Digesting and Evaporating Apparatus. Appareils et Evaporateurs Kestner. 33,777. **204,670**

1923.

Dehydration of Alcohol. Soc. Ricard, Allenet, et Cie. 23,084. **204,697**
Closure of Cylinders for Compressed or Liquefied Gases Soc. Anon. d'Application des Gaz Liquéfiés. 24,077. **204,715**
Arseno-benzene Derivatives. Farbwerke vorm. Meister, Lucius, and Brüning. 24,306. **204,721**
Diaminodiaryldialkylmethanes. Farbwerke vorm. Meister, Lucius, and Brüning. 24,307. **204,722**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Waterproofing Paper. A. T. Masterman, Wooburn Green, Buckinghamshire. British Patent, **202,432**, of 1922.

In waterproofing paper by the addition to the pulp of an emulsion of resin, soap and wax, subsequently precipitated on the fibres by alum, the materials are retained in the emulsified condition and a harder and more waterproof product obtained by the addition of a polymerising agent—*e.g.*, formaldehyde, tannic acid, an alkaline solution of potassium permanganate, chromic acid, etc. Oil may be added to the emulsion and a small quantity of a water-soluble colloid—*e.g.*, glue, gum, alkali-casein, etc. The temperature of the pulp is maintained throughout the operation above the melting-point of the waterproofing agent employed.

Refining Hydrocarbons with Acid Sulphates. Plauson's (Parent Company), Ltd., London. (H. Plauson, Hamburg, Germany.) British Patent, **202,422**, of 1922.

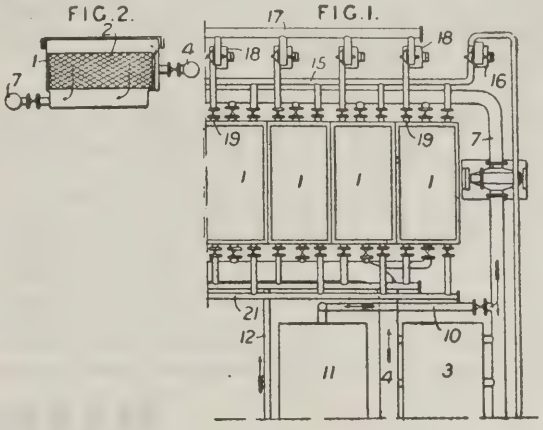
In the purification of petroleum, benzine, solar oil, paraffin, ceresin, ozokerite, montan wax, and the like saturated hydrocarbons by acid sulphate, alkali bi-sulphate or pyrosulphate, free from or containing only a little sulphuric acid, is heated with the oil, as for example to 110-250° C. and may be under pressure, 0.1-0.5 per cent. of acid phosphate or of nitric or nitrous acid or nitrates or nitrites may be added to accelerate the reaction. The treated oil may be distilled under atmospheric or reduced pressure or in a current of superheated air or steam or of carbon dioxide or other inert gas, and bisulphate may be prepared by water-extracting alkali sulphate from the still residue and treating it with sulphuric acid obtained by oxidising the sulphur dioxide evolved during the reaction.

Retorts. H. G. C. Fairweather, London. (Air Reduction Company, Inc., New York, U.S.A.). British Patent, **202,382**, of 1922.

The employment of a retort made of iron or other ferrous metal, which is desirable in various processes such as the manufacture of coal gas, oil gases, and in certain processes for the fixation of atmospheric nitrogen, is rendered possible by giving it an integral external protective coating of a refractory base metal alloy which is applied by spraying. Such an alloy may consist of 85 per cent. nickel and 10-15 per cent. chromium or 50-60 per cent. nickel, 10-20 per cent. chromium and 10-30 per cent. iron.

Dry Distillation. I. Moscicki, Lwow, Poland. British Patent, **202,333**, of 1922.

In the dry distillation of bituminous or cellulose containing materials the distillation products are circulated continuously from a series of distilling chambers through a condenser and superheater and back to the distilling chambers, the surplus products being drawn off. Sheet iron distillation chambers 1 each contains a perforated metal fuel holder 2 which is lifted out of the chamber when recharging is necessary, the heating gases from the superheater 3 entering by pipe 4 and leaving by pipe 7 to be returned to a condenser 11 and the superheater. The condenser may be omitted from the heating circuit and used for cooling the surplus gases and vapours only which enter it by a pipe 10



and pass through it to a gasometer. According to one method of working in five of the chambers 1 distillation is taking place by means of the superheated gases, two chambers are being cooled by the passage of gas injected from pipe 17 by fans 18, this gas being thereby heated and passed into a collecting pipe 21, from which it is led into two freshly charged chambers, the charges in which are heated and dried. The gases and vapours are returned through valves 19 to the exposed cooling pipe 17 in which steam is condensed. Air is displaced from the freshly charged chambers by gas from a pipe 12, the mixture of air and gas being delivered from pipe 15 by a pump 16 to the combustion chamber of the superheater. The remaining chamber is being re-charged. The superheated gases may, however, be passed through a number of the chambers in series. Specification 12508/99 is referred to.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Hydrocarbon Polymerisation with Aluminium Chloride. Soc. Ricard, Allenet et Cie, Melle, Deux-Sèvres, France. British Patent, **202,311**. Convention date, August 9, 1922.

Gaseous ethylenic hydrocarbons are polymerised to liquid hydrocarbon mixtures of indeterminate boiling point by passing them into a suspension of anhydrous aluminium chloride in petroleum ether. The gases should be pure and dry; it is advantageous to work under pressure. The first product is a viscous liquid compound of the aluminium chloride and hydrocarbon, and probably serves as the catalyst for the subsequent polymerisation of more hydrocarbon to a more mobile product. It is advantageous first to pass butylene through the catalyst suspension when ethylene is to be polymerised. The reaction product is treated with water to decompose the aluminium-chloride compound, and rectified for recovery of the petroleum ether; portions of the reaction liquid may also be drawn off at intervals and so treated, more gases being passed through the remainder. The products still contain double bonds and may be hydrogenised by the usual methods; they may also be cracked to obtain products of lower boiling-point. Examples are given of the polymerisation of butylene at ordinary pressure, and of ethylene at a pressure of 3 kg. per sq. cm. Specification 165,452 is referred to.

Vat Dyestuff Derivatives. Durand and Huguenin Akt.-Ges., Basle, Switzerland. (Assignees of M. Bader and C. Sunder, Mulhouse, Haut-Rhin, France.) British Patents, **202,630** and **202,632.** Convention dates, August 21, 1922. Additions to 186,057

In the process described in the parent Specification for the production of ethereal salts of leuco vat-dyes by the action of chlorsulphonic acid upon the said leuco compounds in presence of a tertiary base, and with or without a diluent, a salt of chlorsulphonic acid such as the sodium salt is substituted for the free acid. In an example leuco indigo is treated with sodium chlorsulphonate in presence of dimethylaniline and chlorbenzene and in an atmosphere of carbon dioxide.—The chlorsulphonic acid or chlorsulphonate employed is replaced by fuming sulphuric acid or sulphuric anhydride. Examples are given in which leuco indigo is treated with fuming sulphuric acid, or sulphuric anhydride, in presence of dimethylaniline and chlorbenzene, air being excluded.

Colloidal Sulphur. H. Vogel, Premnitz, Westhavelland, Germany. British Patent, **202,613.** Convention date, August 16. 1922.

Highly dispersed sulphur hydrosols are obtained by introducing sulphur dioxide and sulphuretted hydrogen into water in as fine a distribution as possible and preferably while agitating, the reaction vessel being maintained at a low temperature, for example −3 to +4° C. The degree of dispersion and the concentration obtainable increase with decrease in reaction temperature. Excess of sulphuretted hydrogen serves to increase the yield and to diminish the formation of polythionic acids. The dispersions obtained may be kept in closed receptacles to avoid oxidation. In an example, one of the usual protective colloids is added to the water.

PUBLICATIONS RECEIVED.

Bulletin of the Imperial Institute, Vol. XXI., No. 1, 1923. —Report on the operations of the Imperial Institute; 290 pages. London: John Murray, Albemarle Street, W.; price 3s. 6d. net (by post, 3s. 10d.).

Nickel Ores, by W. G. Rumbold. — One of the Imperial Institute Monographs on Mineral Resources, with Special Reference to the British Empire. London: John Murray; price 5s. net.

The Swedish Economic Review.—No. 3; September, 1923. Compiled by the Swedish Board of Trade, and published quarterly by the Swedish Foreign Office.

Department of Overseas Trade Reports. — Published by H.M. Stationery Office. **Persia** (to June, 1923), by Mr. R. H. Hadow, M.C., Secretary in Charge of Commercial Affairs, British Legation, Teheran; price 9d. net. **Greece** (to July, 1923), by R. F. H. Duke, C.B.E. (Commercial Secretary, British Legation, Athens); price 1s. 6d. net.

"Hydros" (Sodium Hydrosulphite).—Leaflet on a method of quantitative estimation in open apparatus. Brotherton and Co., Ltd., City Chambers, Leeds. A copy will be forwarded to any reader applying to the firm.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—"Uncertain" sums up the general tone in this market, and, due to this position, buyers show no confidence in placing orders of any size, continuing their policy of hand-to-mouth supplies. The trend of the market here depends a good deal on developments in Germany, but so far there are only indications of either a shortage of supplies to offer and at dearer prices. For this reason many spot holders are holding up their prices. **Acetic Acid,** 80% technical, about £47.; 80% pure, about £48.; 98% glacial, about £60. in casks and about £72. in glass demijohns, ex wharf London; the spot position seems a shade easier again this week, and some opinions favour still cheaper prices to come along. **Acetone,** British Government specification, about £124. per ton; the spot position shows no change on the week, with the market quite steady. **Alum,** lump, in casks, about £10. to £10. 10s. per ton, on spot; dealers continue to offer Continental material at about these figures, with not much business passing. **Arsenic,** Cornish, white powdered, spot, about £63. 10s.; f.o.r. Cornwall, about £57. 10s.; foreign material, c.i.f. to arrive, about £61. 10s. per ton; plenty of inquiry on the market from America. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. to 1s. 5½d. per lb.; dealers continue to quote at these rates, with some little business being done. **Bleaching Powder,** 35—37%, on spot, about £10. to £10. 10s. per ton; Continental offers are at about £9. per ton; business remains slow. **Barium Chloride,** 98—100%, about £15. per ton; the spot position keeps steady, with a little business being done. **Borax,** commercial, granulated £24. 10s., crystals £25., powdered £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices for home trade show no change; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered at £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers continue to quote at these prices for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices, for home trade only, show no change; dealers are offering at competitive rates. **Citric Acid,** B.P., crystals, about 1s. 4½d. per lb., less 5%; the spot position remains weak, with little business doing; values as quoted are very easy. **Cream of Tartar,** 99—100%, about 85s. per cwt.; a slight reduction in price for spot material is recorded, with market quiet. **Epsom Salts,** commercial quality, about £4. 10s. per ton, in bags; dealers are offering Continental material at about these figures. **Formaldehyde,** 40%, about £63. per ton; the spot position is again at easier values, and, with business rather slow, the market is none too steady. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; dealers offering at these prices find business on the slow side. **Lead Acetate,** brown, about £41. to £41. 10s.; white, about £42. per ton; supplies on spot seem small, and Continental offerings are dearer. **Litharge,** about £35. 10s. per ton; importers' offers are steady at this unchanged level, with some limited business being done. **Lithopone,** 30% Continental red seal, £22. 10s. to £23. per ton; the spot position tends to firm up to the higher figure quoted; Continental offers are firmer; inquiry good on spot. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; dealers holding spot stocks are firm at these rates, with not much available; Continental position is firmer. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at these prices. **Oxalic Acid,** 6d. per lb.; the lack of business is still very noticeable here, and quoted prices are unchanged. **Carbonate of Potash,** 90—92%, £26. to £27.; 96—98%, about £29. per ton; spot supplies seem rather limited, and, with Continental rates dearer, the prices quoted appear quite steady. **Chlorate of Potash,** crystals and granular, about 2¾d. per lb.; quoted rates are unchanged, with inquiry small. **Caustic Potash,** 88—92%, about £31. per ton, on spot; this price is fully maintained, and tends to firm up a little; supplies are not very plentiful; Con-

tinental offers are dearer. **Permanganate of Potash,** commercial quality, about 9d. per lb.; this market has been dull, with quoted values unchanged. **Prussiate of Potash,** yellow, about 11d. per lb.; dealers have made a further reduction in their prices, but there has been no improvement in demand. **Sulphate of Potash,** 90%, about £11. per ton, ex ship; the market seems steadier after last week's reduction in price. **Mercury,** about £9. 15s. to £10. per bottle of 75—76lb., net; dealers are offering on spot at about these prices. **Red Lead,** imported, about £35. 10s. per ton; imported material is moving off fairly well at about this figure. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £43.; fine white crystals, £25. to £26. per ton; the spot market keeps very steady at these rates, and are likely to advance, in view of the firmer conditions on the Continent. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; the market keeps very steady, with plenty of inquiry about. **Acetate of Soda,** about £24. 15s. per ton, on spot; dealers are offering at this price, with not much doing. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 17s. 6d. per ton, in drums, ex wharf shipping port; dealers continue to quote at these prices, with business slow. British makers' prices are at: 70—72%, £17. 17s. 6d.; and 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid in Great Britain, to home consumers only on contract; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid in Great Britain; British makers' prices, for home trade only, are unchanged. **Bichromate of Soda,** home trade, 4½d. per lb., carriage paid; British makers' prices are level on the week. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers continue to offer at these prices. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in bags, carriage paid in Great Britain; British makers quoting at this figure for home trade only; spot parcels ex store at about same figure. **Hyposulphite of Soda,** pea crystals, about £14. 5s. to £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £9. 10s. to £10. per ton, in casks; the spot position is firmer, with Continental offers dearer. **Nitrate of Soda,** about £13. 5s. per ton, f.o.r. or f.o.b.; the position shows no change on the week, with the market steady. **Nitrite of Soda,** 100%, about £26. 10s. per ton; the quoted price is about the same, with the market dull. **Prussiate of Soda,** about 6d. per lb.; at the quoted rate given the market is rather weak, and has again been quiet. **Sodium Sulphide,** 60—62% solid, about £14. per ton; ditto, broken, about £15. per ton; 60—65% concentrated, about £14. per ton, in casks. **Sulphate of Copper,** about £25. 10s. per ton, less 5% for home or export, delivered and f.o.b. respectively; British makers quote at about these prices. **Tin Crystals,** 1s. 4d. per lb.; the market shows no change on the week. **Tartaric Acid,** B.P., crystals, on spot, 1s. 1½d. per lb., less 5%; business shows no improvement, and with heavy stocks offering the market as quoted is certainly weak. **White Lead,** imported, about £42. per ton; dealers continue to do a little business at about this figure. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers report their prices are unchanged.

Pharmaceutical Chemicals.—The spot position, as forecasted last week, is on a generally higher level as regards quoted prices this week. This movement is clearly due to the position in Germany, where, owing to extremely high costs of raw materials, many makers are standing off temporarily, and the few producing are forced to ask much higher values. **Acetanilid,** crystals and powder, 1s. 9½d. to 1s. 10d. per lb.; prices for spot material are again a shade firmer, with inquiry good. **Acetyl-Salicylic Acid,** B.P., 3s. 1½d. to 3s. 3d. per lb.; the spot position is again at higher rates, with the market firm; supplies limited. **Benzoic Acid,** B.P., 2s. 3d. to 2s. 6d. per lb.; dealers quote at these rates, with very little doing. **Diethylbarbituric acid,** B.P. (barbitone), about 18s. per lb.; the firmer tone reported last week is fully maintained. **Salicylic Acid,** B.P., 2s. 3d. to 2s. 4d. per lb.; dealers holding spot stocks quote firmly at these rates, with business fair. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; this market has been rather quiet during the week, and dealers' prices are unchanged. **Amidopyrin,** about 14s. 6d. per lb.; although business is still slow, spot quotations are quite steady. **Ammonium Bromide,** 7d. to 8d. per lb.; owing to the dearer offers from the Continent, the spot position is a little steadier at the rates quoted. **Benzonaphthol,** about 5s. per lb.; the market remains dull, with quoted values unchanged. **Betanaphthol,** resublimed, 1s. 10d. per lb.; there is seldom any inquiry for this article. **Benzaldehyde 03,** about 3s. per lb.; this item keeps steady on a dull market. **Calcium Lactate,** 1s. 9d. per lb.; the tendency here is to slightly higher prices. **Chloral Hydrate,** duty paid, 3s. 11d. to 4s. 1d. per lb.; the demand has not been much, but the market is very steady. **Creosote,** B.P., about 2s. 6d. per lb.; the market keeps steady, but has again been dull. **Creosote Carbonate,** about 8s. 6d. per lb.; prices are slightly firmer, with business lacking. **Guaiacol Carbonate,** about 10s. per lb.; this higher price is fully maintained. **Hexamine,** 4s. to 4s. 1d. per lb.; still further advances in prices are recorded, with quotations from the Continent moving in the same direction. **Hydroquinone,** 3s. 4d. to 3s. 6d. per lb.; prices for spot goods are a shade easier this week, with little demand about. **Methyl Salicylate,** 2s. 8½d. to 2s. 10d. per lb.; the firmer tone reported last week is fully maintained. **Methyl Sulphonal,** about 15s. per lb.; market remains dull, with quoted rates unchanged and steady. **Paraformaldehyde,** 3s. 6d. to 3s. 9d. per lb.; this item is very steady, and a fair business continues. **Paraldehyde,** 1s. 5d. to 1s. 6d. per lb.; these recently improved prices are being maintained, with a little business doing. **Phenacetin,** 6s. 2d. to 6s. 3d. per lb.; offers of spot parcels are at about these rates, with a tendency to advance. **Phenazone,** 7s. 6d. to 7s. 9d. per lb.; 7s. 9d. to 8s. per lb.; the movement to dearer prices continues, with plenty of inquiry on spot. **Phenolphthalein,** 7s. to 7s. 3d. per lb.; a sharp advance in prices is recorded. **Potassium Bromide,** B.P., crystals and granular, 6¼d. to 6¾d. per lb.; the spot position is inclined to be steadier, although business is still slow; Continental prices are dearer. **Potassium Permanganate,** B.P., 9½d. to 10d. per lb.; prices tend to move to higher rates, with plenty of inquiry on spot. **Potassium Sulphoguaiacolate,** about 5s. 9d. to 6s. per lb.; dealers holding spot stocks are quoting at these higher rates. **Resorcin,** about 5s. 6d. per lb.; at this level the spot market is quite steady. **Sodium Bromide,** B.P., crystals and granular, 7d. to 7¾d. per lb.; prices are somewhat steadier, and tend to harden a little. **Sodium Salicylate,** B.P., crystals, 2s. 9d. to 2s. 10d.; powder, 2s. 8d. to 2s. 9d. per lb.; spot prices quoted at much higher rates this week, with Continental offers also dearer. **Sulphonal,** about 14s. 6d. per lb.; hardly any inquiry; quoted rates unchanged. **Terpin Hydrate,** about 1s. 9d. per lb.; this market shows no change on the week. **Thymol,** about 15s. per lb.; inquiry is infrequent, and prices mentioned are unaltered. **Vanillin,** 100%, 23s. 3d. to 23s. 6d. per lb.; spot offers at these levels.

Coal-tar Products, Intermediates, Etc.—This market shows hardly any change during the past week. Business has been small and slow. Pitch keeps steady. Benzol is weak. Naphthas are dull. **Aniline Oil,** about 9d. per lb., drums free; this item shows little life, and values are a shade easier. **Aniline Salt,** about 9½d. per lb., casks free; there has been but little inquiry during the week; quoted values easy. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; this market remains rather quiet, with values as quoted easy. **Benzol,** about 1s. 3½d. to 1s. 4d per gallon, f.o.r. makers' works, in buyers' packages; this item has been dull, and a slight reduction in price might be anticipated before long. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; quoted rates show no change, with business small and slow. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; dealers are offering at these levels, with little doing. **Naphtha,** about 1s. 4d. per gallon; this price is still quoted, but the market looks like weakening a little. **Solvent Naphtha,** 90/160, 1s. 3d. per gallon, drums extra; inquiry has again been poor, and quoted rates are easy. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; dealers are offering at about this figure, with little business about. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; unchanged rates govern this market, which has been quiet for some time. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; there is no change to record here; market quiet but steady. **Creosote Oil,** about 9¼d. to 9½d. per gallon, f.o.b.; the demand has shown no improvement during the week, and prices are perhaps a shade easier. **Carbolic Acid,** crystals, about 1s. 2d. per lb., f.o.b.; at this rate the market keeps fairly steady, but there has been little business doing. **Naphthalene,** about £19. 10s. to £20. per ton; this market is steadier; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disin-**

fectants, 3s. 9d. per gallon, barrels free; the market is level on the week, with business slow. **Pyridine,** about 21s. per gallon; the spot position keeps very firm. **Hexamethylene,** 3s. 9d. to 3s. 10d. per gallon; the advance in price recorded last week is being fully maintained on spot. **Pure Methyl Alcohol,** about £90. per ton, in drums, ex wharf London; dealers quoted prices are well up to this figure, with a fair inquiry being dealt with. **Pitch,** about 137s. 6d. per ton, f.o.b. East Coast; the better price recorded last week is being maintained on a steady market, with a fair inquiry continuing.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £60. 17s. 6d., cash; £61. 12s. 6d. to £61. 15s., three months; electrolytic, £64. to £65. **Tin:** Standard, £202. 17s. 6d. to £203., cash; £200. 10s. to £200. 15s., three months; Straits, £203. 17s. 6d.; English, £204. **Lead,** soft foreign, £28., prompt; English, £29.; chemical sheet, 36s. 6d. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 10s.; hard, £28. **Antimony,** English regulus, 99%, £28. 5s. to £29. 10s.; special brands, £34 10s. to £35. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. 5s. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. to 12s. 3d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

Business continues dull and uninteresting, with few changes in values to record. Buyers are only placing orders for near requirements, and there is very little inquiry forward. Quotations for alkali products are unchanged. **Caustic Soda,** 70%, £17. 17s. 6d.; **58% Alkali,** £7. 10s.; **Soda Crystals,** £5. 5s., carriage paid. **Bicarbonate of Soda,** £10. 10s., on rails. **Roasted Saltcake,** quiet at £4. 10s., carriage paid. **Bleaching Powder,** softwood casks, easy at £11. 5s. on rails. **Chlorates** in only small demand at 2¾d. and 3d. per lb. for **Soda** and **Potash** respectively. **Bichromates** unaltered. **Copper Sulphate** continues in small demand, and quotations remain nominal at £26., f.o.b. Liverpool. American **Sulphur** is firmly held at £5. 5s. per ton, ex store. **Phosphate** and **Commercial Hyposulphite of Soda** are only moving off slowly, and prices show no improvement. **Nitrite of Soda,** firm at £26. 10s., ex store. **Concentrated Sodium Sulphide,** quiet at £14. per ton, carriage paid. White powdered Cornish **Arsenic** is freely offered at £60., on rails works, but the demand is slow. **Yellow Prussiate of Potash** is firm at 1s. per lb.; **Soda,** 5½d. to 5¾d. per lb., both carriage paid. **Carbonate of Potash,** 90%, easier at £24. **Solid Caustic,** 88—90%, maintained at £29. per ton, c.i.f. **Acetic Acid** and **Acetate of Soda** are steady at recent rates. Grey and brown **Acetate of Lime** continue scarce, and quotations are firm. **Acetone,** dull at £125. per ton. **Miscible Wood Naphtha,** 6s. 3d. per gallon. **Lead Salts** have an upward tendency. White **Acetate** £41. 10s., brown £45., both carriage paid. **Lead Nitrate,** unaltered at £42. **Barium Chloride,** steady at £14. 10s. to £15., on rails makers' works. **Green Copperas** is in better request, but prices show no improvement. **Oxalic Acid,** dull at 5¾d. per lb., ex store. **Permanganate of Potash,** B.P., firm at 9¼d. per lb.

SWANSEA MARKET REPORT. Wednesday.

Tinplate quotations continue firm on the basis of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets** show further strength, and prices are firm at £19. 2s. 6d. per ton for 24-gauge sheets, f.o.b. **Copper** easier, with prompt at £60. 12s. 6d. per ton, and three months £61. 7s. 6d. **Tin,** moderate business without special feature, and somewhat irregular quotations, with prompt £201. 17s. 6d., and three months £200. 2s. 6d. per ton. **Lead** fairly steady, with foreign softs at £26. 7s. 6d. cash, and £26. 10s. three months; English, £28. 7s. 6d. **Spelter** less active, with business holding off; prompt £32. 7s. 6d., and forward £31. 12s. 6d. **Zinc Sheets,** in fair demand at £39. 7s. 6d. per ton, on rail at works. **Rape Oil** firm; best refined, £2. 6s. 3d. per cwt., net, in barrels. **Cod Oil** steady; Newfoundland, £2. 5s. 3d. per cwt.; English, £1. 15s. 9d. per cwt., f.o.b. **Seed Oils** very firm: **Cottonseed,** common edible £2. 3s. 3d. per cwt., and deodorised £2. 6s. 3d., net, in barrels. **Linseed,** rather quiet, with prompt raw £2. 6s. 6d., and boiled £2. 8s. 6d. per cwt., in barrels. **Olive Oil,** scarce and dearer at £41. 2s. 6d. per ton, ex ship. **Coconut Oil** very quiet, with Ceylon at £2. 4s. 6d. per cwt., ex ship. **Castor Oil** firm, with best grades at £2. 18s. 3d., and common £2. 10s. 3d., net, per cwt., in barrels. **Turpentine,** quiet at £3. 15s. 9d. per cwt. for American refined. **Oxalic Acid,** very quiet at 6¼d. per lb., f.o.r. Swansea. **Pitch** firmer, but little business transacted at £6. 2s. 6d. per ton for best grades. **Copperas,** dull at £2. 2s. 6d. per ton, including delivery London or equal. **Arsenic** met with better inquiry, with easier quotations at £60. 17s. 6d. per ton for white powdered. **Palm Oil** was very firm: Lagos, £36. 15s. 6d.; softs, £36. 2s. 6d. prompt, and £36.; mediums, £36. prompt and £36. 7s. 6d. forward; hards, £37. per ton. **Sulphate of Ammonia, very firm on the £14.** 12s. 6d. per ton basis. **Sulphate of Copper,** rather slow at £26. 2s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda,** very steady at 13s. 9d. per cwt., in bags, net. **Bone Meal** slow, with prompt Indian at £9. 2s. 6d. per ton. **Sulphuric Acid** sold freely at unchanged rates. **Coal** rather quiet, and, owing to unsatisfactory ship loading, buyers were able to obtain concessions: Best Admiralty smokeless £1. 1s. 6d., seconds £1. 6s. 6d.; ordinaries £1. 5s. 6d.; Monmouthshire black vein, £1. 7s., all per ton, f.o.b. **Anthracite** rather quiet; best large, £2. 7s. 6d.; cobbles, £2. 15s.; Paris and French nuts, £3. per ton, f.o.b. **Patent Fuel,** steady from £1. 8s. 9d. to £1. 11s. 6d. per ton, f.o.b. **Cokes** were again firmly held at £2. 2s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, on rail at ovens.

LIVERPOOL CHEMICAL MARKET. Wednesday.

The demand for chemicals of the heavier class has been fairly maintained for home-trade requirements. In the export branch orders have come steadily to hand to a fair extent, and shipments have been moderately active. **Bleaching Powder** has been quiet; the price of spot is £11. 5s. per ton, and the same price is quoted for export. For contracts special prices are being quoted. **Chloride of Calcium** has again had a steady inquiry, and is £5. 12s. 6d. per ton. **Caustic Soda** has been in fair request for use in the U.K., and has had a rather active shipment for foreign ports; spot is £19. 7s. 6d. per ton for 76%; for contracts special prices are being quoted. **Bicarbonate of Soda** for home-trade use has again been in very fair demand, and is £10. 10s. per ton, carriage paid; shipments to overseas ports have been on a large scale. **Soda Crystals** continue in good demand for use in the U.K., and are £5. 5s. per ton, carriage paid. **Nitrate of Soda** has moved but slowly, and is £13. 5s. to £13. 10s. per ton. **Borax** has been rather more in demand; commercial crystals are £25. per ton, and powdered £26.; higher-grade crystals are £29. per ton, and powdered £30.; superfine is £31. per ton, in 2cwt. bags, carriage paid in the U.K. **Saltcake** has again sold with some freedom, and is £4. 10s. to £5. per ton for home-trade use, and £5. to £6. per ton for export. **Bichromate of Soda** continues to meet with a fair inquiry, and is 4¾d. per lb. to stated ports. **Ammonia Alkali** has been in good request for use in the U.K., and has been shipped largely to overseas ports; it is £7. 10s. per ton for spot, in bags, f.o.r. at works; for contracts special prices are quoted; for export the price is £8. per ton, varying somewhat according to destination. **Hyposulphite of Soda** has been quieter; it is £10. to £11. per ton, in 2cwt. bags, for commercial; and £15. to £17. per ton for the photographic quality, in 1cwt. kegs. **Sulphide of Soda** has again been in moderate demand; solid is £14. 10s. to £15. per ton, and crystals £8. 15s. to £9. per ton. **Chlorate of Soda** has had a very limited inquiry, and is 3d. to 3¼d. per lb. **Phosphate of Soda** has been but little in demand, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been in quietly steady demand, and is 6¼d. per lb. **Yellow Prussiate of Potash** has been quieter, and is 1s. 1d. per lb. **Red Prussiate** has been in moderate demand, and is 3s. per lb. **Carbonate of Potash** has been but little called for, and is £25. to £30. per ton. **Nitrate of Potash** has been rather more in demand, and is £29. to £30. per ton. **Chlorate of Potash** has been in fair request, and is 3½d. to 4d. per lb. **Caustic Potash** has been steadily called for, and is £29. to £30. per

ton. **Permanganate of Potash** has been quieter, and is 9½d. to 9¾d. per lb. **Bichromate of Potash** has been in quietly steady demand; it is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has had a very fair inquiry; first quality is £60. per ton, and second quality £57. per ton. **Sulphate of Ammonia** has been quiet both for the home trade and for export; neutral of 25¾% is £14. 12s. 6d. per ton, and ordinary of 25¼% £13. 9s. 6d. per ton, for home-trade use, for October deliveries, and 2s. 6d. per ton more for November. **Carbonate of Ammonia** has sold with some freedom, and is 4d. per lb. **Muriate of Ammonia** has been in fair demand, and is £32. per ton. **Magnesia** has been steadily called for; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has had a moderate inquiry; it is £12. per ton for use in the U.K., and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been in fair request, and is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been in rather good request; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s. per ton, and American £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has had a quietly steady sale, and is 1s. 2d. to 1s. 2½d. per lb. **Cream of Tartar** has been in rather good request, and is £4. 10s. per cwt. **Boric Acid** has been in very fair demand; commercial is £48. per ton, and powdered £51. per ton; B.P. grades are £54. to £60. per ton. **Citric Acid** continues very quiet, and is 1s. 6d. to 1s. 7d. per lb. **Oxalic Acid** has had a moderate inquiry, and is 6d. per lb. **White Acetate of Lead** has been rather more in demand, and is £42. to £42. 10s. per ton. **Sulphate of Copper** has been but little called for on home-trade account or for export; the price is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has had a fair inquiry, more especially on export account; quotations have varied widely; from £60. to £61. per ton may be given as the price of white powdered.

WEST OF SCOTLAND CHEMICALS.

Wednesday.

A quieter tone has been evident in the Glasgow market for chemicals, and business on home account has been of smaller dimensions. The export trade still keeps rather dull, with little inquiry. Prices are steady at previous figures, and there are no alterations of note to record. Quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, lower at £66. 10s. per ton on spot; a steady market. **Barium Chloride,** £14. 10s. per ton; at this price the market remains steady. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, makers' prices; demand rather poor. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted at slightly below this figure. **Citric Acid,** 1s. 6d. per lb., less 5%; little business about at last week's quotation. **Copper Sulphate,** £27. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar,** £4. 3s. 6d. per cwt. for 99% at Glasgow; quotation steady, but inquiry small. **Lead Acetate,** white, £41. 10s. per ton on spot; brown, more inquiry at £43. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** lower at 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. 2d. per lb.; at this price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £60. and £57. per ton respectively; crystals £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 12s. per cwt., net; a better market, with quotation unaltered. **Sodium Bichromate,** 4½d. per lb.; unchanged **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate,** £9. 15s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; rather easier in tone, and inclined to be dull. **Tartaric Acid,** 1s. 2d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending October 13.

ALBUMEN—
Shanghai, 112 cs.

BITUMEN—
Boston, 520 brls.
Philadelphia, 200 pkgs.

CEMENT (MAGNESIA)—
Philadelphia, 600 bgs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 137 pkgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 40 cks.
Unspecified
Philadelphia, 20 brls.

GLUE—
Antwerp, 185 pkgs.

IRON OXIDE—
Malaga, 60 cs.

OCHRE—
Almeria, 53 brls.; Rouen, 72 cks.

POTASSIUM PERCHLORATE—
Rouen, 200 cks.

ROSIN—
Brunswick, 700 brls.
Jacksonville, 2,950 brls.

ROSIN—
Savannah, 300 brls.

SALT—
Hamburg, 5,140 bgs.

SOAP—
Philadelphia, 1,000 bxs.

TALLOW—
Monte Video, 84 pkgs.

TANNING MATERIALS—
Quebracho
Buenos Ayres, 6,226 bgs.

TAR (WOOD)—
Jacksonville, 100 brls.

TURPENTINE—
Brunswick, 250 brls.
Jacksonville, 850 brls.
Savannah, 550 brls.

GOOLE.

Week ending October 13.

FERRO CHROME—
Dunkirk, 21 cks.

GLUE—
Antwerp, 60 bgs.

HYDROGEN PEROXIDE—
Ghent, 80 crbys.

KAINIT—
Antwerp, 108 t.

WHITE LEAD—
Antwerp, 12 brls.

GRANGEMOUTH.

Week ending October 13.

COPPER SULPHATE—
Antwerp, 30 bgs.

ZINC OXIDE—
Antwerp, 20 brls.

GRIMSBY.

Week ending October 13.

ACETIC ACID—
Rotterdam, 6 cs.

AMMONIUM BROMIDE—
Hamburg, 3 cs.

BROMIDE—
Hamburg, 7 cs.

CALCIUM CARBIDE—
Trondhjem, 1,200 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 63 cks.

POTASSIUM CYANIDE—
Hamburg, 3 cs.

SOAP—
Grimsby, 4 pkts.
Hamburg, 1 cs.

HULL.

Week ending October 13.

OFFICIAL AMENDMENT.

Deduct—
From Return for week ending July 1?.

FERRO SILICON—
Christiania, 55

CALCIUM CARBIDE—
Christiania, 10 t. 5 c.

Week ending October 13.

ACETIC ACID—
Rotterdam, 10 t.

CALCIUM CARBIDE—
Copenhagen, 24 t.

CAUSTIC POTASH—
Hamburg, 14 t. 14 c.

CHEMICALS (*otherwise undescribed*)
Antwerp, 1 t. 2 c.; Copenhagen, 144 galls.; Hamburg, 8 t. 5 c.; Rotterdam, 22 t. 10 c.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Amsterdam, 420 lb.
Rotterdam, 860 lb.
Unspecified
Amsterdam, 2,580 lb.
Rotterdam, 1,253 lb.

FERRO CHROME—
Antwerp, 10 t.

FERRO SILICON—
Gothenburg, 75 t.

PLUMBAGO—
Moji, 136 t.

ROSIN—
Valencia, 16 t. 12 c.

SALT—
Hamburg, 6 t.

SOAP—
Dunkirk, 6 c.
Marseilles, 10 t. 3 c.

SODA CRYSTALS—
Baltimore, 5 t.

SULPHUR—
Catania, 60 t. 2 c.; Sicily, 7 t.

TALLOW—
Christiania, 10 t.

TANNING MATERIALS—
Sumac
Palermo, 7 t. 8 c.

TARTARIC ACID—
Amsterdam, 10 c.

LEITH.

Week ending October 13.

ACETIC ACID—
Rotterdam, 5 cks.

BASIC SLAG—
Antwerp, 1,500 bgs.

CARBON BLACK—
Baltimore, 10 cs.

CREAM OF TARTAR—
Rotterdam, 286 kgs.

CRYOLITE—
Copenhagen, 650 bgs.

FULLER'S EARTH—
Baltimore, 400 bgs.

GLUE—
Antwerp, 2 cs.

LITHOPONE—
Rotterdam, 80 cks.

MAGNESITE—
Rotterdam, 15 bgs.

MANGANESE (*otherwise undes.*)—
Rotterdam, 35 bgs.

MINERAL COLOUR (*otherwise undescribed*)—
Rotterdam, 4 cks.

OCHRE—
Baltimore, 480 brls.

ROSIN—
Antwerp, 30 brls.

SILICO MANGANESE
Gothenburg, 78 brls.

SOAP—
Copenhagen, 10 cs.
Rotterdam, 10 cs.

SODA CRYSTALS—
Antwerp, 120 bgs.

STEARINE—
Antwerp, 25 bgs.

WHITE LEAD—
Dunkirk, 20 cks.

ZINC OXIDE—
Antwerp, 12 brls.

LIVERPOOL.

Week ending October 13.

ALBUMEN—
China, 294 cs.

AMMONIUM CHLORIDE—
Germany, 28 cks.

ANTIMONY ORE—
Australia, 74 t. 10 c.

ARGOLS—
Phillipines, 28 bgs.

ARSENIC—
Japan, 340 cs.; U.S.A., 40 cs.

BEESWAX—
W.C. Africa, 379 blcks., 29 pkgs.

BISMUTH ORE—
Bolivia, 6 t. 10 c.; China, 2 t. 5 c.

BONE ASH—
Brazil, 120 t.

BORATE OF LIME—
Holland, 6,324 bgs.

CALCIUM CARBIDE—
Yugo-Slavia, 100 drms.

CANDELILLA WAX—
U.S.A., 14 sks.

CARBON BISULPHIDE—
Germany, 167 drms.

CARBON BLACK—
U.S.A., 308 cs.

CARNAUBA WAX—
Brazil, 55 bgs.

CAUSTIC POTASH—
Germany, 52 drms.

CREAM OF TARTAR—
Italy, 100 kgs., 97 bgs.
Spain, 55 kgs., 12 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
U.S.A., 4 kgs.

DYESTUFFS (NATURAL)—
Cochineal
Canaries, 21 bgs.
Cutch
Borneo, 850 cs.
India, 166 bxs., 117 pkgs.
Logwood
U.S.A., 51 cks.

FERRO CHROME—
Belgium, 5 t.; Norway, 27 t. 10 c.

FERTILISER (DRIED BLOOD)—
Argentine, 1,209 bgs.

FERTILISERS (*otherwise undes.*)—
Argentine, 2,940 bgs.
W.C. Africa, 11 bls.

FORMALDEHYDE—
Germany, 111 cks.
U.S.A., 128 brls.

GELATINE—
Belgium, 212 bls.

GLYCERINE—
Holland, 7 cks.; Japan, 1 drm.

IRON OXIDE—
Spain, 76 brls.

ISINGLASS—
Brazil, 4 brls., 3 bgs.
Japan, 10 bls.

KIESELGUHR—
Norway, 1,205 bgs.
Spain, 1,020 bgs.

LITHOPONE—
Holland, 160 cks.

MANGANESE ORE—
India, 7,300 t.; Japan, 17 t. 18 c.
W.C. Africa, 1,030 t.

MANGANESE OXIDE—
Germany, 24 brls.

PARAFFIN SCALE—
U.S.A., 650 brls.

PARAFFIN WAX—
Burmah, 160 bgs.
U.S.A., 100 brls., 103 bgs.

PHOSPHATE OF LIME—
Belgium, 500 bgs.

PITCH (MINERAL)—
U.S.A., 1,020 brls.

PITCH (PETROLEUM)—
U.S.A., 9 drms.

POTASSIUM NITRATE—
Belgium, 4 kgs.

ROSIN—
U.S.A., 1,000 brls., 250 cks.

SALAMMONIAC—
Argentine, 182 cs.

SALTPETRE—
Holland, 40 bgs.

SOAP—
U.S.A., 100 bgs.

SODA ASH—
U.S.A., 40 brls.

SODIUM CHLORATE—
Spain, 30 brls.

STEARINE—
Argentine, 94 cs., 343 cks., 197 trcs.
Belgium, 89 bgs., 30 trcs.
Denmark, 300 cs.
Norway, 50 brls.
U.S.A., 100 bgs.

TALLOW—
Argentine, 1,115 pps., 4,037 cks.; Holland, 100 tcs.; Uruguaya, 53 pps., 282 tcs.

TANNING MATERIALS—
Chestnut
France, 300 cks.; Italy, 105 cs.
Gambier
China, 253 cs.
Quebracho
Argentine, 4,083 cks.
Valonia
Smyrna, 67 sks.
Wattle
Germany, 100 cks.
South Africa, 10,597 bgs.

TAR (WOOD)—
U.S.A., 200 brls.

TIN ORE—
Bolivia, 223 t.; Chili, 1,420 t.

ULTRAMARINE BLUE—
Belgium, 2 cks.

WHITE LEAD—
Belgium, 8 brls.; Italy, 41 cks.; U.S.A., 66 cks.

ZINC ASHES—
U.S.A., 76 t.

ZINC OXIDE—
Belgium, 100 brls.
Holland, 25 cs.

LONDON.

Week ending October 13.

ACETIC ACID—
Canada, 10 cans

ACETONE—
Austria, 11 t. 2 c.
Czecho-Slovakia, 10 3 V. Blagden
Germany, 20 Chance & Hunt
,, 18 c.

ACETYL SALICYLIC ACID—*
——— £253.

ACIDS (*otherwise undescribed*)—
Canada, 2 cbys.
Germany, 1 pkg. H. W. Winter
Irish Free State, 1 pkg.

ALBUMEN—
Belgium, £390. E. G. Boizo
China, £1,545. McDougall & Bonthron
,, £185.
France, £284. W. M. Smith
Germany, £15. Allison
Holland, £25. Allen & Hanburys
S. Australia £110.
,, £110. Overseas Farmers' Co-op. Fed.
U.S.A., £110. R. Warner

ALUMINA—
Sweden, 10 pkgs.

ALUMINIUM HYDRATE—
Germany, 10 pkgs. Stancourt & Muir

ALUMINIUM SULPHATE—
France, 1,200 pkgs. J. Bailey

AMMONIUM CHLORIDE—
Germany, 29 pkgs. Allen Craig
,, 30 E. Friedlander

ARGOLS—
France, 288 pkgs.
Italy, 326
Portugal, 185

ARSENIC—
Japan, 1 t. 11 c.

ARSENIOUS ACID—
Japan, 200 pkgs. W. & T. Bowditch

BARIUM CHLORIDE—
Germany, £112. T. Potter Priestley

BARYTES—
Germany, 29 cks. G. Elliott
,, 21 W. Harrison
,, 45 bgs. ,,
,, 11 brls. Taylor & Cox
,, 66 cks. ,,
,, 150 bgs. ,,
,, 33 cks. Dexters
,, 34 Burrells
,, 38 Dixons White
,, 76 Burton Smart & Orford
,, 61 t.

BARYTES—
Belgium, 300 bgs. Felton & Crepin

BEESWAX—
B.W.I., 1 brl. Weber
,, 3 brls. Smith & Hoare
Morocco, 10 bgs. W. H. Muller
France, 27 cs.

BONE BLACK—
U.S.A., 20 brls. F. W. Taylor

BORAX—
U.S.A., 65 t. W. W. Jones Dooly

BUTYRIC ACID—*
——— £851.

CALCIUM CARBIDE—
Austria, 13 t.

CALCIUM CHLORIDE—
Germany, 20 t. Petri

CARBON BISULPHIDE—
Germany, £212. Allen, Craig

CARBON BLACK—
U.S.A., 1 cs. E. Dechaine
,, 288 Hughes & Hughes

CARNAUBA WAX—
Brazil, 82 bgs. Weber
Smith & Hoare
France, 41 bgs. Poth Hille

CASEIN—
Brit. India, £450. H. C. Puttick
France, £805 E. G. Boize
,, £509.
U.S.A., £48. Gerhard & Hey
,, £35. J. F. Obree

CAUSTIC POTASH—
Germany, 9 drms. J. M. Steel

CHEMICALS (*otherwise undescribed*)
Belgium, £10. M. Ashby
France, £100. Mory
Germany, £98.
,, £59. Greeff
,, £28. W. Connell
,, £6. C. S. Lovell
,, £5. Van Oppen
,, £106. Hertz
Holland, £13. C. H. Haigh
Italy, £135. Borax Consol.
N.Z., £25. Willis, Sindall & Syrett
U.S.A., £54.
,, £56. E. Clayton
,, £13. H. W. Peabody

CHEMICALS (*otherwise undes.*)—*
——— £1,924.

COAL TAR PRODUCTS—
Creosote
France, £1,000. Sender
Unspecified
Germany, £75.
Switzerland, £78.

COBALT OXIDE—
Canada, £4,612. E. A. Kimpton

COCAINE CHLORIDE—*
——— £169.

COUMARINE—*
——— £403.

CREAM OF TARTAR—
France, 20 pkgs. Bessler, Waechter
Holland, 4

DEXTRINE—
Germany, 12 t. 16 c.
Holland, 2 10 R. Windmuller
,, 2
Poland, 10 P. Winn

DYESTUFFS (ARTIFICIAL)—
Unspecified
Canada, 65 pkgs. Knight & Morris
Germany, 4 W. H. Muller
,, 646
,, 82 Rosenberg, Loewe
Switzerland, £318.

DYESTUFFS (NATURAL)—
Cochineal
Canary Is., 5 pkgs.
France, 2 Weigel, Leygoine
Logwood
B. Honduras, 120 t. A. Everingham

* Entered under the Safeguarding of Industries Act.

FERTILISERS (*otherwise undes.*)—
Denmark, 6 t. Hollingshurst
,, 8 T. Elliott
Sweden, 19 Hollingshurst

FORMALDEHYDE—
U.S.A., 125 pkgs. V. Blagden

FORMIC ACID—*
——— £178.

FUSEL OIL—
Hungary, 1 ck. Scheuer

GELATINE—
Belgium, £2,935. Duche
,, £110. Soc. des Prod. Chim.
,, £9. E. G. Boize
France, £1,448. G. T. Symons
Germany, £142.
,, £107. Williams & Geils
,, £34. J. B. Ballantyne
,, £571. Crowe
,, £109. C. Zimmermann
Switzerland, £32. Europ. & Gen. Exp.

GLUE—
Austria, £600. Gerhard & Hey
Belgium, £255.
,, £146. P. Ingenlath
,, £48. Duche
,, £72. E. G. Boize
France, £1,212. Symons
,, £34. Stonecourt & Muir
,, £67. Soc. des Prod. Chim.
,, £25. Weigel Leygonie
,, £125. O. Murray
Holland, £325. H. W. Winter
,, £165. P. Ingenlath
,, £38.
Italy, £205. Union Glue & Gel.
Roumania, £298. ,,
U.S.A., £132. Knight & Morris
Hungary, £350. H. Smart

GLYCERINE—
Holland, £39.

HYDROGEN PEROXIDE—
U.S.A., 1 t. Allen & Hanburys

ISINGLASS—
Batoum, 26 pkgs. Arcos
Brit. Guiana, 5 Gillespie
France, 7 bgs.

KIESELGUHR—
Algeria, 2 t. J. W. Cook
U.S.A., 22 t. 7 c. Garton

LITHOPONE—
Belgium, 60 cks. Taylor & Cox
Germany, 40 Bush, Beach & Gent
,, 40 Dixons White
,, 100 S. Bramwell
,, 40 E. W. Taylor
,, 60 M. Ashby
Holland, 120
,, 25 F. T. H. Nye

MAGNESITE—
Brit. India, £60. Cayzer, Irvine
Holland, £50. Ray
,, £133.

METHYL SALICYLATE—*
——— £170.

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 4 cks. J. S. Holt & Moseley
Spain, 40 Lavington
,, 34 Houlder

MONTAN WAX—
Germany, 300 bgs. Holroyds Oil & Cer.

OCHRE—
U.S.A., 20 brls, J. Johnson
,, 9 D. Wait

OZOKERITE—
Germany, 23 bgs, Holroyds Oil & Cer.

PARAFFIN WAX—
Poland, 29 t, 12 c. A. C. E. Garnham
U.S.A., 118 10 Anglo-Am Oil

PARALDEHYDE—
Canada, £616,

PHOSPHATE OF LIME—
Belgium, 200 t. Hollingshurst

PLUMBAGO—
France, 100 bgs. Hall & Hall
Italy, 100 Wills
U.S.A., 7 cks. H. Johnson

POTASSIUM CARBONATE—
E. Turkey, 16 pkgs. Centrosjus
Germany, 15
,, £8.

POTASSIUM NITRATE—
Germany, 1,500 Nobel Industries
Belgium, 20 pkgs.

PRUSSIAN BLUE—
Germany, 2 cks. Stancourt & Muir

RED LEAD—
France, 3 brls.
Germany, 4 cs. Stancourt & Muir

ROSIN—
France, 74 cks. Lowden, Connell
Germany, 20 bgs. E. Friedlander
Portugal, 141 H. J. Hughes
,, 66 Bigland & Jeffries
Spain, 50 Rosin & Turp. Imp.
U.S.A., 150 brls.
,, 1,100 Rosin & Turp. Imp.
,, 250 Langley Smith
,, 250 Bowring Jones
,, 150 Bigland & Jeffries
,, 500 Fox Stockwell
,, 300 M. H. Winkley
,, 200 W. R. Green
,, 250 Fairclough Dodd & Jones
,, 700 Lowden Connell

SALAMMONIAC—
Germany, 78 pkgs. R. Moore
,, 19 ,, J. Bailey

SALT—
Germany, 80 t.

SHELLAC—
Brit. India, 39 t. 7 c. J. W. Cook
,, 7 13 Litchfield & Saundy

SIZE—
Germany, £33. E. W. Taylor

SOAP—
Austria, £33.
Canada, £3,848. Gerhard & Hey
Denmark, £39.
France, £30. J. D. Hewett
,, £230. E. J. Francois
,, £60. C. E. Wood
,, £28. W. J. Frith
,, £16. Symons
,, £102.
,, £47. E. E. Mayer
,, £40. Cini
,, £30. Pronk Davis & Rushby
Germany, £4. S. Salisky
,, £63. T. Meadows
,, £10. Scheukers
U.S.A., £316. H. A. Lane
,, £348. L. F. Smith
,, £59. Swift
,, £30. J. Christy
,, £289. Knight & Morris
,, £1,924. J. Knill

SODA CRYSTALS—
Belgium, 15 t. P. Winn

SODIUM SALTS (*otherwise undes.*)
Germany, 1 ck. Allen Craig

STEARINE—
Belgium, 33 bgs. A. C. E. Garnham
,, 13 Rubeck, Thew
N.S.W., 29 cks. Loders & Nucoline

TALLOW—
Argentine, 29 t, 10 c,
Norway, 106 J. Knight
N.Z., 11 3 Goad Rigg
,, 17 Anning & Cobb
,, 13 17 J. H. Rayner
,, 2 17

TALLOW—
Queensland, 25 t. 3 c.
Uruguay, 50 Co-op. W'sale

TANNING MATERIALS—
Chestnut
France, 102 pkgs.
Italy, 100
Gambier
Straits Setts. 100 Everingham
,, 170
Myrabolans
Brit. India, 4,000 Leach
Oak
Belgium, 210 pkgs. W. A. J. Tilleray
Sumac
Italy, 50 pkgs. H. G. Harper
,, 100 Gough Kidston
,, 200 C. S. Lovell
,, 400 Fisher King
Valonia
A. Turkey, 85 t. Phillips, Conquest & Damala

TARTARIC ACID—
Holland, 10 pkgs. F. C. Devon

THYMOL—*
——— £176.

TURPENTINE—
Sweden, 3 drms. G. Elliott
Poland, 12 brls. Mann
U.S.A., 2,729
,, 100 Langley Smith
,, 25 White Sea & Baltic
,, 200 P. A. Watt
,, 650 Rosin & Turp. Imp.
,, 400 Goodlake & Nutter
,, 4,425 Fairclough, Dodd & Jones
,, 100 Lowden Connell

VANILLIN—*
——— £448.

WHITE LEAD—
Canada, 25 cks. L. Bucknell
France, 3 brls.
Germany, 1 cs. E. Friedlander
,, 67 cks. Burrell

ZINC OXIDE—
Belgium, 50 brls. M. Ashby
Holland, 50 cks. F. T. H. Nye

MANCHESTER.

Week ending October 13.

ANTIMONY COMPOUNDS (*otherwise undescribed*)—
Hamburg, 40 cks.

BARYTES—
Bremen, 62 cks., 150 bgs., 2 cs.
Hamburg, 23 cks.

CALCIUM CARBIDE—
Rotterdam, 250 drms.

CALCIUM PERMANGANATE—
Hamburg, 2 drms.

CAUSTIC POTASH—
Hamburg, 94 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 1 bskt.
Hamburg, 30 bgs.

COAL TAR PRODUCTS—
Naphthalene
Hamburg, 25 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bremen, 3 cs. ; Hamburg, 5 cks.

FERTILISER (BONE)—
Antwerp, 165 bgs.

FERTILISERS (*otherwise undes.*)—
Antwerp, 790 bgs.

FORMALDEHYDE—
Antwerp, 35 drms.
Hamburg, 422 crbys.

GLUCOSE—
Hamburg, 200 brls.

GLUE—
Antwerp, 38 bls.
Rotterdam, 132 pkgs.

GLYCERINE—
Rotterdam, 2 cks.

LITHOPONE—
Amsterdam, 40 cks.

MAGNESITE—
Amsterdam, 100 bgs.
Rotterdam, 145 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 455 drms.

MAGNESIUM SULPHATE—
Antwerp, 2 bgs.
Rotterdam, 2,292 bgs.

MINERAL WAX—
Hamburg, 10 bgs.

OXALIC ACID—
Hamburg, 42 cks.

ROSIN—
Gothenburg, 11 brls.

SALAMMONIAC—
Hamburg, 7 brls.

SALT—
Hamburg, 500 bgs.

SALTPETRE—
Antwerp, 50 bgs.
Rotterdam, 50 bgs.

SODA—
Antwerp, 13 cks.

SODIUM ACETATE—
Hamburg, 40 brls.
Rouen, 71 cks., 100 bgs.

SODIUM BICHROMATE—
Petrograd, 997 brls.

SODIUM CARBONATE—
Hamburg, 14 brls.

SODIUM CHLORATE—
Gothenburg, 80 kgs.

SODIUM NITRITE—
Hamburg, 50 cks.
Rotterdam, 8 cks.

SODIUM PERBORATE—
Hamburg, 32 drms.

STEARINE—
Antwerp, 76 bgs.
Rotterdam, 31 bgs.

WHITE LEAD—
Antwerp, 26 cks.

ZINC DUST—
Antwerp, 46 cks.

ZINC OXIDE—
Antwerp, 68 cks.
Rotterdam, 10 cks.

NEWCASTLE-ON-TYNE

Week ending October 13.

ACETIC ACID—
Montreal, 55 brls.
Rotterdam, 10 cks., 6 cs.

ACID (*otherwise undescribed*)—
Rotterdam, 4 cks.

BARYTES—
Hamburg, 222 brls.

CALCIUM CARBIDE—
Christiania, 710 drms.
Hamburg, 547 cs.
Rotterdam, 400 drms.

CARBON BLACK—
New Orleans, 132 cs.

CHEMICALS (*otherwise undescribed*)
Bremen, 30 cks.
Hamburg, 11 brls.

GLUE—
Antwerp, 20 bls.

LITHOPONE—
Hamburg, 20 brls.

MAGNESITE—
Rotterdam, 40 bgs.

SALT—
Hamburg, 1,270 bgs.

SODIUM NITRATE—
Christiania, 103 bgs.

STEARINE—
Antwerp, 38 bgs. ; Hamburg, 27 bgs. ; Rotterdam, 7 bgs.

TAR—
Hamburg, 94 brls.

WAX (*otherwise undescribed*)—
New Orleans, 617 brls.

N. & S. SHIELDS.

Week ending October 13.

NIL.

* Entered under the Safeguarding of Industries Act.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending October 13.

ANTIFOULING PAINT—
Bombay, £100. : Shanghai, £50.

BOILER COMPOSITION—
Calcutta, £28. ; Rouen, 1 c.

CEMENT (MAGNESIA)—
Hong Kong, £31.

CHEMICALS (*otherwise undescribed*)
Adelaide, 46 pkgs. ; Algoa Bay, 121 pkgs. ; Balik Pappan, 203 pkgs. ; Batavia, 247 pkgs. ; Bombay, 140 pkgs. ; Boston, 56 pkgs. ; Buenos Ayres, 40 pkgs. ; Cape Town, 12 pkgs. ; Colombo, 10 pkgs. ; Hamburg, 229 pkgs. ; Kingston (Ja.), 50 pkgs. ; Hong Kong, 1,620 pkgs. ; Madras, 509 pkgs. ; Kobe, 710 pkgs. ; Melbourne, 30 pkgs. ; Mollendo, 100 pkgs. ; Mombasa, 54 pkgs. ; Montreal, 232 pkgs. ; New York, 2,482 pkgs. ; Pt. Elizabeth, 10 cs. ; Penang, 1 pkg. ; Rio de Janeiro, 260 pkgs. ; Rouen, 31 pkgs. ; Santos, 100 pkgs. ; Singapore, 306 pkgs. ; Sydney, 135 pkgs. ; Va paraiso, 16 pkgs. ; Vera Cruz, 200 pkgs.

CHLOROFORM—
Cape Town, 50 lb.

COAL-TAR PRODUCTS—
Creosote
Boston, £700.
Tar
Algoa Bay, 1 t. 15 c. ; Batavia, £360. ; Cape Town, 268 t. 6 c. ; Kingston (Ja.), £11. ; Mombasa, £4. ; Penang, £138. ; Talara, £43. ; Singapore, £45.
Unspecified
Batavia, £46. ; New York, £378. ; Melbourne, £58. ; Rouen, £159. ; San Antonio, £2,240. ; Sydney, £235.

DYESTUFFS (NATURAL)—
Unspecified
Bombay, £41.

FERTILISER (*otherwise undescribed*)
Philadelphia, 3 t. 5 c.

GELATINE—
Montreal, £130.
New York, £160.

LITHARGE—
Bombay, £71.

MAGNESIA—
Madras, 10 cs.

MAGNESIUM OXIDE—
Rouen, 58 bgs.

NAPHTHA (SHALE)—
Rouen, £110.

PARAFFIN WAX—
Aden, £30. ; Antofagasta, £1,134. ; Naples, £756. ; Valparaiso, £910.

PLUMBAGO—
Singapore, 10 c.

POTASSIUM BICHROMATE—
Cape Town, 1 c.

SHEEP DIP—
Batavia, £127. ; Buenos Ayres, 37 t. 13 c. ; Callao, £90. ; Comodora (Rivadavia), 5 t. 17 c. ; Deseado, 11 t. 14 c. ; East London, 18 t. 19 c. ; Gallegos, 5 t. 17 c. ; Paita, 15 c. ; Pt. Elizabeth, 9 t. 10 c. ; Rio de Janeiro, £30. ; San Julian, 11 t. 14 c. ; Santa Cruz, 11 t. 15 c.

SOAP—
Buenos Ayres, 3 t. 13 c.
Montreal, 13 c. ; Pt.
Sudan, 1 t. 15 c.
Talara, 2 c.
Singapore, 1 t. 14 c.

SODA CRYSTALS—
Calcutta, 4 c. ; Pt. Said, 2 t. ; Singapore, 17 c.

SODIUM BICHROMATE—
Algoa Bay, 4 t. 5 c.

SPERMACETTI WAX—
Hamburg, 16 c.

TANNING MATERIALS—
Sumac
Boston, 50 cks. ; New York, £122. ; Philadelphia, 50 cks.

WAX (*otherwise undescribed*)—
Shanghai, £136.
Singapore, £10.

GRANGEMOUTH.

Week ending October 13.

BORIC ACID—
Rotterdam, 10 bgs.

MAGNESIUM OXIDE—
Antwerp, 23 cks.

SODIUM BICHROMATE—
Antwerp, 13 cks.

HULL.

Week ending October 9.

ANTIMONY—
New York, 51 cks.

CHEMICALS (*otherwise undescribed*)
Abo, 1 ck., 85 pkgs. ; Amsterdam, 29 cs. ; Bombay, 18 pkgs. ; Christiania, 4 cs., 1 kg. ; Dunkirk, 5 cks. ; Guayaquil, 20 brls. ; Hamburg, 4 cs., 75 drms. ; Helsingfors, 15 cks. ; Kalmar, 40 cks. ; Kotka, 180 drms. ; Newfairwater, 18 cks. ; Rotterdam, 768 pkgs., 25 drms. ; Stockholm, 29 cks. ; Santa Marta, 5 cs. ; Valencia, 80 bgs. ; Wiborg, 287 drms.

COAL TAR PRODUCTS—
Creosote
New York, 39 drms.
Pitch
Dunkirk, 565 t. ; Helsingfors, 650 bgs. ; New York, 534 brls.
Tar
Pt. Said, 50 cks.

COPPER SULPHATE—
Vera Cruz, 4 cks.

DISINFECTANTS (*otherwise undes.*)
Dunkirk, 5 brls.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiania, 1 cs., 6 cks.
Dunedin, 6 cs.
Lyttleton, 8 cs.

FULLER'S EARTH—
New York, 400 bgs.

GLUE—
Rotterdam, 1 cs., 22 bgs.
Santa Marta, 3 bgs.

GLYCERINE—
Christiania, 2 drms.

GUANO (FISH)—
Charleston, 500 bgs.

LITHARGE—
Riga, 10 kgs.

MINERAL WHITE—
New York, 1,700 bgs.

SALT—
Stockholm, 18 cs.

SOAP—
Bombay, 15 cs.
Christiania, 4 cks., 403 cs.

SULPHUR—
Rouen, 20 bgs.

TALLOW—
Antwerp, 17 cs.

WOOD PRESERVATIVE—
Christiania, 45 drms.
Stockholm, 50 drms.

LEITH.

Week ending October 13.

COAL TAR PRODUCTS—
Creosote
Gothenburg, 2 drms.

DYESTUFFS (NATURAL)—
Cutch
Rotterdam, 25 bxs.

GLYCERINE—
Amsterdam, 20 drms.

IODINE—
Dunkirk, 2 cks.

MAGNESIUM CARBONATE—
Amsterdam, 2 cs.

PARAFFIN WAX—
Bremen, 48 bgs. ; Dunkirk, 112 bgs. ; Ghent, 800 bgs. ; Gothenburg, 36 bgs. ; Hamburg, 32 bgs. ; Rouen, 95 bgs.

PITCH—
Gothenburg, 10 cks.

POTASSIUM BICHROMATE—
Dunkirk, 25 cks.
Hamburg, 12 cks.

SODIUM BICHROMATE—
Malmo, 6 cks.

SPERMACETTI WAX—
Copenhagen, 10 cs.

TALLOW—
Rotterdam, 30 cks.

LIVERPOOL.

Week ending October 11.

ACETYLENE GAS—
South Georgia, 3 c., £15.

ALUM—
Brisbane, 2 t. 2 c., £22.

ALUMINOFERRIC—
Calcutta, 5 t., £36.

ALUMINIUM SULPHATE—
Amsterdam, 1 t., £10.

AMMONIA (ANHYDROUS)—
Cape Town, 1 t. 2 c., £198.
Pt. Harcourt, 3 c. 2 qr., £26.

AMMONIUM CARBONATE—
Bahia, 17 c., £41. ; Copenhagen, 2 t. 9 c., £67. ; Fremantle, 10 c., £14. ; ; Hamburg, 13 t. 8 c., £322. ; Madras, 1 t. 5 c., £48. ; Maranham, 10 c., £26. ; New York, 4 t. 9 c., £121. ; Pernambuco, 1 t. 19 c., £85.

AMMONIUM CHLORIDE—
Alexandria, 8 t. 7 c., £360. ; Algoa Bay, 15 c., £33. ; Bombay, 8 t., £318. ; Bourgas, 19 c., £41. ; Calcutta, 7 t., £284. ; Durban, 10 c., £22. ; Genoa, 5 t. 3 c., £178. ; Kobe, 59 t. 16 c., £1,761. ; Karachi, 10 t., £406. ; Melbourne, 4 t. 1 c., £129. ; Montreal, 25 t., £745. ; Piraeus, 6 c., £11. ; Rouen, 19 t. 16 c., £604. ; Sydney, 1 t. 3 c., £36.

AMMONIUM SULPHATE—
Beria, 11 t. 8 c., £174. ; Barcelona, 222 t., £3,066. ; Brindisi, 150 t., £2,116. ; Demerara, 680 t., £8,968. ; Hong Kong, 50 t., £863. ; Kobe, 150 t., £2,907. ; Las Palmas, 209 t. 18 c., £3,039. ; Naples, 197 t. 18 c., £2,795. ; Palermo, 148 t. 14 c., £2,101. ; Samarang, 1,144 t. 18 c., £18,975. ; Tarragona, 292 t. 12 c., £3,755.

ANTIFOULING PAINT—
Singapore, 9 t. 10 c., £750.

ARSENIC PENTOXIDE—
Brisbane, 1 t. 19 c., £172.

BARIUM CHLORIDE—
East London, 19 c., £16.

BLEACHING POWDER—
Aalborg, 1 t. 2 c., £10. ; Brisbane, 1 t., £15. ; Bombay, 9 t. 10 c., £114. ; Christiania, 20 t. 2 c., £202. ; Calcutta, 80 t. 4 c., £776. ; Corfu, 3 t. 18 c., £48. ; Drammen, 40 t. 1 c., £402. ; Maceio, 3 t. 11 c., £52. ; Montreal, 20 t. 17 c., £190. ; New York, 6 t. 13 c., £160. ; Piraeus, 2 t. 1 c., £24. ; Pernambuco, 5 t. 13 c., £74. ; Rio de Janeiro, 10 t. 1 c., £110. ; Sydney, 2 t. 18 c., £69. ; Shanghai, 15 t., £195.

BORAX—
Amsterdam, 1 t., £26. ; Alicante, 2 c., £2. 10s. ; Barcelona, 3 t. 9 c., £88. ; Bourgas, 10 c., £12. 10s. ; Cienfuegos, 9 c., £12. ; Danzig, 2 t. 19 c., £75. ; Sydney, 3 t. 1 c., £76.

BORAX GLASS—
Auckland, 1 t., £71.

BORIC ACID—
Alicante, 10 c., £31.
Stockholm, 19 c., £49.

CALCIUM CHLORIDE—
Brisbane, 2 t. 2 c., £12. ; Bombay, 9 t. 18 c., £47. ; Colombo, 9 t. 18 c., £47. ; Dar-es-Salaam, 2 t. 19 c., £19. ; Durban, 15 t. 8 c., £92. ; Geelong, 10 t. 6 c., £61. ; Lisbon, 5 t. 1 c., £29. ; Melbourne, 12 t. 1 c., £69. ; Newcastle, 2 t. 19 c., £17. ; Sydney, 15 t. 3 c., £89. ; San Francisco, 50 t. 4 c., £246. ; Wellington, 2 t. 2 c., £13.

CALCIUM SULPHOCYANIDE—
Antwerp, 4 c., £35.

CHEMICALS (*otherwise undescribed*)
Alleppey, 1 t., £166. ; Alexandria, 1 t., £25. ; Barcelona, 2 t. 10 c., £65. ; Batavia, 1 t. 4 c., £30. ; Gothenburg, 7 t. 10 c., £195. ; Melbourne, 4 t. 11 c., £559. ; Monte Video, 5 t. 1 c., £58. ; Perth, 6 c., £64. ; Sydney, 1 t., £26. ; Santos, 1 t. 1 c., £95. ; Teneriffe, 5 t. 5 c., £13. ; Varna, 19 c., £25.

CHLORINE—
Durban, 7 c., £12.

CHROME ALUM—
Helsingborg, 3 t. 6 c., £55.

CITRIC ACID—
Durban, 3 c., £24.

COAL TAR PRODUCTS—
Carbolic Acid
Calcutta, 2 c., £63. ; Fremantle, 2 c., £23. ; Gothenburg, 10 c., £74. ; Hamburg, 20 t. 1 c., £486. ; Kobe, 10 t. 1 c., £1,266. ; Riga, 27 t. 19 c., £3,426.
Creosote
Alexandria, 5 t. 5 c., £133.
Christiania, 8 c., £10.
Sydney, 2 t. 2 c., £79.
Dinitrochlorbenzol
Riga, 30 t. 4 c., £2,411.
Mirbane Oil
Newcastle, 9 c., £26.
Naphtha
Bordeaux, 4 t. 3 c., £70.
Paranitrochlorbenzol
Switzerland, 6 c., £48.
Pitch
Sierra Leone, 5 c., £15.
Tar
Antofagasta, 11 c., £12.
Durban, 2 t., £20.

COBALT OXIDE—
Oporto, 1 c. 2 qr., £53.

COBALT SULPHATE—
Santos, 5 c., £87.

COPPER SULPHATE—
Melbourne, 3 t. 2 c., £75.
Sekondi, 1 c., £1 10s.

CREAM OF TARTAR—
Brisbane, 4 t., £344. ; Dunedin, 2 t., £166. ; Melbourne, 2 t. 10 c., £215. ; Newcastle, 5 t., £430. ; Sydney, 9 t. 10 c., £817.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 2 t. 4 c., £42. ; Batavia, 19 c., £32. ; Calcutta, 5 t. 18 c., £193. ; Durban, 5 c., £10. ; Demerara, 1 t. 1 c., £17. ; Gothenburg, 5 c., £29. ; Monte Video, 1 t. 3 c., £58. ; New York, 32 t. 3 c., £1,289. ; Penang, 1 t. 7 c., £67. ; Payta, 5 c., £17. ; Puerto Deseado, 18 t. 2 c., £1,450. ; Pt. Madryn, 1 c., £15. ; Rangoon, 1 t. 1 c., £11. ; Singapore, 4 t. 5 c., £140. ; St. Johns (N.F.), 4 c., £20.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 21 t. 6 c., £3,180.
Samarang, 4 t. 8 c., £742.
Unspecified
Bordeaux, 10 c., £81.; Barcelona, 5 c., £136.; Calcutta, 2 c. 2 qr., £12.; Durban, 1 c. 2 qr., £47.; Halifax, 2 c., £20.; Havre, 4 c., £95.; Melbourne, 2 t., £550.; Montreal, 6 c. 3 qr., £155.; Oporto, 1 c., £19.; Sydney, 4 c. 2 qr., £52.; Shanghai, 1 c. 1 qr., £25.

ESSENTIAL OILS (SYNTHETIC)—
Durban, 1 c., £64.

FORMALDEHYDE—
Adelaide, 1 t., £88.

GLYCERINE—
Antwerp, 8 c. 2 qr., £38.; Aalborg, 19 c., £66.; Bolivia, 1 c., £78.; Christiania, 11 t., £747.; Copenhagen, 6 t. 17 c., £476.; Calcutta, 5 t., £440.; Karachi, 1 t., £92.; Riga, 1 t. 19 c., £147.; Stockholm, 19 c., £68.

LACTIC ACID—
Singapore, 4 c. 2 qr., £10.

MAGNESIUM CARBONATE—
Colombo, 3 t., £98.; Santos, 19 c., £47.; Sydney, 2 t., £72.

MAGNESIUM SULPHATE—
Demerara, 1 t., £7.; Durban, 18 c., £10.; Moulmein, 10 c., £12.; St. Johns (N.F.), 2 c. 1 qr., £3 15s.

MANGANESE SULPHATE—
New York, 4 t. 16 c., £130.

NAPHTHA (WOOD)—
Demerara, 3 qr., £13.

NICKEL SULPHATE—
Melbourne, 1 t. 7 c., £58.
Monte Video, 6 c., £12.
Sydney, 18 c., £38.

PITCH (*otherwise undescribed*)—
Gothenburg, 25 t. 12 c., £360.

PLATING SALTS (*otherwise undes.*)
Melbourne, 6 c. 2 qr., £78.

POTASH (*otherwise undescribed*)—
Alleppey, 2 c., £10.

POTASSIUM BICHROMATE—
Constantinople, 19 c., £50.
Karachi, 10 c., £27.
Piraeus, 19 c., £49.

POTASSIUM CITRATE—
Brisbane, 1 c., £13.; Fremantle, 3 qr., £10.; Melbourne, 5 c., £62.

POTASSIUM IODIDE—
Forcados, 15 lb., £14.
Koko, 1 qr., £28.

POTASSIUM PRUSSIATE—
Buenos Ayres, 1 t. 18 c., £234.
New York, 4 t. 3 c., £428.
Sydney, 1 t. 1 c., £116.

SALAMMONIAC—
Adelaide, 5 c., £15.
Montreal, 1 t., £31.

SALTCAKE—
Leghorn, 50 t., £280.
Norrkoping, 288 t. 10 c., £1,296.

SHEEP DIP—
Beira, 1 t. 15 c., £124.; Buenos Ayres, 19 t. 10 c., £800.; Delagoa Bay, 5 t. 6 c., £412.; Durban, 7 t. 14 c., £503.; Kilindini, 4 c., £21.; Rio Gallegos, 2 t. 6 c., £175.; Santa Cruz, 4 t. 11 c., £350.; Valparaiso, 1 t. 13 c., £142.

SULPHURIC ACID—
Beira, 12 c., £18.
Maranham, 15 c., £25.

SUPERPHOSPHATE OF LIME—
Las Palmas, 4 t., £16.

SUPERPHOSPHATES—
Demerara, 5 t. 17 c., £25.

TANNIC ACID—
Christiania, 12 c. 2 qr., £134.

TANNING MATERIALS—
Unspecified
Auckland, 1 t. 11 c., £31.; Christiania, 4 t. 18 c., £119.; Gothenburg, 4 t. 15 c., £130.; Genoa, 3 t. 11 c., £52.; Nelson, 3 t. 2 c., £63.; Rotterdam, 7 t. 4 c., £142.

TARTARIC ACID—
Adelaide, 3 t., £395.; Brisbane, 1 t. 5 c., £153.; Durban, 1 t. 3 c., £138.; Hamburg, 10 t., £1,236.; Melbourne, 5 t. 10 c., £696.; Nelson, 10 c., £61.; Sydney, 3 t. 10 c., £450.

TIN OXIDE—
Halifax, 1 t., £228.; Santos, 10 c., £118.; Sydney, 1 t. 4 c., £308.

TURPENTINE—
Monte Video, 1 t., £26.

WOOD PRESERVATIVE—
Calcutta, 1 c., £29.
Dunedin, 4 t., £120.;
Rangoon, 10 c., £22.

ZINC CHLORIDE—
Balik Papan, 2 t., £28.; Bombay, 8 t. 12 c., £169.; Colombo, 3 t., £114.; Gothenburg, 19 t. 11 c., £431.; Philadelphia, 16 c., £22.; Reval, 1 t., £38.; Shanghai, 10 c., £13.; Samarang, 1 t., £27.

ZINC OXIDE—
Bombay, 1 t. 19 c., £85.
Rio de Janeiro, 1 t. 11 c., £72.

Week ending October 12.

CAUSTIC SODA—
Alexandria, 68 drms.; Auckland, 10 drms.; Batavia, 100 drms.; Bombay, 415 drms.; Bourgas, 200 drms.; Cape Town, 47 drms.; Brisbane, 77 pkgs.; Christiania, 150 drms.; Buenos Ayres, 66 drms.; Calicut, 90 pkgs.; Constantinople, 36 drms.; Copenhagen, 105 drms.; Corfu, 10 drms.; Delagoa Bay, 45 drms., 38 pkgs.; Dunedin, 63 drms.; Durban, 719 drms.; East London, 94 drms.; Fremantle, 45 pkgs.; Gothenburg, 140 drms.; Geelong, 32 pkgs.; Hobart, 15 drms.; Kilindini, 17 drms.; Lisbon, 30 drms.; Lyttleton, 20 drms.; Madras, 206 drms.; Melbourne, 232 drms., 206 pkgs.; Monte Video, 100 drms.; Mossel Bay, 26 cs.; Newcastle, 90 drms.; Oporto, 34 drms.; Padang, 96 drms.; Paita, 30 drms.; Panarockan, 120 drms.; Penang, 30 drms.; Passoerrean, 20 drms.; Pekalongan, 50 drms.; Puerto Cabello, 90 drms.; Pt. Elizabeth, 15 cs.; Pt. Said, 45 drms.; Riga, 117 drms.; Rotterdam, 228 drms.; Salonica, 27 drms.; Samarang, 9 drms.; Stockholm, 25 drms.; Sydney, 65 pkgs.; Tampico, 69 drms.; Tuticorin, 20 drms.; Wellington, 15 drms.; Zanzibar, 20 drms.

FERRO MANGANESE—
Baltimore, 1,106 t.
Buenos Aires, 30 t.
Montreal, 90 t.
Philadelphia, 200 t.

GLUE, SIZE, AND GELATINE—
Alexandria, 1 cs.; Auckland, 40 pkgs.; Bombay, 12 cks.; Cape Town, 82 pkgs.; Havana, 250 pkgs.; Madras, 16 pkgs.; Montreal, 20 pkgs.; Para, 7 brls.; Pimental, 11 pkgs.; Pt. Elizabeth, 5 cks.; Quebec, 26 pkgs., 71 cks.; Santiago de Cuba, 12 bgs.; Sydney, 3 cs., 10 cks.; Tangiers, 4 bgs.; Vera Cruz, 20 bgs.

LEAD ASHES—
Antwerp, 16 t.

MANGANESE ORE—
Melbourne, 1 t.; Rouen, 2 t.

PARAFFIN WAX—
Hamburg, 51 pkgs.; Puerto Colombia, 10 brls., 320 bgs.

PITCH (STEARINE)—
Boston, 25 brls.

POTASSIUM BICHROMATE—
Danzig, 27 pkgs.

SALT—
Aarhus, 50 t.; Antwerp, 160 t.; Auckland, 2 t.; Brisbane, 31 t.; Burutu, 359 t.; Christiania, 350 t.; Conakry, 14 t.; Copenhagen, 107 t.; Duala, 22 t.; Falmouth (B.W.I.), 5 t.; Lyttleton, 180 t.; Gisborne, 44 t.

SALT—
Gothenburg, 225 t.; Kilindini, 5 t.; Kingston (Ja.), 46 t.; Kolding, 10 t.; Livingston (Guatem.), 50 t.; Montego Bay, 9 t.; Nelson, 153 t.; Mombasa, 3 t. 5 c.; Montreal, 270 t.; Melbourne, 31 t.; Opobo, 50 t.; New Orleans, 165 t.; Quebec, 30 t.; Rangoon, 1,000 t.; Reval, 110 t.; Rosario, 1 t.; Rouen, 10 t.; Sundsvall, 10 t.; Warri, 59 t.; Wellington, 48 t.

SALTCAKE—
Calabar, 10 pkgs.; Christiania, 499 pkgs.; Durban, 25 pkgs.

SOAP—
Accra, 5 bxs.; Aden, 20 bxs.; Alexandria, 376 pkgs.; Amboina, 501 pkgs.; Antofagasta, 54 bxs.; Auckland, 920 bxs.; Bandjermassin, 501 bxs.; Bangkok, 408 pkgs.; Banjoewangie, 50 bxs.; Barbados, 835 cs.; Batavia, 2,052 bxs.; Belawan, 152 pkgs.; Benkoelen, 130 bxs.; Bilbao, 50 pkgs.; Bombay, 2,769 pkgs.; Beira, 347 bxs.; Bolaang, 50 bxs.; Bolivia, 723 pkgs.; Buenos Ayres, 797 pkgs.; Burutu, 125 cs.; Calcutta, 472 bxs.; Callao, 4 pkgs.; Cayenne, 50 pkgs.; Christchurch, 320 pkgs.; Colombo, 7 pkgs.; Cochin, 37 bxs.; Copenhagen, 523 bxs.; Coquimbo, 100 pkgs.; Dar-es-Salaam, 90 pkgs.; Demerara, 255 bxs.; Dominica, 55 pkgs.; Falklands, 45 pkgs.; Falmouth, 42 pkgs.; Fiume, 7 pkgs.; Funchal, 109 pkgs.; Gibraltar, 280 pkgs.; Gisborne, 80 pkgs.; Gorontalo, 100 pkgs.; Guayaquil, 112 pkgs.; Guadeloupe, 254 pkgs.; Havana, 10 pkgs.; Hong Kong, 80 pkgs.; Iddo, 80 pkgs.; Karachi, 634 pkgs.; Kilindini, 50 pkgs.; Kingston (Ja.), 435 pkgs.; Kota Baroe, 25 pkgs.; La Libertad, 24 pkgs.; Lagos, 530 pkgs.; Langsa, 100 pkgs.; Larache, 255 pkgs.; Las Palmas, 392 pkgs.; Lindi, 56 pkgs.; Lome, 100 pkgs.; Madras, 4 cs., 68 bxs.; Malta, 108 pkgs.; Mongoulon, 50 bxs.; Matadi, 6 bxs., 1 cs.; Moulmein, 1 cs.; Macassar, 1,252 bxs.; Menado, 200 bxs.; Mombasa, 759 bxs., 20 pkgs., 9 cs.; Nelson, 81 cs.; New York, 10 pkgs.; Olehleh, 200 bxs.; Orotava, 25 bxs.; Panama, 520 bxs.; Panarockan, 100 bxs.; Paramaribo, 275 bxs.; Penang, 804 bxs.; Pontianak, 82 bxs.; Puerto Colombia, 3 cs.; Pt. Said, 55 cs.; Pt. Sudan, 25 bxs.; Pt. Swettenham, 126 bxs.; Rangoon, 1,143 pkgs.; Rotterdam, 12 cs.; Salaverry, 2 cs.; Samarinda, 400 cs.; Savanna-la-Mar, 10 bxs.; Sekondi, 18 cs.; Shanghai, 1,730 pkgs.; Sierra Leone, 1 cs.; Singapore, 948 bxs.; Sourabaya, 77 bxs.; St. Kitts, 125 bxs.; St. Lucia, 176 cs.; Stockholm, 1,045 cs.; Suez, 9 cs.; Suva, 2 cs.; Sydney, 15 cs.; Tanga, 159 bxs.; Tangiers, 77 bxs.; Ternate, 100 bxs.; Teneriffe, 163 pkgs.; Tocal, 50 bxs.; Trinidad, 2,363 pkgs.; Valparaiso, 68 pkgs.; Warri, 18 bxs.; Wellington, 327 cs.; Zanzibar, 10 bxs.

SODA ASH—
Adelaide, 166 pkgs.; Auckland, 55 pkgs.; Bombay, 239 bgs.; Brisbane, 72 cks.; Cape Town, 60 cs.; Cheribon, 25 bgs.; Christiania, 150 bgs., 500 pkgs.; Corfu, 100 bgs.; Dalny, 2,438 pkgs.; Durban, 191 pkgs.; Fremantle, 236 pkgs.; Geelong, 36 cks., 104 pkgs.; Gothenburg, 910 pkgs.; Hobart, 20 bgs.; Karachi, 1,000 bgs.; Kobe, 10,115 pkgs., 2,414 bgs.; Launceston, 12 bgs.; Lyttleton, 21 pkgs.; Maranham, 5 cks.; Melbourne, 605 pkgs.; Moji, 462 bgs.; New Orleans, 2,200 bgs.; Oporto, 100 pkgs.; Penang, 30 bgs.; Portland (Aust.), 21 cks.; Rangoon, 180 pkgs.; Reval, 300 bgs.; Salaverry, 50 kgs.; Riga, 100 bgs.; Shanghai, 1,063 bgs.

SODA ASH—
Singapore, 125 cks.; Sourabaya, 25 bgs.; Sydney, 118 bgs.; Tsingtao, 5,600 bgs.; Vera Cruz, 250 bgs.; Wellington, 267 pkgs., 59 cks.

SODA CRYSTALS—
Durban, 100 pkgs.; Penang, 20 pkgs.; Trinidad, 20 pkgs.

SODIUM BICARBONATE—
Adelaide, 177 pkgs.; Auckland, 116 pkgs.; Bluff, 151 kgs.; Bombay, 500 bgs.; Bourgas, 60 kgs.; Brisbane, 371 pkgs.; Colombo, 135 pkgs.; Christiania, 90 pkgs.; Constantinople, 43 pkgs.; Copenhagen, 11 pkgs.; Demerara, 45 pkgs.; Durban, 50 pkgs.; Fremantle, 20 pkgs.; Galatz, 250 pkgs.; Genoa, 239 pkgs.; Geelong, 135 pkgs.; Hobart, 94 pkgs.; Gothenburg, 20 pkgs.; Karachi, 400 pkgs.; Kobe, 2,144 pkgs.; Launceston, 40 pkgs.; Limassol, 5 kgs.; Manila, 200 kgs.; Melbourne, 995 pkgs.; Monrovia, 5 cs.; Napier, 247 pkgs.; Nelson, 69 kgs.; Para, 2 pkgs.; Norrkoping, 120 pkgs.; Pt. Sudan, 25 pkgs.; Pt. Swettenham, 8 pkgs.; Riga, 100 pkgs.; Sourabaya, 2 brls.; Sydney, 159 kgs.; Trinidad, 40 pkgs.; Varna, 370 kgs.

SODIUM BICHROMATE—
Antwerp, 5 pkgs.
Danzig, 26 cks.

SODIUM BISULPHATE—
Pernambuco, 4 drms.
Pt. Swettenham, 10 drms.
Singapore, 30 drms.

SODIUM CYANIDE—
Cartagena (Col.), 65 cs.

SODIUM HYDROSULPHITE—
Santos, 20 kgs.

SODIUM HYPOSULPHITE—
Melbourne, 100 kgs.

SODIUM SILICATE—
Alexandria, 400 bgs.; Belize, 7 drms.; Buenos Ayres, 102 drms.; Demerara, 5 pkgs.; Durban, 61 pkgs.; Fremantle, 8 drms.; Hankow, 78 pkgs.; Hong Kong, 150 pkgs.; La Guayra, 10 pkgs.; Lyttleton, 26 pkgs.; Madras, 29 drms.; Messina, 53 cks.; Montreal, 32 cks.; Napier, 16 cks.; Shanghai, 31 drms.; Zanzibar, 11 drms.

SODIUM SULPHIDE—
Geelong, 21 pkgs.; Madras, 4 drms.; Mossel Bay, 10 drms.; Pt. Swettenham, 40 drms.

STEARINE—
Rotterdam, 60 brls.

TALLOW—
Alexandria, 8 brls.; Copenhagen, 27 pkgs.; Danzig, 24 cks.; Hamburg, 322 pkgs.

WAX (*otherwise undescribed*)—
La Guaira, 150 pkgs.
Rangoon, 1 cs.

LONDON.

OFFICIAL AMENDMENTS.

Deduct—
From Return week ending July 4.

SALTPETRE—
Sydney, 1 t., £125.

Deduct—
From Return week ending July 11.

SALTPETRE—
Brussels, 1 t., £32.

Week ending October 10.

ACETIC ACID—
Bombay, 4 crts., £15.; Delagoa Bay (F.), 4 cs., £12.; Dunedin, 5 cs., £15.; Launceston (F.), 2 cs., £6.; Sydney, 10 cs., £32.

ACETONE—
Sydney, 17 drms., £413.

ACETYL SALICYLIC ACID—
Bombay, 2 cs. (pt.), £10.
Madras, 1 cs. (pt.), £8.
Sydney, 1 ck., £36.

ALUM—
Delagoa Bay (transit), 20 cs., £16. ; East London, 15 cs., £6. ; Pt. Elizabeth, 50 cs., £21.

AMMONIA—
Alexandria, 4 cs., £6. ; Antwerp, 20 pkgs., £35. ; Beira, 12 cs., £43. ; Bombay, 20 cs., £42. ; Buenos Ayres, 6 pkgs., £14. ; Calcutta, 4 cs., £15. ; Cape Town, 8 cs., £15. ; Durban, 15 cs., £35. ; Hong Kong, 4 cs., £9. ; Malta, 3 cs., £5. ; Montreal, 12 cs., £21. ; Shanghai, 4 cs., £21. ; Singapore, 4 cs., £7.

AMMONIA (ANHYDROUS)—
Belawan, 200 cylds., £2,467.
Bombay, 20 cylds., £278.

AMMONIUM ACETATE—
Sydney, 1 cs., £5.

AMMONIUM CARBONATE—
Antwerp, 2 t. 10 c., £68. ; Bangkok, 1 t. 10 c., £96. ; Bombay, 9 c., £53. ; Brussels, 10 c., £13. ; Calcutta, 13 c., £56. ; Demerara, 5 c., £11. ; Hamburg, 2 t., £47. ; Karachi, 1 c., £6. ; Melbourne, 3 c., £6. ; Metelin, 4 c., £13. ; Padang, 17 c., £48. ; Penang, 5 c., £12. ; Pt. Elizabeth, 4 c., £8. ; Rouen, 10 c., £15.

AMMONIUM CHLORIDE—
Bombay, 2 cs., £7.

AMMONIUM CITRATE —
Montreal, 2 cs., £25.

AMMONIUM NITRATE —
Dunkirk, 30 t. 1 c., £780.
Las Palmas, 10 t., £245.

AMMONIUM PERSULPHATE—
Beira, 4 cs., £56.

AMMONIUM PHOSPHATE—
Aarhus, 15 cks., £105.

AMMONIUM SULPHATE—
Antwerp, 975 t., £14,625. ; Calcutta, 62 t., £899. ; Hong Kong, 100 t., £1,540. ; Kudat, 11 t. 18 c., £171. ; Las Palmas, 30 t. 10 c., £441. ; Mauritius, 250 t., £3,781.

ANTIMONY SULPHIDE—
Brussels, 4 pkgs., £39.
New York, 7 cks., £138.
Trelleborgs, 5 cks., £47.

ARSENIC—
Abo, 20 cs., £60. ; Durban, 200 drms., £616. ; Delagoa Bay, 1 drm., £6. ; Rotterdam (F.), 48 cs., £150. ; San Paulo, 80 drms., £355.

BARIUM SULPHATE (BLANC FIXE)—
Sydney, 20 bgs., £17.

BARIUM SULPHIDE—
Barcelona, 1 ck., £22.

BENZOIC ACID—
New York, 3 cs., £87.

BISMUTH CARBONATE—
Bombay, 1 cs., £71. ; Calcutta, 1 cs., £71. ; Montreal, 1 cs., £92. ; Sydney, 3 cs., £287.

BISMUTH SALICYLATE—
Aarhus, 9 pkgs. (pt.), £41.

BISMUTH SALTS (*otherwise undes.*)
Perth, 3 pkgs. (pt.), £9.

BISMUTH SUBNITRATE —
Athens, 1 cs., £31.
Aarhus, 9 pkgs. (pt.), £42.
Bombay, 5 cs., £299.
Calcutta, 3 cs., £181.;
Colombo, 1 cs. (pt.), £8.
Sydney, 1 cs., £125.

BISMUTH TRIBROMPHENOLATE
Aarhus, 9 pkgs. (pt.), £21.

BITUMEN—
Calcutta, 17 brls., £34.
Karachi, 57 pkgs., £112.
Melbourne, 18 cks., £60.

BLEACHING POWDER—
Malta, 36 pkgs. (pt.) £44.

BONE MEAL—
Antwerp, 5 t., £50.
Channel Islands, 5 t., £40.

BORAX—
Antwerp (F.), 30 t., £735. ; Beira, 5 c., £14. ; Danzig (F.), 10 t., £245. ; Delagoa Bay, 2 c., £5.

BORAX—
Durban, 4 c., £10
Lisbon, 3 t. (F.), £78.

BORIC ACID—
Bangkok, 6 c., £20. ; Bombay, 6 c., £35. ; Calcutta, 19 c., £52. ; Launceston, 2 c., £5. ; Malta, 2 c., £7. ; Pt. Elizabeth, 4 c., £12. ; Pt. Swettenham, 2 c., £7.

CALCIUM CARBIDE—
Beira (F.), 7 c., £14.
Channel Islands (F.), 1 t. 12 c., £26.

CALCIUM HYPOPHOSPHITE—
Calcutta, 1 cs., £14.
Kobe, 10 cs., £138.

CARBON TETRACHLORIDE—
Sydney, 3 drms., £49.

CAUSTIC SODA—
Buenos Ayres, 1 c., £7. ; Haifa, 10 c., £26. ; Hong Kong, 2 c., £9. ; Shanghai, 9 c., £40.

CHEMICALS (*otherwise undescribed*)
Aarhus, 18 pkgs. (pt.), £15. ; Ahwaz, 4 cs., £13. ; Auckland, 50 pkgs., £77. ; Beira, 70 pkgs., £249. ; Benguella, 4 pkgs., £5. ; Bombay, 17 cs. (pt.), £78. ; Buenos Ayres, 150 pkgs., £1,290. ; Calcutta, 8 cs. (pt.), £47. ; Cape Town (F.), 1 cs., £7. ; Cape Town, 2 pkgs. (pt.), £17. ; Colombo, 1 cs., £21. ; Delagoa Bay, 200 pkgs., £710. ; Durban, 6 pkgs. (pt.), £12. ; East London, 10 cs., £20. ; Fremantle, 8 cs., £18. ; Gothenburg, 15 pkgs., £39. ; Hamburg, 100 pkgs., £244. ; Hong Kong, 4 bgs., £6. ; Irish Free State, 2 pkgs., £6. ; Launceston, 13 pkgs. (pt.), £157. ; Madras, 2 cs., £5. ; Malta, 72 pkgs. (pt.), £62. ; Melbourne, 14 cs. (pt.), £74. ; New York, 4 cs. (pt.), £88. ; Paris, 1 cs., £11. ; Penang, 7 pkgs., £190. ; Perth, 2 pkgs. (pt.), £56. ; Pt. Elizabeth, 1 cs., £12. ; Pt. Said, 3 cs. (pt.), £6. ; Pt. Swettenham, 8 pkgs., £13. ; Rotterdam, 32 pkgs., £157. ; Rotterdam (F.), 48 pkgs., £239. ; Shanghai, 5 cs., £18. ; Singapore, 36 pkgs. (pt.), £94. ; Sydney (F.), 5 cs., £16. ; Sydney, 55 pkgs., £1,312. ; Valparaiso, 2 cs., £17. ; Wanganui, 20 pkgs., £26. ; Wellington, 3 cs., £77.

COAL TAR PRODUCTS—
Carbolic Acid
Colombo, 1 cs., £5.
Creosote
Galveston (bulk), 40,807 galls., Sydney, 1 cs., £8.
Mirbane Oil
Singapore, 2 pkgs., £26.
Naphthalene
Antwerp, 400 bgs., £420.
Rotterdam, 1,000 bgs., £1,413.
Pitch
Alexandria, 130 brls., £265. ; Antwerp (bulk), 330 t., £2,028. ; Dunkirk (bulk), 250 t., £1,596. ; France (bulk), 840 t., £5,366.
Pyridine
Calcutta, 20 drms., £105.
Rotterdam, 11 drms., £260.
Tar
Beira, 100 drms., £31. ; Delagoa Bay, 162 drms., £31. ; Durban, 52 pkgs., £11. ; East London, 55 cks., £11. ; Limon (C.R.), 5 cs., £7. ; Mozambique, 10 brls., £22. ; Seychelles, 25 drms., £5. ; Singapore, 30 drms., £32.

CITRIC ACID—
Amsterdam (F.), 1 t. 2 c., £187. ; Barbados, 1 c., £10. ; Calcutta, 6 c., £47. ; East London, 2 c., £15. ; Fremantle, 3 c., £27. ; Jamaica, 2 c., £16. ; Melbourne, 10 c., £91. ; Rotterdam, 9 c., £85.

COBALT ACETATE—
Amsterdam, 1 cs., £14.

COBALT OXIDE—
Brussels, 4 cs., £180.
Helsingfors, 1 cs., £55.
Melbourne, 1 cs., £22.

COBALT SULPHATE—
Sydney, 1 ck., £36.

COPPER SUBOXIDE—
Wellington, 3 drms., £33.

COPPER SULPHATE—
Delagoa Bay, 4 c., £7.
Durban, 5 c., £7.
East London, 9 c., £15.
Pt. Elizabeh, 17 c., £29.

CREAM OF TARTAR—
Concepcion, 1 c., £6. ; Delagoa Bay (F.), 7 c., £48. ; Durban (F.), 6 c., £41. ; Durban, 1 c., £6. ; East London, 1 c., £6. ; Fremantle, 15 c., £89. ; Madras (F.), 1 c., £6. ; Pt. Elizabeth, 5 c., £24.

DISINFECTANTS (*otherwise undes.*)
Acajutla, 2 t. 6 c., £83. ; Alexandria, 2 c., £12. ; Auckland, 1 t. 15 c., £125. ; Barbados, 1 t., £22. ; Beira, 6 c., £102. ; Bombay, 18 c., £37. ; Canton, 3 c., £23. ; Cape Town, 1 t. 9 c., £27. ; Christchurch, 2 t. 15 c., £683. ; Colombo, 5 c., £19. ; Dar-es-Salaam, 5 c., £10. ; Delagoa Bay, 1 t. 5 c., £60. ; Demerara, 2 t. 9 c., £54. ; Durban, 2 t., £92. ; Karachi, 2 t. 6 c., £71. ; La Libertad, 18 c., £33. ; Linde, 1 t. 6 c., £39. ; Malta, 2 c., £5. ; Penang, 2 t. 17 c., £94. ; Pt. Elizabeth, 4 c., £37. ; Pt. Moresby, 1 c., £7. ; Pt. Swettenham, 7 c., £108. ; Singapore, 2 t. 7 c., £76. ; Swatow, 15 c., £91. ; Tanga, 2 c., £6. ; Trinidad, 2 t. 17 c., £61. ; Wanganui, 1 c., £18. ; Wellington, 2 t. 4 c., £153.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 170 kgs., £1,080.
Jamaica (F.), 1 kg., £99.
Nigrosine Base
Brussels, 1 ck., £25.
Unspecified
Bombay, 9 cs. (pt.), £31. ; Brisbane, 1 cs., £11. ; Cape Town, 1 cs., £14. ; Jamaica, 1 cs. (pt.), £13. ; Melbourne, 5 pkgs. (pt.), £154. ; New York, 2 cs. (pt.), £21. ; Ostend, 4 pkgs., £30. ; Singapore, 1 cs., £8.

ETHER—
Adelaide, 10 cs., £32. ; Canton, 1 cs., £7. ; Pt. Elizabeth, 1 cs., £7. ; Salamanca, 1 cs., £9. ; Shanghai, 5 cs., £11. ; Sydney, 2 cs., £8. ; Trinidad, 2 cs., £6.

ETHYL CHLORIDE—
Durban, 2 cs., £15.
East London, 2 cs., £24.
Sydney, 1 cs. (pt.), £6.

FERTILISERS (*otherwise undes.*)—
Aarhus, 10 c., £13.
Barcelona, 12 c., £8.
Channel Islands, 4 t., £42.

FORMALDEHYDE—
Malta (F.), 8 cs. (pt.), £8.
Trinidad, 20 cs., £43.

GALLIC ACID—
Calcutta, 1 cs. (pt.), £9.

GLYCERINE—
Bombay, 5 c., £37.
Metelin, 2 c., £12.

HYDROCHLORIC ACID—
Bangkok, 2 cs., £5. ; Durban, 10 c. £29. ; Sekondi, 1 cs. £2. ; Trinidad, 8 c., £10. ; Wellington, 1 c., £6.

HYDROFLUORIC ACID—
Durban, 2 cs., £27.

HYDROGEN PEROXIDE—
Bombay, 2 cs., £6.
Colombo, 3 cs., £10.
Santander, 17 cs. (pt.), £6.

IODINE—
Alleppo, 1 cs. (pt.), £11. ; Bombay, 1 cs. (pt.), £26. ; Buenos Ayres, 3 cs., £310. ; Calcutta, 3 cks. (pt.), £257. ; Paris (F.), 20 kgs., £1,660. ; Sydney, 2 cs., £156.

IODINE (RESUBLIMED)—
Aarhus, 1 pkg. (pt.), £26.
Malta, 36 pkgs. (pt.), £27.
Sydney, 1 cs., £57.

IRON AMMONIUM CITRATE—
Sydney, 1 cs. (pt.), £15.

IRON GLYCEROPHOSPHATE—
Launceston, 1 cs. (pt.), £6.

LEAD ACETATE—
Fremantle, 4 cks., £49.

LEAD ARSENATE—
Medan, 80 drms., £203.

LEAD NITRATE—
Beira, 2 pkgs., £13.
Rouen, 8 cks., £84.

MAGNESIA—
Christchurch, 5 cs., £12. ; Shanghai, 2 cs., £5. ; Sydney, 20 cs., £48. ; Wellington, 30 cs., £72.

MAGNESIA (CALCINED)—
Buenos Ayres, 1 cs., £8.
La Guaira, 1 cs., £8.

MAGNESIUM CARBONATE—
Buenos Ayres, 2 cs., £7. ; Calcutta, 2 cs., £9. ; Launceston, 1 cs., £8. ; Melbourne, 5 cs., £11. ; Rio de Janeiro, 6 pkgs., £24. ; Sydney, 4 cs., £10.

MAGNESIUM CITRATE—
Havre, 13 cs., £240. ; Havana, 4 cs., £29. ; Limon, 2 cs., £10.

MAGNESIUM HYDRATE—
Santander, 17 cs. (pt.), £7.
Switzerland, 1 cs., £6.

MAGNESIUM SULPHATE—
Barbados, 5 c., £10. ; Brisbane, 1 t. 4 c., £27. ; Calcutta, 3 c., £12. ; Cape Town, 5 c., £6. ; Colombo, 2 c., £5. ; Delagoa Bay, 14 c., £17. ; Durban, 1 t. 9 c., £37. ; East London, 6 c., £7. ; Fremantle, 1 t. 18 c., £42. ; Launceston, 3 c., £6. ; Malta, 4 c., £5. ; Maryborough, 5 c., £6. ; Melbourne, 11 c., £12. ; Pt. Elizabeth, 1 t. 14 c., £43. ; Sydney, 2 t. 11 c., £57. ; Toronto, 10 c., £8.

MERCURIALS (*otherwise undes.*)—
Calcutta, 2 cks., £48.

MERCURY OXIDE—
Amsterdam, 4 cs., £196.
Wellington, 3 cs. (pt.), £114.

MERCURY SUBCHLORIDE—
Melbourne, 1 cs. (pt.), £6.

NICKEL SALTS (*otherwise undes.*)—
Sydney, 9 cs. (pt.), £24.

NITRIC ACID—
Durban, 2 c., £16. ; Dunedin, 2 c., £6. ; Wellington, 2 c., £8.

PHOSPHATE OF LIME—
Cape Town, 5 c., £15.

PHOSPHORIC ACID—
Cape Town, 2 cs., £5. ; Callao, 1 cs., £16. ; Launceston, 2 cs., £6. ; Sydney, 1 cs., £7. ; Trinidad, 3 cks., £19.

PHOSPHORUS—
Launceston, 5 cs., £44.

PLATING SALTS (*otherwise undes.*)
Brussels, 2 cs., £12.
Switzerland, 1 cs., £10.

POTASH (*otherwise undescribed*)—
Melbourne, 4 cks., £52.

POTASSIUM ACETATE—
Bombay, 1 cs., £8.
Calcutta, 1 ck., £5.

POTASSIUM BICARBONATE—
Calcutta, 1 cs., £6.

POTASSIUM BROMIDE—
Bombay, 1 cs., £9. ; Calcutta, 1 cs., £8. ; Melbourne, 1 cs. (pt.) £7.

POTASSIUM CARBONATE—
Lisbon (F.), 1 ck., £15.

POTASSIUM CHLORATE—
Trinidad (F.), 10 cs., £19.

POTASSIUM CHLORIDE—
Townsville (F.), 240 bgs., £151.

POTASSIUM CITRATE—
Bombay, 3 cs., £42. ; Calcutta, 1 cs., £19. ; Launceston, 1 cs.; £12. ; Melbourne, 2 cs., £24. , Sydney, 19 cs., £141.

POTASSIUM CYANIDE—
Canton, 2 cs., £33.
Shanghai, 2 cs. (pt.), £12.

POTASSIUM IODIDE—
Aarhus, 9 pkgs. (pt.) £92.; Bangkok 3 cs., £289. ; Bombay, 8 cs., £729. ; Calcutta, 3 cs., £263. ; Cape Town, 1 cs., £44. ; Launceston, 1 cs., £44. ; Malta, 36 pkgs. (pt.), £60. ; Muscat, 2 cs., £182. ; Pt. Elizabeth, 1 cs. (pt.), £8. ; Singapore, 7 pkgs. (pt.), £90. ; Sydney, 4 cs., £448.

POTASSIUM METABISULPHITE—
Melbourne, 29 cs., £93.

POTASSIUM PERMANGANATE—
Colombo, 1 drm., £6.
Melbourne (F.), 5 drms., £18.
Sydney, 1 kg., £7.

POTASSIUM PRUSSIATE—
Antwerp, 5 cks., £110.
Paris, 10 pkgs., £155.

POTASSIUM SILICATE—
Bilbao, 20 drms., £38.

POTASSIUM SULPHATE—
Suva (F.), 540 bgs., £472.
Townsville (F.), 480 bgs., £406.

PRUSSIAN BLUE—
Adelaide, 1 ck., £17.; Amsterdam, 1 ck., £64.; Antwerp, 4 cks., £200.; Genoa, 12 cks., £516.

ROCHELLE SALTS—
Hong Kong, 1 c., £7.

SALAMMONIAC—
Ahwaz, 2 kgs., £6.; Cape Town, 6 kgs., £17.; Durban, 4 kgs., £13.; Melbourne, 1 ck., £14.

SALICYLATES (*otherwise undes.*)—
Sydney, 1 cs. (pt.), £6.

SALICYLIC ACID—
Jamaica, cs. (pt.), £13.
Singapore, 1 cs., £12.

SALTPETRE—
Adelaide, 1 t., £41.; Copenhagen, 4 c., £23.; Dunedin, 1 t., £45.; Durban, 12 c., £26.; Pernambuco, 1 t. 19 c., £79.; Pt. Elizabeth, 13 c., £30.; Wanganui, 3 c., £6.; Wellington, 5 t., £204.

SHEEP DIP—
Buenos Ayres, 4 t. 10 c., £208.
Manta, 6 c., £26.

SILVER NITRATE—
Hong Kong, 1 cs., £78.
New York, 1 cs. (pt.), £12.

SODA CRYSTALS—
Hong Kong, 10 c., £38.
Montreal, 2 t. 1 c., £47.

SODIUM ARSENITE—
Durban, 19 c., £69.

SODIUM BENZOATE—
Madras, 18 c., £233.
Melbourne, 4 c., £48.

SODIUM BICARBONATE—
Alexandria, 1 c., £11.; Bangkok, 6 c., £5.; Calcutta, 5 c., £14.; Cape Town, 5 c., £8.; Colombo, 5 c., £10.; Delagoa Bay, 4 c., £6.; Durban, 19 c., £28.; East London, 10 c., £14.; Karachi, 2 c., £8.; Monte Video, 12 c., £36.; Pt. Elizabeth, 8 c., £12.; Sydney, 6 c., £30.

SODIUM BIPHOSPHATE—
Sydney, 1 c., £7.

SODIUM BISULPHITE—
Copenhagen, 5 t., £93.; Hobart, 7 c., £5.; Monte Video, 4 t., £76.; Trondhjem, 5 t. 10 c., £100.

SODIUM BROMIDE—
Hamburg, 1 t. 18 c., £58.

SODIUM CARBONATE—
Rio de Janeiro, 2 c., £11.

SODIUM CHLORIDE—
Bombay, 2 c., £9.

SODIUM GLYCEROPHOSPHATE—
Aarhus, 9 pkgs. (pt.), £9.

SODIUM HYDROSULPHITE—
Barbados, 1 c., £9.
Pasages, 1 c., £10.

SODIUM HYPOSULPHITE—
Colombo, 8 c., £7.
Irish Free State, 11 c., £11.

SODIUM IODIDE—
Aarhus, 9 pkgs. (pt.), £30.

SODIUM PHOSPHATE—
Fremantle, 1 t., £85.

SODIUM PRUSSIATE—
Rio de Janeiro, 1 t., £78.

SODIUM SALICYLATE—
Bombay, 3 c., £38.
Hamburg, 1 c., £42.
Singapore, 7 pkgs. (pt.), £6.

SODIUM SALTS (*otherwise undes.*)
Buenos Ayres, 1 cs. (pt.), £35.
Colombo, 1 cs. (pt.), £8.
Perth, 10 c., £12.

SODIUM SILICATE—
East London, 10 c., £8.

SODIUM SILICO FLUORIDE—
Rouen, 1 t., £27.

SODIUM SULPHATE—
Barbados, 15 c., £5.
Sydney, 10 c., £8.
Trinidad, 13 cks., £6.

SODIUM SULPHITE—
Coquimbo, 2 c., £5.
Lyttleton, 1 t., £25.
Valparaiso, 9 c., £23.

SODIUM TARTRATE—
Hong Kong, 2 c., £7.

SODIUM THEOBROMINE SALICYLATE—
Hamburg, 1 c., £42.

SPENT OXIDE—
Hamburg, 243 t. 5 c., £727.

SULPHUR—
Barcelona (F.), 1 t., £2.
Brussels (F.), 10 c., £6.
Trinidad, 2 t. 14 c., £40.

SULPHUR (FLOWERS)—
Channel Islands (transit) (F.), 10 t., £75.

SULPHURIC ACID—
Aden, 6 c., £7.; Beira, 14 c., £15.; Rio de Janeiro, 9 c., £35.; Sekondi, 10 c., £10.; Trinidad, 2 c., £6.; Wellington, 9 c., £25.

SUPERPHOSPHATE—
Kudat, 37 t. 13 c., £164.

TANNIC ACID—
Bombay, 1 cs., £6.; Melbourne, 1 ck., £18.; Melbourne (F.), 1 ck., £9.; Sydney, 1 cs., £17.

TARTARIC ACID—
Amsterdam (F.), 2 t. 7 c., £282.; Bombay (F.), 1 t., £120.; Calcutta, 3 c., £19.; Calcutta (F.), 1 c., £13.; Concepcion, 2 c., £16.; Delagoa Bay (F.), 4 c., £36.; Durban (F.), 4 c., £31.; East London, 2 c., £16.; Fremantle, 5 c., £36.; Limon (F.), 2 c., £15.; Pt. Elizabeth, 1 c., £6.

THEOBROMINE—
Hamburg, 2 cs. (pt.), 3 cs., £282.

TIN OXIDE—
Launceston, 1 cs. (pt.), £7.

URANIUM NITRATE—
Buenos Ayres, 1 cs., £7.

ZINC OXIDE—
Bombay, 2 cs., £7.; Copenhagen, 425 cks., £1,429.; Colombo, 2 cs., £16.; Lisbon, 2 cks., £9.; Launceston, 1 ck., £6.; New York, 40 cks., £67.

ZINC SULPHATE—
Sydney, 2 cks., £17.

Week ending October 13.

BEESWAX—
Rotterdam, 2 c.; Sydney, 1 t.

CERESINE WAX—
Sydney, 2 t.

FERRO VANADIUM—
Paris, £175.

FULLER'S EARTH—
Accra, 8 c.; Durban, 10 t.; Rotterdam, 53 t.; Santos, 5 t.

GLUE, SIZE, AND GELATINE—
Amsterdam, 3 c.; Antwerp, 1 t. 7 c.; Arica, 4 t.; Boston, 5 t.; Boulogne, 2 c.; Bombay, 1 t.; Colombo, 1 t.; Cuba, 10 t.; Delagoa Bay, 10 c.; Durban, 1 t. 18 c.; East London, 5 c.; Hong Kong, 4 t. 6 c.; Karachi, 10 c.; Kobe, 15 t.; Los Angeles, 3 t.; Madras, 5 c.; Melbourne, 1 t.; Montreal, 1 t. 11 c.; Monte Video, 2 c.; Paris, 20 t. 10 c.; Pt. Elizabeth, 3 c.; Puerto Plata, 1 c.; Shanghai, 3 t. 3 c.; Sierra Leone, 2 c.; Singapore, 4 c.; Sydney, 5 t. 11 c. Yokohama, 20 t.; Zanzibar, 2 c.

LEAD ASHES—
Antwerp, 30 t.

MINERAL WAX—
Rotterdam, 1 t. 12 c.
Wellington, 2 t.

PLUMBAGO—
Melbourne, 1 t.
Rio de Janeiro, 6 c.
Singapore, 10 c.
Stockholm, 3 t. 3 c.

QUININE—
Bombay, 2,223 oz.; Calcutta, 11,100 oz.; Melbourne, 320 oz.; Pt. Elizabeth, 100 oz.; Shanghai, 1,673 oz.; Stettin, 2,645 oz.; Sydney, 7,640 oz.

ROSIN—
Amsterdam, 1 t.; Antwerp, 4 t.; Brussels, 10 c.; Kilindini, 5 c.; Lisbon, 6 c.

SALT—
Bergen, 10 c.; Dunedin, 30 t.; Hobart, 1 t. 12 c.; Madras, 4 c.; Montreal, 2 c.; Penang, 3 c.; Pt. Elizabeth, 16 c.; Yokohama, 2 t. 8 c.

SHELLAC—
Colombo, 1 c.

SOAP—
Alexandria, 1 t.; Amsterdam, 1 t. 11 c.; Arica, 3 c.; Bagdad, 13 c.; Barcelona, 4 c.; Beira, 3 c.; Brisbane, 1 c.; Bombay, 4 t. 5 c.; Buenos Ayres, 17 c.; Calcutta, 2 t. 8 c.; Cape Town, 2 c.; Channel Islands, 6 c.; Christiania, 6 c.; Cologne, 15 c.; Colombo, 18 c.; Delagoa Bay, 8 c.; Demerara, 4 c.; Dar-es-Salaam, 3 c.; Dunedin, 2 c.; Durban, 1 t. 9 c.; East London, 5 c.; Gibraltar, 13 c.; Gothenburg, 10 c.; Hong Kong, 1 c.; Jamaica, 1 t. 4 c.; Karachi, 1 t. 9 c.; Kilindini, 3 t. 2 c.; Kobe, 10 c.; Launceston, 1 c.; Lisbon, 2 c.; Leghorn, 6 c.; Lyttleton, 1 c.; Madras, 5 t. 2 c.; Malta, 8 c.; Melbourne, 14 c.; Mombasa, 1 t.; New York, 2 t. 10 c.; Opobo, 8 t. 18 c.; Ostend, 2 c.; Panama, 1 c.; Penang, 9 c.; Piraeus, 1 c.; Pt. Elizabeth, 15 c.; Pt. Harcourt, 4 t. 9 c.; Pt. Said, 9 c.; Pt. Swettenham, 7 c.; Pt. Sudan, 1 c.; Rangoon, 2 t. 16 c.; Rio de Janeiro, 4 c.; San Francisco, 3 c.; Santander, 3 c.; Seville, 1 c.; Shanghai, 10 c.; Singapore, 10 c.; Sourabaya, 8 c.; St. Kitts, 2 t. 10 c.; Stockholm, 11 c.; Sydney, 13 c.; Timaru, 1 t.; Tientsin, 4 c.; Tocopilla, 14 c.; Toronto, 2 t.; Trinidad, 11 t. 17 c.; Valparaiso, 1 c.; Vancouver, 15 c.; Wanganui, 2 c.; Wellington, 1 t. 16 c., Warri, 2 t. 10 c.; Yokohama, 2 c.; Zanzibar, 4 c.

TALLOW—
Bourgas, 2 t.; Duisburg, 23 t. 2 c.; Genoa, 6 t. 14 c.; Hamburg, 10 t.; Harlingen, 5 t. 1 c.; Libau, 19 t. 18 c.; Pasages, 10 t. 3 c.; Rotterdam, 40 t.; Trinidad, 4 c.; Wiborg, 50 t. 4 c.

TAR (STOCKHOLM)—
Valparaiso, 2 t. 10 c.

WAX (*otherwise undescribed*)—
Melbourne, 1 t.

WHITE LEAD—
Adelaide, £95.; Apia, £132.; Auckland, £622.; Barbados, £50.; Bombay, £132.; Brisbane, £91.; Calcutta, £39.; Cape Town, £45.; Durban, £40.; Gibraltar, £8.; Hong Kong, £25.; Lyttleton, £232.; Melbourne, £480.; Montreal, £68.; Mossel Bay, £5.; Napier, £71.; Newcastle, £13.; New Plymouth, £48.; New York, £11.; Ostend, £92.; Panama, £25.; Shanghai, £104.; St. Lucia, £32.; Sydney, £134.; Wellington, £593.

MANCHESTER.

Week ending October 12.

AMMONIUM CARBONATE—
Montreal, 20 cks.

BLEACHING POWDER—
Kotka, 592 cks.

CARBON BLACK—
Switzerland, 2 cs.

CHEMICALS (*otherwise undescribed*)
Abadan, 3,237 drms.; Ahwaz, 60 kgs., 10 cks., 900 drms.

CHROME ALUM—
Danzig, 93 cks.
Hamburg, 15 cks.

COAL TAR PRODUCTS—
Carbolic Acid
Denmark, 31 drms.
Naphthalene
New York, 600 bgs.
Rotterdam, 485 bgs.
Unspecified
Switzerland, 130 drms.

DEXTRINE—
Bombay, 25 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 51 cks.
Unspecified
Australia, 6 cs., 22 drms.; 26 kgs.; Auckland, 98 kgs.; Basle, 5 cks.; Brisbane, 6 kgs.; Italy, 4 cks.; 1 kg.; Melbourne, 1 cs., 20 kgs.; Montreal, 1 kg.; Rouen, 2 cs.; 3 cks., 11 kgs.; Sydney, 95 kgs.; 7 cs.; Switzerland, 22 cks.

FERRO MANGANESE—
Baltimore, 500 t.
Montreal, 25 t.

GLUE—
Alexandria, 100 bgs.
Adelaide, 12 bgs.

SALT—
Gothenburg, 1,273 t.; Malmo, 2,991 sks., 25 brls., 40 t.; Montreal, 5,280 sks.; Quebec, 3,200 sks; St. John (N.B.), 1,400 sks.

SOAP—
Ahwaz, 3 cs.; Bombay, 17 cs.; Mohammerah, 100 cs.; Canada, 10 cks.

SODIUM SULPHATE—
Philadelphia, 102 bgs.

TALLOW—
Bombay, 56 brls.

ULTRAMARINE—
Montreal, 10 cks.

NEWCASTLE-ON-TYNE

Week ending October 13.

ANTIMONY—
Antwerp, 50 kgs.
Montreal, 45 cks.

BARIUM SULPHATE (BLANC FIXE)—
Bergen, 11 cks.

BARYTES—
Antwerp, 300 bgs.

BLEACHING POWDER—
Copenhagen, 9 cks.; Gothenburg 60 cks.; Rotterdam, 142 cks.

CAUSTIC SODA—
Bergen, 118 drms.; Copenhagen, 79 drms.; Gothenburg, 85 drms.; Rotterdam, 173 drms.

CHEMICALS (*otherwise undescribed*)
Montreal, 2,134 pkgs.

COAL TAR PRODUCTS—
Tar
Cette, 1,490 t.

COPPER SULPHOCYANIDE—
Copenhagen, 2 cks.

LITHARGE—
Antwerp, 28 cks.
Gothenburg, 78 cks.
Rotterdam, 12 cks.

MAGNESIA—
Antwerp, 66 cs., 50 bgs.
Montreal, 20 cs.

PHOSPHORUS—
Gothenburg, 100 cs.

RED LEAD—
Antwerp, 40 kgs.; Bergen, 5 kgs. 5 cks.; Copenhagen, 26 cks.; Gothenburg, 3 cks.; Rotterdam, 153 cks.

SOAP—
Bergen, 7 brls.

SODIUM SULPHITE—
Copenhagen, 5 bgs.
Gothenburg, 20 bgs.

WHITE LEAD—
Rotterdam, 5 cks.

ZINC OXIDE—
Antwerp, 22 cks.

N. & S. SHIELDS.

Week ending October 12.

NIL.

PRICES CURRENT.

WEDNESDAY, OCT. 17, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23- / & 46/-		
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	5
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	1½
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9½
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	6
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	6	12	6
Pyridin	gallon	1	1	0
Tar, crude	ton	4	2	6
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	125	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	12	6
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	61	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	10	0
Formaldehyde, 40%	ton	65	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	10	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge (British)	ton	38	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	3
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	3
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	24	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	9
Potassium Prussiate (yellow)	lb.	0	1	0½
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/-	&	57/-
Sodium Acetate	ton	24	10	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	14	10	0
Sodium Prussiate	lb.	0	0	5¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	0	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	7	6
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	35	0	0
Copper	ton	60	12	6
Lead (Chemical Sheet), delivered	cwt.	1	16	6
Lead (Foreign Pig)	ton	27	7	6
Nickel	ton	130	0	0
Silver	oz.	0	2	7⅜
Tin, English Ingots	ton	202	0	0
Zinc (Spelter)	ton	32	18	9
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	43	0	0
Linseed, Raw	*ton	46	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt.	3	15	0

* *Packages extra or returnable*: otherwise prices usually include packages.

† Makers' prices for home consumption only

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
The Future of Rubber Technology	481
A Lead from the Engineering Industry	482
The Vacuum Flask as a Commercial Container	482
The Castor Oil Industry	483
Estimation of Sodium Hydrosulphite	486
The Chemical Industry of Austria	487
Society of Chemical Industry	488
Chemical Trade and Industry of Greece	488
The German Chemical Trade	490
The Directorate of the Dyestuffs Corporation	490
Societies' Winter Activities	490
Items of Interest	492
Coming Events	493
Legal Intelligence	493
Imports of Chemicals and Allied Products in September	494
Exports of Chemical and Allied Products in September	495
Reports of Companies	496
New Companies	496
Fertiliser News	497
South Wales Notes	497
Cumberland Coking and By-product Industries	497
Gazette News	498
The Patent List:—	
Applications for British Letters Patent	498
Complete Specifications Accepted	498
Complete Specifications Open to Public Inspection before Acceptance	498
Abstracts of Latest Complete Specifications	499
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	499
Publications Received	500
Market Reports:	
London "Open Market" Report	500
London Metal Market	502
Manchester Chemical Market	502
Swansea Market Report	502
Liverpool Chemical Market	502
West of Scotland Chemicals	503
Imports of Chemical Products	503
Exports of Chemical Products	506
Prices Current	510

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CURRENT TOPICS.

THE FUTURE OF RUBBER TECHNOLOGY.

THE striking progress that has been such a feature in the development of most branches of industrial technology during the past decade is in no case more markedly typified than in that of the rubber industry. From the time of the discovery of the vulcanisation process by Goodyear about 80 years ago, no advance of fundamental importance was made until the introduction of the organic vulcanisation accelerators about the year 1910. It must not be understood, of course, that no progress was made during the intervening period, but such improvements as were made were entirely in the direction of details in machinery, and the introduction of new rubber products. Even the use of the organic accelerators themselves, whilst leading to appreciable economies in the time of manufacture and giving rise to products of superior physical properties, has not necessitated any drastic modification in the usual methods of rubber manufacture. The first suggestion embodying a radical alteration in these methods was that put forward and patented by Peachey in 1919. According to this process, rubber is vulcanised at ordinary temperatures by alternate treatment with sulphur dioxide gas, and hydrogen sulphide gas. Vigorous efforts have been, and are being made to secure the large-scale adoption of this process, and several minor modifications that have since been made; but up to the present, whilst the process has been operated very successfully upon a large experimental scale, we are not aware that any extensive rubber manufacturing firm has definitely adopted it. The most recent—and, in our opinion, most attractive—proposal for cheapening rubber manufacturing costs, however, is that of the direct utilisation of the rubber latex. We have already referred to this method in these columns on several occasions, particularly in connection with the use of latex in paper making; but our attention has again been directed to the question by some remarkable and far-reaching proposals for the general utilisation of the latex have been made quite recently by the Austrian chemist, Dr. Rudolf Ditmar, of Graz. Dr. Ditmar's proposals embrace practically the whole gamut of rubber products and processes, and are based upon the elimination of the water from the latex either by evaporation or absorption, or by the use of water-absorbing materials, such as calcined gypsum. Thus he employs

porous moulds for the production of shaped articles. The latex is poured over the moulds, the excess water eliminated partly by absorption and partly by evaporation. The resulting coating of rubber—which, of course, preserves its original mechanical strength unimpaired—is vulcanised in the cold or, if colloidal sulphur has previously been added to the latex, by a heat process. The introduction of the colloid mill, which enables practically all the usual rubber compounding ingredients to be prepared in a colloidal hydrosol condition capable of forming stable homogeneous mixtures with latex, has extended very considerably the range of usefulness of Dr. Ditmar's methods, and rendered them applicable to the production of even such unlikely products as solid band tyres. One of the uses to which Dr. Ditmar puts rubber latex appears particularly interesting. We refer to its employment as an impregnating agent for waterproofing wood, where the elasticity of the deposited rubber gives it a decided advantage over other impregnating media, inasmuch as no amount of expansion or contraction of the wood can displace the rubber from the pores in which it was originally deposited. In this connection Dr. Ditmar makes the ingenious suggestion that the old Italian master violin makers, such as Stradivari, used the latex-like juice of the *Ficus Elastica* for impregnating their material before the varnishing process. Some credibility is indeed lent to this idea in that the microscopist Koch has actually discovered a deposit of elastic material under the varnish layer of old violin wood. Thus science would appear about to render yet another service to art.

A LEAD FROM THE ENGINEERING INDUSTRY.

The British Engineers' Association has just forwarded to the President of the Board of Trade a Memorandum dealing fully with the attitude of the engineering industry to the Imperial Economic Conference, and stating in no uncertain manner the dissatisfaction and alarm felt by British engineers generally at the present economic policy of the country. The Memorandum, which sets forth its arguments in an eminently logical manner, and which does not harm its case by any attempt at exaggeration, is worthy of serious study by all having the industrial welfare of this country at heart. Old habits of thought die hard. Confirmed political opinion based upon the experience of over a hundred years' stability in economic conditions is difficult to modify even in the face af a far-reaching change in such conditions. Political inertia, the reluctance to depart from principles deeply embedded in tradition, is one of the greatest dangers confronting us at present. Ultimately, of course, some drastic modification must be made in our fiscal policy. A country's politics must, in the long run, be dictated by the economic conditions prevailing. Normally such changes come but gradually, and in the past the time lag between cause and effect has not been productive of much permanent harm. No parallel can be found in history, however, for the cataclysmal upheaval in the world's economic inter-relationships that has occurred within the last ten years, and we fear that unless the process of readjustment of fiscal policy to economic realities be considerably accelerated, the permanent harm done to our industries will be both extensive and irreparable. The engineering industry has made out a very strong case for immediate measures of protection. Before the war, many of our prominent engineers were Free Traders. They have not changed their opinions as the result of abstract reasoning, but have been driven to their present views by the pressure of facts, the growing total of unemployment, the diminution of output below the economic productive capacity, the emigration of skilled labour, and the realisation of the only termination that our present policy, if not speedily amended, can have.

THE VACUUM FLASK AS A COMMERCIAL CONTAINER.

The work that has been carried out by the Oxygen Research Committee of the Department of Scientific and Industrial Research on the design and construction of containers for low boiling-point liquefied gases, is a striking exemplification of the type of investigation to which Government aided research particularly lends itself. No one commercial undertaking, even if it had deemed it advisable to attack the problem on the broad lines adopted by the Committee, could have provided the facilities and the range of technical and scientific service that have enabled the Committee's research to be carried to the advanced position now reached. Despite the progress made by the Gas Cylinders Committee on the design and construction of cylinders for compressed gases, it is obvious that the weight of such cylinders will always prove a grave disadvantage in this method of storage and transport; and as regards aeronautical, medical, and general scientific purposes, there can be no doubt that the use of oxygen and other gases in the liquid condition is the method of the future. Although the double-walled vacuum flask was the invention of the late Sir James Dewar, to whom is due also the discovery of the remarkable effect of activated charcoal and other substances as adsorbents for traces of gases, yet the commercial metal vacuum vessel container was first produced in Germany. During the latter part of the war, when such vessels were required for the Royal Air Force and for the Royal Army Medical Corps, the manufacture was commenced in this country, and a vessel of an efficiency considerably surpassing that of the German product was constructed to the Air Ministry specification. It has been the task of the Oxygen Research Committee to consider how this efficiency may be still further improved, and how the loss of liquefied gas by evaporation may be reduced to a minimum. This task the Committee has successfully accomplished, and although finality has by no means been reached, yet the amount of information and experience gathered from the standpoints both of theory of design, and practical details of manufacture and testing, makes it safe to assume that the advent of the perfected commercial vacuum vessel is very near.

THE CASTOR OIL INDUSTRY.

By "Omega."

CASTOR OIL is obtained from the seed or bean of *Ricinus communis* and *Ricinus sanguineus*. The castor fruit consists essentially of a rough white pod which protects a white kernel covered by a husk, which again encloses a delicate brittle shell. The plant, which grows to a height of 35 to 40 feet, is cultivated widely in tropical and sub-tropical countries, particularly in India, Ceylon, and Java. Botanical authorities are agreed that *Ricinus* is not a native of India, but has spread from Africa, where it grows in a wild state.

The castor plant is now being cultivated on a commercial scale in Mediterranean countries, Indo-China, Russia, South Africa, Congo, Uganda, Rhodesia, Egyptian-Sudan, and the United States of America. Of late years some progress has been made in the cultivation of the plant in Manchuria, the seed being crushed at Newchang in China. The total castor oil produced in Manchuria in 1920 amounted to 2,000 tons, which was exported mainly to Japan, where there is a growing demand for the oil as a special lubricant. However, the primitive Eastern methods of seed crushing cannot compete with the modern European methods. Experiments on the cultivation of the castor plant have been conducted at Marseilles (*Matières Grasses*, 1919, Vol. 12, p. 5,159), but of 23 varieties tested, only 12 developed into maturity, the Indian and Senegal seeds being found to be the most serviceable and to give the hardiest plants.

Much the greater proportion of the castor seed and castor oil produced are obtained from India, where both the small and large seed varieties are cultivated. The superior quality medicinal oil is obtained from the small seed variety, of which India has a monopoly. The total weight of castor seed exported from the world's ports in 1913 was 137,000 tons, of which amount India exported 135,000 tons, a figure amounting to 98 per cent. of the total.

The Growth and Present Extent of the Industry.

Castor oil appeared as a commercial commodity on the European markets early in the 19th century. The growth of the industry has been phenomenal as is seen from the table given below, in which the Indian exports for the years indicated are shown:

Indian Exports of Castor Products.

Year.	Castor Seeds (tons).	Castor Oil (gallons).
1804	—	2,200
1877	—	56,000
1879	11,880	2,651,889
1890	44,731	2,664,990
1913	134,888	1,007,000
1917	92,447	1,723,000

The fluctuating sterling value of the Indian castor seed is shown in the following table:

Exports of Castor Seed from India.

Year	1912/13	1913/14	1914/15	1915/16	1916/17.
Tons	110,630	134,888	82,814	87,948	92,447
	£ 1,092,177	1,336,649	773,289	802,185	957,201

The extent of the Indian castor oil and seed trade is also shown in the following table, which is compiled from the Indian Government Returns:

Year.	Castor Oil (English gallons).	Seed. (American gallons).
1918	2,502,618	219,603,888
1919	1,990,776	183,656,816
1920	353,290	18,950,808

The Principal Directions of Trade.

The principal countries of destination of the castor seed exported from India in 1890 and 1913 are given below. The increase in the English castor-seed trade has been phenomenal compared with the other European countries.

	1890. Tons.	1913. Tons.
England	11,500	60,277
France	25,000	20,988
Belgium	2,150	14,822
Italy	4,040	11,788
Germany	—	9,761

The total English trade (Board of Trade Returns figures) in castor oil and castor seeds for the years 1913, 1919, 1920, are given below:

Imports of Castor Products into Great Britain.

Year.	Castor Oil. Tons.	Castor Oil. Value.	Castor Seeds. Tons.	Castor Seeds. Value.
1913	1,399	£41,875	60,277	£710,587
1919	354	£29,186	14,813	£487,557
1920	420	£39,140	14,647	£440,320

Exports of Castor Oil from Great Britain.

Year.	Castor Oil. Tons.	Castor Oil. Value.
1913	10,818	£301,839
1919	2,789	£282,754
1920	4,130	£414,096

For the years 1912-1916, of the total castor seed imported into England, Hull received 82 per cent., by far the greater portion coming from British India.

Production of the Castor Oil from the Seeds.

The castor seeds themselves are composed of 25 per cent. husk and 75 per cent. kernel, the husk being of no value as an oil-bearing substance. The oil content of the seed varies from 45-55 per cent., and that of the kernel from 60-65 per cent. The following percentage analysis of Bombay castor seed is given by Kling (*Landwirtschaft Versuchs-Stationen*, 1906, Vol. 64, p. 51/52):

	Compn. of Seed.	Water.	Protein.	Oil.	Carbo-Hydrates.	Fibre.	Ash.
Whole Seed .	—	5.14	17.88	46.65	12.61	14.99	2.73
Kernel	70	3.60	23.43	66.02	4.01	0.70	2.24
Husk	30	8.76	4.76	0.98	32.92	48.69	3.89

The percentage of husk appears to vary in different varieties of seed—*e.g.*, three varieties of seed from Cyprus were found to vary from 35 to 48 per cent. (*Bull. Imp. Institute*, Vol. 17, No. 4, p. 492).

Seasonal variations and general native economic conditions, are reflected in a remarkable manner in the market prices of the castor seed, as may be seen from the table given below:

Year.	Price of Castor Seed per ton.
1913	£9–12
1919	£30–40
1923	£18–21

For the best quality medicinal oils, the seeds are first freed from any foreign matter and decorticated. The kernels after separation from the light husks by means of a blast of air in a specially constructed magnetic separator are then crushed between rollers, made into a pulpy mass and cold-pressed by means of an hydraulic press, when the best oil is obtained. Solvent extraction methods are unsuitable for the production of medicinal castor oil.

The oil extracted at low temperatures dissolves the least amount of colouring matter and is of a high quality, being known commercially as cold drawn, salad or virgin quality oil. Only traces of ricine pass into the oil in the cold. During the first pressing about 25/30 per cent. of the oil is expressed. More oil is obtained from the residue by further pressing in the warm, such further oil being used for manufacturing and lubricating purposes. By hot expression the oil content of the cake is reduced to about 8 per cent. Finally the cake is solvent extracted which process further reduces the oil content to about 1 per cent.

Composition and Uses of Castor Cake.

The castor cake retains the alkaloid and is hence unfit for cattle feeding purposes. It is used as a fertiliser. Nagel (*J.S.C.I.*, 1902, p. 31), states that although the alkaloid contained in castor cake is highly poisonous to man, it has but little effect on bird life. Nagel fed chickens without injury on castor cake alone for 8 days. The composition of castor cake varies according to the method of extraction used and the source and treatment of the seeds. The composition of various castor cakes are given below, and are quoted from "Reports on Oil Seeds" Indian Trade Inquiry, 1920, p. 135.

Composition of Castor Cakes.

	From Whole Seed. Per cent	From Decorticated Seed. Per cent	From Castor Meal Extracted by Solvents Per cent
Moisture	9.85	10.38	11.73
Ash	15.02	10.50	6.05
Oil	5.25	8.75	1.10
Proteins	20.44	46.37	30.62
Crude Fibre	49.44	24.00	36.52
Carbohydrates			36.96
Phosphoric Acid ..	1.62	2.26	—

The fertilising value of the castor cake may be judged from the following statement of percentage vital components which is typical of the Indian product:—Nitrogen, 6.37 per cent.; phosphoric acid, 2.55 per cent.; and potash, 0.96 per cent.

Typical percentage analyses of Manchurian castor cake are as follows:—Proteins, 34 to 40; fibre, 30 to 40; soluble carbohydrates, 12 to 18; ash, 6 to 9, and oil 1 to 3.

The principal solvents used in castor seed extraction are carbon bisulphide, solvent naphtha B.P. 108° to 112° C., carbon tetrachloride, trichlorethylene, and benzene. The present prices (October, 1923), of the various grades of castor oil and castor cake are as follows:

	Per ton.
Castor Oil (Pharmaceutical)	£57
,, (First Pressed)	£51
,, (Second Pressed).....	£49
Castor Cake	£5

Properties of Castor Oil.

Castor oil is pale-green to water-white in colour, thick, viscid with little odour. It has a mild though nauseous taste, followed by a sense of bitterness. It is characterised by its high density, viscosity, acetyl value, solubility in alcohol and high optical activity, being strongly dextro rotatory. This latter phenomenon is due to the presence of ricinoleic acid, which contains asymmetrical carbon atoms. Dilution or sophistication of castor oil is no easy matter, as it can be readily detected. Castor oil, for example, possesses a much higher solubility in alcohol than any other oil which could be economically introduced. Castor oil is soluble in glacial acetic acid, insoluble in light petroleum and in ether, and does not readily congeal at low temperatures. The following table shows the characteristic high values of castor oil compared with other oils:

	Specific Gravity.	Acetyl Value.	Viscosity.
Castor Oil	0.9650	148	1160
Coconut Oil	0.9250	12	64
Cotton Seed Oil	0.9235	15	206
Palm Oil	0.9210	18	175

The following are the more important physical constants of castor oil:

Specific gravity at 15.5/15.5° C.	0.9600	to	0.9679
Saponification value.....	183	,,	186
Iodine value (absolute, Wright)	106.9		
,, (Wij's)	84	,,	86
,, (Hübl.)	82	,,	84
Acetyl value	146	,,	150
Hehner ,, ...	0.14	,,	14.5
Reichert—Meissel value	1.2	,,	2.5
Melting point	−5°	,,	−6° C.
Solidifying point	−10°	,,	−18° C.
Refractive index at 15° C.	1.4803		
,, ,, 60° C.	1.4647		
Viscosity at 37° C.	1160 seconds.		
,, (absolute at 40° C.)	248	,,	
Viscosity ratio number	15		
Optical rotation (200 mms. tube)	7.5°	to	10°
Unsaponifiable matter	0.3	,,	0.6 %
Maumené test	46° C.	,,	
Specific temperature reaction (strong acid)...	91°	,,	92° C.
Specific temperature reaction (89/90 per cent. acid)	84°	,,	86° C.
Bromine thermal test	14.5°	,,	15° C.
Elaidin test	Pearly white solid.		

Castor Oil Fatty Acids.

Specific gravity at 15.5/15.5° C.	0.9509
Solidifying point	3.0° C.
Melting point	13° C.
Neutralisation value	192.1° C.
Iodine value (total fatty acids)	87 to 93
,, (liquid fatty acids)	107
Refractive index at 60° C.	1.4546
Mean molecular weight	295

Castor oil is rendered miscible with mineral oils by heating at 300° C. at 80lb. pressure. A soap soluble in mineral oils is also produced by saponifying after heating at 250° C. Castor oil becomes highly fluorescent when heated with logwood, tumeric, or camwood. Castor oil preserves well and does not easily become rancid. Lewkowitsch exposed a quantity of castor oil in thin layers over the course of 4 years, and found but little rancidity and that the increase in free fatty acids amounted to less than 1 per cent.

Catalytic Decomposition and Oxidation of the Oil.

Destructive distillation of castor oil gives oenanthaldehyde and undecylenic acid, the residue consisting of the anhydride of triundecenoic acid (*Thoms. Arch. d. Pharm.*, 1901, Vol. 239, p. 1). Castor oil heated in the presence of a concentrated solution of zinc chloride, polymerises forming a crystalline mass. The catalytic decomposition of castor oil varies with the catalyst used and also depends on the temperature. Mailhe (*Compt. rend.*, 1923, Vol. 176, pp. 37/40), states that above 600° C., using copper and aluminium as catalysts, hydrocarbons of the following type are produced: Benzene, toluene, m-xylene, and oenanthaldehyde, below 600° C., homologues of methane entirely are formed. Brochet (*Compt. rend.*, 1923, Vol. 176, pp. 513/516), found that under a pressure of eleven atmospheres using nickel as a catalyst at 112° C., castor oil is completely hydrogenated in 90 minutes, one gramme of castor oil absorbing 70 c.c. of hydrogen. The hydrogenated castor oil produced had an iodine value of 2 and a melting-point of 86° C. Paul (*Berichte*, 1908, p. 2,283; and 1909, p. 1,543), obtained a product of iodine value 1.9 and melting-point 77° C.

The Villiers (London) Co. (*Brit. Pat.*, 193,099, of 1921), claim that a superior lubricant is produced by introducing a small percentage of a metallic stearate into castor oil at boiling temperature. During blowing or oxidation castor oil undergoes a distinct change as may be seen from the following table (quoted from Lewkowitsh, Vol. 2, p. 396).

	Before Blowing.	After 10 hrs. Blowing.
Colour	Light Yellow.	Orange Yellow.
Specific gravity	0.9623	0.9906
Acid value	1.1	5.7
Saponification value....	179	191
Acetyl value	146	165

The Composition of Castor Oil.

Castor oil is composed mainly of the triglyceride of ricinoleic acid with a small percentage of the glycerides of dihydroxystearic acid and stearic acid, see Haller (*Compt. rend.*, 1907, Vol. 144, p. 462). The oil contains the dextro and lævo rotatory ricinoleic acid, but the latter variety has not yet been isolated. A specimen of the ricinoleic acid prepared from castor oil had a melting-point of 4° C., and a specific rotation in acetone of $[a]_D$ = + 6.25° to 7.50° (Walden).

The pure acid according to Krafft has a M.P. of 16/17° C., whilst Juillard states that with continued crystallisation he obtained a final product of M.P. 4/5° C. According to various authorities the ricinoleic acid content varies from 90-95 per cent. Jones (*J.S.C.I.*, 1917, p. 359), states it to be 93 per cent. and that the transparency of the sodium soap of castor oil is due to the presence of this constituent. The ricinoleic acid content of castor oil may be calculated approximately from a consideration of the respective acetyl values of castor oil and triricinolein, which are 150 and 158.8, giving approximately 94.5 per cent. triricinolein.

Castor seeds have been found to contain a highly toxic element "ricin," see Mendel (*Proceedings, Amer. Physiol. Soc.*, 1903, pp. 36/38), and Harris (*Zeit. f. analyt. Chem.*, 1907, Vol. 46, p. 213). Ricin enters into the composition of the seed proteids and physiologically agglutinates the red corpuscles of the blood. The castor seed also contains fat-splitting enzymes, upase and urease which are capable of hydrolysing urea (Falk, *J.A.C.S.*, 1914, Vol. 36, p. 2,166). Some of these enzymes have found commercial application for fat-splitting purposes. The castor enzyme, upase, hydrolyses some edible oils at low temperatures. (Blanchet, *Compt. rend.*, 1914, Vol. 158, p. 895). Investigations are now being made on the effect of these enzymes on the hydrolysis and rancidity of fats and oils during preservation, and particularly during storage of foodstuffs under cold-storage conditions.

The composition of castor oil and the state in which the oil exists in the seed have been investigated by Policard and Mangenot (*Compt. rend.*, 1923, Vol. 177, pp. 1,840/1,846), by a novel method. A sectional seed was pressed gently on to a prepared dry plate of the dyestuff Biebrick scarlet red in benzene. The dye crystals immediately penetrated the seed cells. Microscopic examination of the seed after treatment showed the appearance of coloured crystals of aleurone, but no nucleus could be observed. The authors conclude that the oil in ripe castor seed does not exist as an emulsion. The oil increases during the period of maturing and dehydration takes place, with the expulsion of water. An inversion takes place, the external phase displacing the internal phase. Mangenot (*Compt. rend.*, 1923, Vol. 177, pp. 346/350) also found that prior to the germination period, the oil is distributed evenly throughout the grain, and that eventually the oil coagulates into drops and become suspended in the cytoplasm.

The Refining of Castor Oil.

The refining of crude castor oil consists mainly in the removal of the albumen, free fatty acids, colouring and odorous matters, and is conducted by first coagulating the albuminous matter and mucilage by steaming and filtering, then bleaching and deodourising by agitation in the presence of animal charcoal, and finally filtering and drying. The bleaching of the solvent-extracted castor oil has been found to be a difficult operation. The colouring matter is held in colloidal suspension, and has probably become very firmly fixed during the heating operation. It is most resistant to the action of bleaching agents (*Boll. Olli. e. Grassi*, 1923, Vol. 1, pp. 53/56).

Recent investigations have shown that the presence of traces of metals such as copper and iron have an important influence on the colour of oils. The percentage iron content of a number of oils have been found to be as follows:—Castor oil (medicinal), 0.0004; castor oil (commercial), 0.0022; olive oil (commercial), 0.0016; and cod-liver oil (medicinal), 0.0004.

Schwareman (*U.S. Pat.*, 1,372,632, of 1921) proposes refining castor oil by agitating at a temperature of 82° C. with an amount of caustic soda equivalent to the free fatty acids contained in the oil. The oil is then washed with hot water, the aqueous layer allowed to subside and the oil drawn away and dried. C. and G. Müller, Speissefett Fbr. A.G. (*Ger. Pat.*, 339,027, of 1918), suggest an ingenious method of fractional precipitation of the castor oil from an aqueous-acetone solution of the crude oil, sufficient water being added to precipitate the oil and still hold the free fatty acids in solution. Lemmens (*Brit. Pat.*, 197,974, of 1921), refines castor oil by atomising the oil into excess of dilute alkali, the refined oil flowing away by means of an overflow pipe placed at a high level and quantities of the spent alkali drawn away at regular intervals. Various methods making towards the preservation of losses during refining of castor oil, such as the addition of salt and the introduction of substances to operate as adsorbent agents, have been suggested by Bechhold (*Chem. Umschau.*, 1923, Vol. 30, p. 199).

Commercial and Industrial Applications.

The principal uses of castor oil are, as a lubricant, a preservative for leather and leather belting, a leather dressing and fat liquoring, in the preparation of artificial leather, linoleum, and rubber substitutes, and as a component of blended lubricants. It is also used in the preparation of gums and adhesives, in soap manufacture, and for medicinal purposes, where its purgative action has been found to be due to the ricinoleic acid. Castor oil also finds extended use in the manufacture of Turkey red oil. The castor oil cake finds a ready market as a fertiliser, and has been found to be specially suitable for the fertilising of tea, sugar-cane, and potatoes. There is also some application of the castor oil cake as a fuel for engines and boilers, and also as a base for the production of illuminating gas by a low-temperature carbonisation process. Morser (*Landw. Vers.*, 1911, Vol. 75, p. 107), states that castor cake under the name of "poonac" is used for caulking timber, and for the destruction of insects. In 1913 India exported 4,900 tons of castor cake to Ceylon, to be used as a fertiliser on the tea plantations. The annual French imports of castor oil cake is about 20,000 tons, for use mainly by the market gardeners.

Castor oil during the period of war, became a substance of first-rate importance as a lubricant for aeroplane engines, and an enormous demand arose, which was also the means of fostering the industry of castor seed crushing in India. Castor oil is an excellent lubricant for internal combustion engines and loco bearings which need a viscous lubricant. During 1917 the total castor oil imported into the U.K. from all sources amounted to 2,000,000 gallons, together with 45,000 tons of castor seed, which would yield about 4,000,000 gallons of oil, which was used mainly for military aircraft purposes (*J.S.C.I.*, 1919, p. 32OR). Prolonged investigations have been made in Belgium towards the utilisation of castor oil as a motive power (*Bull. Mat. Grasses*, 1921, Nos. 7 and 8). M. Mathot found that vegetable oils can be used with advantage as a fuel in 2 and 4 cycle Diesel engines, and that castor oil is particularly suitable, being an excellent fuel and lubricant.

Shrader states that the normal castor oil consumption of the United States is over 2,000,000 gallons per annum (*U.S.A. Agric. Bull.*, No. 867, 1920). The average imports of castor seed for the years 1912/1917 was 17,000 tons, and for 1917/19 26,000 tons, the increase being due to the great demand for castor oil for aeroplane engine lubrication purposes. A conference has been held recently by the Italian Government to consider the question of growing the castor plant in the Southern Provinces. At present Italy imports seeds and oil from British India (*Chemical Trade Journal and Chemical Engineer*, August 17, 1923).

Turkey red oil consists essentially of a mixture of ricinoleic acid and sulpho-ricinoleic acid, and is used primarily for alizarin dyeing. It is prepared by mixing together castor oil and 25 per cent. sulphuric acid, the temperature being maintained below 35° C. When the reaction is complete, salt is added and the precipitated material is separated and washed with salt water and neutralised with caustic soda. A good quality Turkey red oil should contain at least 60 per cent. fatty acids (*Siefens, Zeitung*, Mar. 29, and April 6, 1923). Schopper (*Gummi Zeit.*, 1916, Vol. 30, p. 601), has used castor oil for the purification of raw rubber, the resins being easily soluble and the resin-castor oil solution makes an excellent soap stock. Schelle1z (*Pharm. Zeit.*, Vol. 57, p. 473), proposes castor oil as a substitute for camphor in the manufacture of celluloid and also as a solvent for sulphur in pharmacy. Patat and Co. (*French Pat.*, 361,954), manufacture an adhesive agent consisting of gum tragasol and castor oil. Escalles (*Explosivstoffe, Dammers Chemische Technologie der Neuzeit*), states that castor oil is used in the explosive industry, and enters into the composition of the blasting explosive Cheddite, made at Chede, in Hauté-Savoie. A palatable castor oil is made by introducing into the oil, 0.1 per cent. saccharin, 0.4 per cent. methyl salicylate, 2 per cent. alcohol, 0.1 per cent. oil of cassia, and 0.01 per cent. oil of aniseed (see *Year Book of Pharmacy*, 1917, p. 315). During recent years much success has been attained in India in the production of a high grade castor oil which is claimed to be entirely free from acidity, for use in aero engines (*Journal Indian Industries*, Nov., 1921).

Oil Splitting by Castor Seed Enzyme.

Considerable research has been conducted on the lipolytic enzymes contained in castor seeds, particularly as regards their application in fermentation and fat splitting operations. Siegmund (*Sitz. Kais. Akad. Wiss. Wien.*, 1901, Vol. 100, pp. 328-9), investigated castor seed, *ricinus communis* and *r. major*, the active enzyme being extracted with water and found capable of hydrolysing fats and oils. Green (*Proc. Royal Soc.*, 1890, Vol. 48, p. 370), gives the results of numerous experiments in a botanical and plant physiological study of the castor seed enzyme. Sudborough and Watson (*Journal of Indian Institute of Science*, 1919, Vol. 2, Pt. 15, pp. 213/273), give a detailed account of the modern researches on the castor seed enzymes and their applications in oil splitting. Green summarises the results of his classical researches as follows (quoted from *Journal of Indian Institute of Science*, 1919, Vol. 2, Pt. 15, pp. 214):—

1. The reserve material of the seeds of *r. communis* consists of oil and protein matter, the latter being a mixture of globulin and albumose. 2. The changes during germination are partly due to ferment action, and three distinct ferments are present—viz., a proteolytic or tryptic, a fat splitting or lipolytic and a rennet ferment. 3. At least two of the three, and probably all three, are in a zymogen condition in the resting seed and become active in consequence of the metabolic activity set up in the cells by the conditions leading to germination—*e.g.*, warmth and moisture. 4. The proteins are converted into peptone and finally into asparagin. 5. The oil is split into fatty acids and glycerol; the latter gives rise to sugar and the former to a crystalline vegetable acid soluble in water and ether. 6. The appearance of starch and of oil in the embryo or young plant is due to secondary reactions and not to a simple translocation of either.

The castor husk and the castor oil have no lipolytic activity, and it has also been established that germinating seeds are less active lipolytic agents than the non-germinating or resting seeds. The optimum H-ion concentration for the lipase activity of castor seed is 1×10^{-5}. When the acidity is increased above this point the lipolytic activity declines and becomes stationary at a H ion concentration of 1×10^{-3} (*J.A.C.S.*, 1921, Vol. 43, pp. 2,664-2,670). Of the two lipolytic enzymes contained in castor seed, esterase is soluble in water and hydrolyses true esters, like ethyl acetate, more readily than glycerides like triacetin. Lipase is insoluble in water and is more active in the hydrolysis of glycerides. It is a remarkable fact that castor enzymes become inert in the presence of alkalies, alcohol, formaldehyde, or soap (Ormerod, *Proc. Royal Soc.*, 1906, Vol. 78, p. 376), and that their action is increased by the presence of sodium glycolate, calcium, and magnesium salts and hydroxyl ions. Dakin (*J. Physiol.*, 1903, Vol. 30, p. 84), shows that the lipase enzyme has a

selective hydrolysing action on racemic mandelic acid esters, the unsaponified ester being found to be lævo-rotatory and the free acid dextro-rotatory.

Coconut oil and palm kernel oil are more difficult to hydrolyse by means of the castor enzymes than most of the other vegetable oils. Animal fats such as lard are still more resistant. Acetic acid and manganous sulphate have a marked catalytic and accelerating effect on castor enzyme fermentation reactions. The optimum temperature is 30° C., when the best results are obtained; at 36° C. enzyme activity becomes feeble, and fails entirely at 40° C.

The Adulteration of Castor Oil.

The detection of adulterants in castor oil is not usually a difficult matter. Fabot (*Annalen Chim. Analyt.*, 1917, Vol. 22, pp. 217/225), has studied the whole question, and his results may be summarised thus:—

(1). Above 2 per cent. of foreign oils may generally be detected by the acetyl value, the other values being of no consequence for this purpose.

(2). Arachis oil is detected by the solidifying point, solubility in alcohol, and also the turbidity temperatures of alcoholic solutions. A 1 per cent. solution of castor oil in alcohol is clear at –20° C., 2 per cent. of arachis oil in castor oil gives a turbidity at –2° C., a 1 per cent. solution at –9° C.

A separation of foreign oils from castor oil may often be effected by agitating with excess of petroleum ether, of B.P. 35°/70° C.

The specific gravity of genuine castor oil is higher than that of any fatty oil except oxidised oils. An excessive addition of a foreign oil would be detected by the optical activity. Oxidised oils would be identified by the high acetyl value, low saponification value, and the absence of soluble acids in castor oil. The chlorine index figure also affords a ready means of detecting the presence of adulteration.

The ozone number is also of value in determining the purity of a specimen of castor oil. The ozone values of typical vegetable oils are as follows, quoted from Fenaroli (*Gazz. Chim. Ital.*, 1906, Vol. 36 (2), p. 292):—Linseed oil, 33.5; maise oil, 21.6; and castor oil, 16.3.

Allen states that on examining a large number of imported castor oil samples, the more common adulterants were: poppy oil, rosin oil, coconut oil, lard oil, and seal oil. In some cases blown or oxidised oils had been introduced, amongst this class were identified blown cotton seed, rape, and linseed oils.

The Outlook for the Industry.

Of all the vegetable oils used commercially and industrially, castor oil appears to have found the widest variety of applications, although not the most extensive. During the last decade it has become a commercial commodity of national and outstanding importance as a lubricant, especially for aero engines, in which capacity its superior qualities have been recognised, and found for the oil almost world-wide application. The future of the castor oil industry lies in the economical raising and intensifying of castor crops by modern forestry and agricultural methods, which would tend to reduce and stabilise the price of the castor seed and oil, and so bring the oil into a wider and still more general application in commerce and industries.

The French Dye Combine. — Further information is now available regarding the amalgamation of the Compagnie Nationale des Matières Colorantes and the Etablissements Kuhlmann-Manufactures de Produits Chimiques du Nord, a preliminary announcement of which appeared in our issue of October 12. The capital of the allied firms will be 150,000,000 francs. The new company's board contains six former directors of the Cie. Nationale des Matières Colorantes. The general manager of the Etablissements Kuhlmann, M. Raymond Berr, will hold a similar position in the new company, while the general manager of the Cie des Matières Colorantes, M. Joseph Frossard, will become the head of the organic chemicals department. These two departments will be parallel. The manufacture of intermediate products will be undertaken in future mainly at Oissel, whereas the works at Villers-Saint-Paul will be devoted to colour manufacture. By this amalgamation national competition will be avoided, and the technical knowledge of one concern is allied to the hundred years' commercial experience of the other.

ESTIMATION OF SODIUM HYDROSULPHITE.

SIMPLIFIED IODIMETRIC METHOD.

In a previous issue (*The Chemical Trade Journal and Chemical Engineer*, February 23, 1923, page 224) we published the details of a new method for the estimation of sodium hydrosulphite worked out in the research laboratories of Brotherton and Co., Ltd., at their Port Rainbow Works. This method was based upon the decomposition of sodium hydrosulphite in formaldehyde solution into an equimolecular mixture of sodium-sulphoxylate formaldehyde and sodium-bisulphite formaldehyde, the former of which two compounds reacts quantitatively with iodine in neutral or acid solution, and so enables an iodimetric volumetric method of analysis to be elaborated.

Whilst this method represented a great advance over previous methods in simplicity of manipulation, in speed of execution, and accuracy of results, yet the chemists of Brotherton and Co. recognised that finality had not been reached, and continued their investigations with a view to still further simplification of the analysis. As a result they have now elaborated a method which not only renders the use of formaldehyde unnecessary, but enables the quantitative estimation to be carried out in open apparatus. The great advantage of the new method, however, is that the results are not affected by oxygen in the water used in the analysis.

The method must not be used for analysing hydrosulphite containing decomposition products or soda ash. Messrs. Brotherton and Co. have published the method in leaflet form, and will be pleased to send a copy to any chemist who makes application for one. We give below the new method as described in the leaflet:—

Theory of the Process.

A mixture of hydrogen iodide and hydrogen iodate in solution decomposes at once, giving free iodine:

$$HIO_3 + 5HI = 3I_2 + 3H_2O.$$

A mixture of potassium iodide and iodate can, therefore, be used to measure the hydrolysis of the bisulphite formed when "Hydros" (sodium hydrosulphite) oxidises potassium iodate:

$$3Na_2S_2O_4 + KIO_3 + 3H_2O = KI + 6NaHSO_3$$
$$6NaHSO_3 + KIO_3 + 5KI = 3I_2 + 3H_2O + 3Na_2SO_3 + 3K_2SO_3.$$

The sulphite formed in the reactions above is oxidised by the free iodine:

$$3Na_2SO_3 + 3K_2SO_3 + 6H_2O + 6I_2 = 3Na_2SO_4 + 3K_2SO_4 + 12HI.$$

The hydrogen iodide, however, reacts with more of the iodide-iodate mixture and liberates a further six molecules of free iodine, so that the oxidation of the sulphites may be ignored:

$$12HI + 2KIO_3 = 2KI + 6I_2 + 6H_2O.$$

The effect of Hydros on a mixture of potassium iodate and iodide is, therefore:

$$3Na_2S_2O_4 + 4KIO_3 + 2KI = 3I_2 + 3Na_2SO_4 + 3K_2SO_4.$$

The Hydros liberates its equivalent of iodine, and this iodine is measured by titration with standard thiosulphate.

Analytical Details.

A litre flask is about half filled with water, and 6 grammes of potassium iodate, together with 10 grammes of potassium iodide, are added and dissolved. These quantities are approximate, but more rather than less should be used. 300 c.c. of N/10 thiosulphate is added from a pipette, and the flask filled to within about 50 c.c. of the mark. About 2 grammes of Hydros are accurately weighed in a weighing bottle, and poured into the flask through a perfectly dry funnel with a short wide neck. The flask is first shaken so as to impart a whirling motion to the liquid, then the flask and funnel are inclined to meet the weighing bottle, so that when the latter is completely inverted, the funnel seals its mouth. This prevents the loss of any fine particles of Hydros in the form of a cloud. The flask is then filled up to the mark, stoppered, and shaken till the Hydros is dissolved. The empty weighing bottle is reweighed, and the weight of the Hydros is determined by difference. The excess of thiosulphate is measured by titration (100 c.c. at a time), with standard N/10 iodine.

It is essential that in the weighing the Hydros be transferred from the sample bottle to the weighing bottle with a spatula, and not poured from one to the other. In the latter case a partial separation of the salt, generally used as a diluent, occurs, and the results are always too low, often by several units per cent.

Calculation.

The following example illustrates the method of calculating the result:—

Weight of Hydros taken = 2.036 grammes.
Mean titration = 7.24 c.c.
N/10 iodine used to titrate complete litre
$= 10 \times 7.24 = 72.4$ c.c.
$\therefore$ N/10 thiosulphate left after dissolving Hydros = 72.4 c.c.
$\therefore$ N/10 thiosulphate absorbed in Hydros reaction
$= (300 - 72.4) = 227.6$ c.c.
Molecular weight of Hydros = 174.
$\therefore$ Percentage of Hydros

$$= \frac{174}{2} \times \frac{227.6 \times 100}{10{,}000 \times 2.0136} = 98.34 \text{ per cent.}$$

THE CHEMICAL INDUSTRY OF AUSTRIA.

MATERIAL AVAILABLE FOR EXPORT.

IN *Die Chemische Industrie* (the official organ of the Verein zur Wahrung der Interessen der Chemischen Industrie Deutschlands) of October 20, 1923, there appears the following account of an article by Josef Brunner in the "Wochenschrift des Niederösterreichischen Gewerbevereins."

The chemical industry of Austria has undergone considerable modifications since the Armistice. The large factories which were within the confines of the former Austro-Hungarian monarchy are to-day within the borders of Czecho-Slovakia. The appreciation in the value of Czecho-Slovakian currency and the formidable tariff wall erected by the new State have practically prohibited importation of chemicals into the impoverished and greatly-shrunk Austria, with the consequence that the latter country has had to rely upon Germany to an extent greater than in pre-war days. The tendency of late, however, has been for Austria to commence herself what chemical manufactures she was able, and among the new manufactures that have thus come into being may be mentioned chrome alum, sodium bisulphite, sodium sulphite, sodium thiosulphate, etc. In many of these materials, Austrian production is now considerably in excess of home requirements and export markets are being sought for.

Considerable developments are being made in the exploitation of water power for the purpose of electro-chemical industries. Processes for the fixation of atmospheric nitrogen are being conducted on a manufacturing scale, but the products are being mainly exported. Hydrogen peroxide is being produced electrolytically, but practically the whole of the Austrian output of this substance is being exported to Japan and, to a lesser extent, to South America.

The bleaching powder and caustic soda plants have very little excess production for export, but the general opinion seems to be that the near future will witness a considerable increase in output. Austria is at present exporting large quantities of calcium carbide and lead compounds. The soda ash industry is beset with many difficulties, the principal of which is the high price of salt as fixed by the State which holds the monopoly of this raw material. Ammonium sulphate is at present available for export from Austria in large quantities.

Tartaric acid is a product in the manufacture of which Austria is exceptionally strong. All the three factories which she possessed before the war are still in the territories of the new Austria, and practically the whole of the production is available for export. Again, both in copper sulphate and in glue, Austria is able to satisfy any reasonable demands from outside customers. Austria has always occupied a prominent position in the lacquer and paints industry, and she is still able to export considerable amounts.

Mr. Brunner makes the plea that for the chemical industry of Austria to become really firmly established and to meet competition when the international exchanges become stabilised, all the necessary raw materials such as the mineral acids and the alkalies must be imported duty-free so far as possible. The chemical merchanting-business in Vienna has greatly expanded, the writer stating that the number of wholesale dealers in chemicals and drugs in German-Austria is more than ten times what it was before the war.

TITANIA AS A GLASS CONSTITUENT.

PRODUCTION OF HEAT- AND CHEMICAL-RESISTING WARE.

THE first meeting of the Society of Glass Technology for the session 1923-24 was held in Sheffield on October 17, the President, Professor W. E. S. Turner, D.Sc., in the chair. The initial formal business included the presentation of "Frank Wood" medals to Mr. A. R. Sheen and Mr. F. Winks, by Sir W. H. Hadow, Vice-Chancellor of the University of Sheffield. The President referred appreciatively to the hospitality experienced by members who visited France during the first week of July. It was resolved to send a cordial invitation for a conference in this country sometime during 1924, jointly to members of the Society in France and to the Chambre Syndicale des Maitres de Verreries (the representative body of French manufacturers who had welcomed the party to Paris in July).

Disadvantages of High-Silicon-Boron Glass.

A paper entitled "The Effect of Titania on the Properties of Glass," by A. R. Sheen and Professor W. E. S Turner, was given by Mr. Sheen. Mr. Sheen remarked that a great deal of interest had been shown recently in the production of heat-resisting glass. Manufacturers, especially of scientific glassware, were realising the necessity of making a glass which had a high thermal endurance and which at the same time was capable of resisting the attack of substances with which the glass came into contact, whether solid, liquid or gaseous. Modern heat-resisting glasses contained a high percentage of silica and also boric oxide in considerable amount—*e.g.*, the well-known glass, Pyrex (which owed its high thermal endurance to its exceptionally low co-efficient of expansion, 0.0000032), contained approximately 80 per cent. silica and 12 per cent. boric oxide. There were, however, objections to the use of these oxides. In the case of silica the difficulty was merely one of obtaining a sufficiently high melting temperature. On the other hand, glasses containing boric oxide were very readily melted, but here the objection was the effect of the oxide on the durability of the glass.

Recent Research at Sheffield University.

Recent research in the Department of Glass Technology of Sheffield University had shown that as the B_2O_3 content of a glass was increased the durability towards water and acid increased to a maximum and then as the B_2O_3 content was further increased, the durability fell off rapidly. Boric oxide-containing glasses (and, of course, glasses with high silica content) on account of their acidic nature were very readily attacked by alkali—*e.g.*, it was quite useless using Pyrex ware as an alkali container. What information there was concerning the use of titania in the production of glass seemed to point to the fact that titania glasses were heat-resisting, but no experimental data were given. It was with this consideration specially in mind that this piece of work was undertaken.

Selection of Batch Mixture.

At the outset preliminary tests were made to find out what mixture of silica, titania and soda would give glasses at the highest temperature obtained in glass-melting practice—*e.g.*, temperatures of 1,400° to 1,450° C. It was found impossible to obtain a glass from silica and titania alone at this temperature. Batches were then calculated out on the basis of the glass formula:

$$6SiO_2\ xNa_2O\ yTiO \text{ where } x + y = 2$$

and it was found that the first six members of the series gave glasses quite readily—*i.e.*, glasses of the approximate molecular compositions:—

(1) 6 SiO_2, 1.9Na_2O; 0.1TiO_2
(2) 6 SiO_2, 1.8 Na_2O, 0.2 TiO_2
etc. etc. etc.
(6) 6 SiO_2, 1.4 Na_2O, 0.6 TiO_2

in which the soda was gradually replaced by titania. Above 1.8 mol. TiO_2—*i.e.*, 13 per cent. TiO_2, it was found increasingly difficult to melt the glass and higher temperatures were required. It was found that if these glasses were melted under reducing conditions, their colour varied from light amber to dark brown. Therefore part of the soda content was added as soda nitre and the melting operation was carried out in crucibles with well-fitting lids. By this means colourless glasses were obtained.

There were indications during these melting operations that titania glasses were heat resisting. It was found in

many cases that the glass could be removed straight from the furnace, and allowed to cool down in the open air without splintering or cracking of the mass of glass occurring.

After considering the analyses of these glasses the first question dealt with was the durability of the titania glasses towards water. It was found on comparing with the corresponding lime and magnesia glasses that the titania glasses were less attacked than the lime glasses, especially in the earlier members of the series. The durabilities of the titania glasses were found to be practically the same as those of the corresponding magnesia glasses. The annealing temperatures were found to be rather less than those of the corresponding lime and magnesia glasses.

Heat Resistance Not Due to Low Thermal Expansion.

Next, the important question of thermal expansion was dealt with. It was originally intended to determine this optically by the Fizeau-Pulfrich method, but it was eventually decided to repeat the melts on a large scale (28lb. pot), to draw tubing and determine the expansion by the ordinary dilatometer method. The thermal expansions of these titania glasses (only the first four glasses of the series were tested) were only slightly less than those of the corresponding lime glasses. Therefore if titania glasses are heat resisting it is certainly not due to their having a low expansion as is the case with Pyrex glass, for example, but the cause must be sought in some other factor such as tensile strength or elasticity.

These glasses possessed good working properties, their viscosity increasing as titania replaced soda. Throughout all the glasses melted in connection with this work there was hardly any evidence of devitrification occurring. This bore out the statement of previous workers that titania hindered devitrification.

SOCIETY OF CHEMICAL INDUSTRY.

NOTTINGHAM SECTION.

THE opening meeting of the session of the Nottingham Section of the Society of Chemical Industry was held on October 17, when the Chairman (Mr. J. W. Wilkie, B.Sc., F.I.C.) read his address entitled "Some Reflections on the Importance of Chemistry to the Community, and the Means which should be Adopted to Bring the Fact Home to the Man in the Street."

The Importance of Chemistry to the Community.

The speaker opened his subject by referring to the publicity given to the importance of chemistry during the war, but pointed out that very little reference to this subject had been made by the Press subsequently. He then mentioned some vital questions which were being actively investigated by chemists, such as the close connection between dietetics and deficiency diseases, and the importance of extending our knowledge of the various vitamines. The problem of the exhaustion of the soil was still unsolved in so far as the replenishing of very necessary supplies of potash and phosphates was concerned. Public notice should be frequently brought to such investigations.

In the discussion which followed, as to the ways in which the real meaning of chemistry could be made known more widely, it was generally agreed that the first step was the popularising of the subject in the schools.

The Action of Sodium Hyposulphite on Silver Chloride.

Dr. J. B. Firth and Mr. G. F. Higson then read a paper on the action of aqueous sodium hyposulphite upon silver chloride. In the case of solid silver chloride the action was very slight, but this action increased with temperature (up to a maximum at 50° C.) and concentration of the hyposulphite, the main products being silver sulphide and metallic silver.

The reaction between hyposulphite and silver chloride dissolved in sodium-thiosulphate solution produced silver sulphide in quantitative amounts according to concentrations. This reaction could be utilised for the recovery of silver from silver residues, as the silver sulphide was readily converted into a bead of metallic silver on lightly fusing.

Silver chloride dissolved in excess of ammonium hydroxide solution was rapidly and quantitatively reduced by hyposulphite to metallic silver in a finely divided condition, and thus another method presented itself for the recovery of silver residues. The silver obtained by this reduction was very easily fused into a metallic bead. A similar quantitative reduction to metallic silver (finely divided) occurred when silver nitrate solution, dissolved in excess of ammonium hydroxide, was treated with aqueous sodium hyposulphite.

CHEMICAL TRADE AND INDUSTRY OF GREECE.

PROGRESS DURING 1922.

A REPORT* just issued by the Department of Overseas Trade and compiled by Mr. R. F. H. Duke, C.B.E. (Commercial Secretary, British Legation, Athens), with the assistance of H.M. Consular Officers at Athens, Patras, Crete, Volo, Corfu, Salonica, and Syra, deals fully with the industrial and economic situation in Greece and contains information revised to the end of June of this year.

Factors Influencing British Trade.

Commenting upon the general position, Mr. Duke states: There are two main questions affecting British commercial relations with Greece—namely, the opportunities of obtaining contracts for constructional work or concessions for the development of the natural resources of Greece, and the position of British firms already established and operating in the country. As regards the former, Greece continues to be a country of almost infinite opportunity, of which, however, present conditions render it impracticable to take full advantage. For many years British firms have been looking forward to the possibility of obtaining such concessions as the Piraeus harbour works, the Athens water supply, telephone installation, the drainage of the Struma and Vardar valleys, the reconstruction of the railways, the development of electric power from the Aliakmon and Achelous rivers, and the like. There is obviously little inducement to British firms to commit themselves to definite engagements in present economic conditions, but at the same time the work will have to be carried out in due course, and British firms will be well advised, while not necessarily entering into too definite engagements at present, to keep a close watch on the progress of events.

The position of British firms, industrial, commercial and insurance, who have been for many years operating in Greece, is becoming a precarious one; well-established concerns which have persevered in spite of disappointing results in their endeavours to make a livelihood out of their Greek concessions, are beginning seriously to wonder whether the game is worth the candle. Already before the revolution, economic legislation in 1922 had consisted almost entirely of revenue-producing measures, and the fiscal policy of the Government, though their efforts to make Greece self-supporting by taxation in the absence of foreign financial assistance cannot but be eulogised, has been such as must sooner or later tend to drive foreign capital out of the country.

Chemical Imports into Greece.

Dealing with foreign imports into Greece during 1922, Mr. Duke goes on to say that the principal articles of importation are agricultural products (principally flour and wheat) which account for over 1,250 million drachmae or two-fifths of the total imports, and textile yarns and fabrics, which are responsible for over 579 millions, or more than one-fifth. Minerals and raw metals (218 millions), chemical products (167 millions), sugar (195 millions) and manufactured metals (97 millions) are the other main items of importation. Of chemical products the most important are sulphate of copper (6,778 tons, of which 5,911 tons were supplied from Great Britain), benzine (for motor fuel, 3,560 tons, U.S.A. sending 1,692 tons, and Roumania 1,234); quinine—a monopoly article of which about three-fifths comes from Germany and one-fifth from Great Britain; and dyestuffs—Germany supplies over one-third of the latter, Belgium, one-fifth, France one-eighth, and Great Britain about one-sixth. The position has changed considerably in this field, as in 1921 Great Britain supplied over one-third and Germany only one-seventh, while Belgian trade has also increased. In soda, two-thirds of the trade is divided equally between Great Britain and Belgium, the latter having considerably improved her position since 1921.

Principal Exports from Greece.

Exports from Greece in 1922 have increased to every country except Jugoslavia, Spain, Norway and Russia, and have more than doubled (in value) to many other destinations. Actual increase in tonnage is apparent only (from the detailed statistics for the first ten months) in cheese, hides, tobacco (30,896 tons against 20,175), olive oil (14,641 tons against 9,135), olives, colophony, turpentine, magnesite (23,524 tons against 18,349), soap (8,352 tons against 7,681),

* London. H.M. Stationery Office. Price 1s. 6d. net.

and wine (43,975 tons against 10,613), the principal customer being France, with 28,000 tons. Great Britain is a prominent purchaser in emery (one-half the export) and lead ore.

Olive Oil Production Figures.

H.M. Consul at Corfu, the principal district for olive oil production, reports that the amount realised in 1922 was not up to the estimate, being only 210,000 barrels instead of 250,000 to 300,000. 90,000 barrels were shipped to the Italian and French markets and a small amount to England and America; also about 80,000 to other ports in Greece. The price for export commenced at 250 to 300 drachmae according to quality until the month of August, when the prices fluctuated 450 and 600 drachmae per barrel. The quantity remaining unsold and awaiting demand amounts to 20,000 barrels.

The Vice-Consul at Zante reports a considerably larger crop than in 1921, the figures being 40,000 barrels (or 640,000 gallons) for 1922 compared with 400,000 gallons for 1921. This is all consumed locally, the non-edible oil being used in the manufacture of soap, and export is practically nil. The crop in Crete appears to have been a medium one and amounted to some 20,000 tons as against 8,500 for 1921 (the latter being an exceptionally poor year). The quality is considered very good. The total production of olive oil in Greece for 1922 is given as 98,013,500 kilos.

Greece is now self-supporting as regards supplies of salt, the sale of which is a State monopoly.

Control of the Emery Industry.

The mineral resources of Greece are numerous and varied, but, chiefly owing to lack of suitable transport facilities and the fact that deposits are generally widely distributed in relatively small quantities, they have never been fully exploited.

The output of Naxos emery in 1922 was very small—only about 6,330 tons as compared with 12,709 tons in 1921—owing to a five months' strike in the mines and the continued inadequacy of means of transport and loading. Government prices ruled from £5. to £8. 10s. per ton, but owing to the maintenance of the system of allocation to speculators of all kinds, emery was unobtainable by foreign buyers at prices below £7. to £12. An attempt was made by the French buyers early in the year to interest both the Greek Government and their British and Italian competitors to accept a scheme for transferring the production and distribution of emery to an international company, but British buyers failed to accord their support to the scheme, and it was not approved by the Greek Government. In October, however, Monsieur Hadjikyriakos, the new Minister of National Economy, decided to abolish the prevailing system of distribution and introduced a decree providing (*a*) for improvement of the means of transport with the aid of a loan from the National Bank repayable by an addition to the price of the emery, (*b*) for distribution to bona-fide manufacturers of four-fifths of the production, the remainder being put up to public auction.

The total quantity sold during the year was 12,035 tons, of which 6,257 tons went to Great Britain, 3,358 to France, 850 to Germany and 824 to the U.S.A. Of the 3,500 tons which remained available for allocation when the new system came into force at the end of the year, 1,000 tons each were allocated to French, British and American interests respectively, and a single representative was appointed for each country to deal with the allocation and shipment to the individual manufacturers. The new method introduced both in production and distribution should effect a distinct improvement in the securing of adequate supplies by British users, but the re-opening of the Asia Minor market and the growing use of artificial abrasives from America is likely to diminish the demand for the Greek product in future years.

Magnesite in 1922.

Magnesite mining during 1922 was handicapped by lack of labour and especially of skilled miners, while the absence of demand for all classes of magnesite restricted output still further. The bulk of the magnesite shipped went, as in the preceding year, to Holland and Germany, the export to Great Britain direct from Greece being limited and the United States taking at the most one or two shipments of crude and calcined mineral. The Anglo-Greek Magnesite Company, Limited, produced, during the year, 28,356 tons of crude ore as against 33,100 tons during 1921. Of the raw ore thus mined 12,987 tons were calcined and 8,541 tons were shipped in the crude state. This company's production of caustic calcined magnesite amounted to 5,686 tons, and 6,647 tons of this mineral were sold and shipped. No dead burnt magnesite was produced during the year.

Official figures for the whole year of other magnesite companies are not available (semi-official figures give the total magnesite output for Greece as 55,780 tons). The production of all these other companies during the period January-August, 1922, is given as being 17,000 tons crude ore, about three-quarters of which, it is estimated, were calcined and shipped to Holland, where the caustic calcined magnesite is ground. The purchase by the Anglo-Greek Magnesite Company, Limited, from the Allatini Group of Salonica of the Yerakini Magnesite Mines in the Chalkideau Peninsula for £70,000. is now confirmed. The Yerakini Mines produce a very high grade class of mineral, and are said to have ore reserves of over half a million tons. These mines are probably the richest deposit of amorphous magnesite in the world, and being close to the sea have no transport problem to contend with. It is expected that when these mines are fully equipped and developed they will far outdistance the Euboean Magnesite Mines in cheaply produced good quality ore.

Chrome and Lead Ores.

Chrome ore, which exists in small deposits almost throughout the country, is mainly produced in Thessaly and Boeotia at the mines of Tsangli, Alchani and Boeboda, the production for the first eight months amounting to over 5,000 tons, which would give a figure of some 7,500 tons for the year. The first-named mine shipped 5,800 tons to the U.S.A. during 1922 at 9 dollars per ton f.o.b. Volo.

Lead from the Société Fr. de Mines du Laurium amounted to 3,002 tons, or a rate of 4,500 tons per annum. Lead-bearing ores by the Greek Soc. Metallurgique de Laurium amounted to only 274 tons, or 400 per annum. During the first ten months some 3,400 tons were exported, 2,713 going to Great Britain.

Developments in Greek Industry.

There are signs that industry is developing in Greece, and some of the prominent Greek business men who have hitherto been engaged purely in mercantile operations, are investing capital in industrial companies and creating groups for the establishment of new and modernisation of old factories. Of the more established chemical industries the following figures, based on the estimates of a Government expert as published in the Press, will give an idea of the progress which is being made:—

	1922.	1921.
Chemical Products (total value in drs.)	2,929,920,000	1,612,320,000
Including Olive oil (used for soap-making (tons)	4,000	7,500
Soap (tons)	25,000	20,000
Fertilisers (tons), ...	19,000	18,000
Dyes (tons)	107	105
Colophony (tons)	4,000	3,500
Turpentine (tons)	1,000	900

The chemical industries are going ahead, directed as they are by some of the best commercial and industrial brains in Greece, especially in regard to dyestuffs and other coal-tar products (such as the Greek aspirin "Saloxine" which has an increasing sale) and glass, which in this country has been a development of chemical manufacture. The principal obstacles to the development of Greek industry have so far been the high cost of plant and raw materials owing to the depreciation of the drachma, and the inadequate facilities and high rates of railway transport. Motive power in particular has been expensive owing to the rise in the price of coal from 250 to 950 drachmae per ton during 1922, and the failure of lignite supplies to come up to expectations. Oil-power has developed, some 8,500 tons of crude petroleum having been used for this purpose in 1922 compared with 6,300 in 1921.

Hydrocyanic Acid for Fumigation.—The Ministry of Health has issued (H.M. Stationery Office, 2s. 6d. net) for official use a preliminary report by Dr. P. G. Stock and Dr. G. W. Monier-Williams on the use of hydrogen cyanide for fumigation purposes. The report recommends that in the interests of both health and commerce further inquiry in several directions should be initiated, but the attention of all Government departments and all shipping companies is directed to the data and conclusions embodied in the present report.

THE GERMAN CHEMICAL TRADE.

RECENT IMPORT AND EXPORT STATISTICS.

THE following table which is compiled from statistics given in the *Chemiker-Zeitung* (October 18, 1923) shows the quantities (in doppel-zentner—*i.e.*, in 100 kilogrammes) of the principal German imports and exports of chemical products during the month of July last and during the seven months January-July, 1923. A few metal products, rubber and leather are also included.

	Imports.		Exports.	
	July.	Jan-July.	July.	Jan.-July
Refined waxes, solid fatty acids, paraffin wax, soaps, and other products from oils, fats, and waxes	11,888 ..	53,512 ..	20,546 ..	134,743
Chemical and pharmaceutical products, dyes, and dyewares (total)	243,626 ..	2,050,766 ..	2,353,531 ..	14,751,805
Heavy chemicals, including acids and salts	176,094 ..	1,368,681 ..	2,224,992 ..	13,599,090
Dyes and dyewares	5,736 ..	43,028 ..	89,243 ..	752,787
Varnishes, lacquers, and cements.....	41 ..	721 ..	3,558 ..	28,593
Ethers, alcohols, ethereal oils, synthetic perfumes .	5,690 ..	56,895 ..	6,159 ..	39,278
Artificial Fertilisers	39,970 ..	439,130 ..	7,094 ..	158,030
Explosives and matches....	278 ..	1,051 ..	10,088 ..	74,308
Glass and glassware.....	1,040 ..	18,368 ..	127,870 ..	821,824
Gold, platinum, and silver..	485 ..	3,345 ..	190 ..	1,499
Aluminium and alloys	5,627 ..	29,160 ..	6,036 ..	46,749
Lead and lead alloys	26,493 ..	200,797 ..	7,620 ..	75,330
Zinc and zinc alloys	47,858 ..	321,928 ..	11,234 ..	57,593
Nickel and nickel alloys ...	797 ..	9,648 ..	235 ..	2,991
Copper and copper alloys ..	85,821 ..	860,285 ..	37,491 ..	334,038
Tin and tin alloys	4,048 ..	37,322 ..	1,583 ..	8,591
Hard rubber goods	5 ..	74 ..	728 ..	5,643
Soft rubber goods	176 ..	1,493 ..	13,819 ..	104,444
Leather	1,508 ..	12,948 ..	10,166 ..	75,751
Coal, lignite, and fuel oil ...	30,236,000 ..	214,743,000 ..	3,512,000 ..	24,156,000
Coal tar	34,207 ..	378,634 ..	69 285 ..	489,552

THE DIRECTORATE OF THE DYESTUFFS CORPORATION.

SIR WILLIAM POPE'S REPLY TO MR. J. M. ROBERTSON.

IN our issues of October 12, p. 430, and October 19, p. 459, we have published the correspondence that has taken place, mainly in the columns of the *Morning Post*, on the constitution of the directorate of the British Dyestuffs Corporation. The last letter was the reply of Mr. J. M. Robertson to the criticisms of Sir William Pope. During the past week Sir William Pope has further written to the editor of the *Morning Post* as follows:

Sir,—As Mr. J. M. Robertson in your issue of the 16th deals with the ill-success of the British Dyestuffs Corporation, a few dates and references will further illumine the situation. On March 6, 1915, the prospectus of British Dyes, Ltd., appeared, inviting subscriptions to a national dyestuff scheme, of which roughly one-half the capital was to be subscribed by the Government. This scheme, promoted by the Board of Trade, was widely condemned in the Press and was very adversely criticised in the House of Commons debate on March 11, 1915, when the Government was told that "disappointed shareholders and complaining employees would arraign them for it later." Suspicions were aroused by the absence of technical and scientific leaders from the directorate, but the objections were lightly brushed aside by the Board of Trade. It is certain that the capital could not have been raised in 1915 without the encouragement given by the Board, acting on behalf of the Government; the company was floated without the collaboration of our technical chemical leaders, and, very naturally, this collaboration was not forthcoming when the enterprise became the British Dyestuffs Corporation in 1919.

The depreciation of capital values, the non-payment of dividends, and what is of greater moment, the failure to establish a vigorous coal-tar colour industry in this country are the direct consequence of the policy of the Board of Trade in March, 1915; the shareholders who "ignorantly meddling with politics," to use Mr. Robertson's phrase, put their money into the Government dyestuff scheme could not withdraw it intact when the control of the Board shortly afterwards changed. My own infirmities, upon which Mr. Robertson moralises, are irrelevant to the question under discussion, and I regret that they should have been so unnecessarily, though so eloquently, exposed.—Yours, etc.,

W. J. Pope.

University of Cambridge, October 22.

SOCIETIES' WINTER ACTIVITIES.

PROGRAMME OF COMING SESSION.

WITH the opening of the season when the various societies and institutions renew their activities, it is of interest briefly to review the programmes of the sections. Information as to the work to be undertaken so far as is at the moment available, is given below.

On Wednesday, October 31, a joint Societies' dinner is being arranged under the auspices of the Chemical Society, the Institute of Chemistry, and the Society of Chemical Industry. The dinner will be held in the Edward VII. Rooms, Hotel Victoria, Northumberland Avenue, W.C. 2, at 7.30 p.m. Sir William J. Pope, F.R.S., will be in the chair. Members of any of the societies concerned are invited to attend, and bring guests.

Society of Chemical Industry.

Bristol Section.—The meetings of the Bristol Section, which was established in April, 1917, are held in the Chemical Department of the University, Woodland Road. The opening paper delivered before the members, was "An Outline of Rubber Manufacture," on October 4, by J. F. Reid. Future papers include "Some Aspects of the Paint Trade: Fine-colour and Lake Making," by A. H. Bridges, on November 1; "Reminiscences of an Alkali Inspector," by R. D. Littlefield, on December 6, a joint meeting with the Institute of Chemistry; "The Chemical Technology of Canned Foods," by O. Jones, on January 3; "Current Chemical Research at Bristol University," by Professors F. Francis and J. W. McBain, on February 7, in co-operation with the Chemical Society; the annual meeting and election of officers on March 6, when papers will be read on fuel economy by H. T. Ringrose and H. Womersley. Certain visits to works have been arranged, and the annual dinner will be held in February. The Secretary of the Section is Arthur Marsden, 39, Belvoir Road, St. Andrew's Park, Bristol.

Glasgow Section.—The opening meeting of the Glasgow Section is to be held to-day, October 26, at 7.15 p.m., at 39, Elmbank Crescent. A paper on "The Industrial Chemist" will be read by the Chairman, W. E. Moodie. Further papers include "Artificial Resins—their Preparation and Uses," by Dr. H. Hepworth, on November 23; Ramsay Chemical Dinner at the Ca'dōro Restaurant, on December 20; joint meeting with the Institute of Chemistry on January 25, when a paper will be given by F. W. Harris; "Notes on Continuous Causticising and Cresylic Acid," by W. Walmsley and R. F. Stewart, on February 22; "The Influence on Chemistry of the Recent Knowledge Gained of Atomic Structure," by Dr. John A. Cranston (secretary of the section); April 3, annual general meeting. It is expected that a visit to Provan Chemical Works will be arranged during the Session.

Manchester Section.—Dr. H. Levinstein, the chairman of this Section, opened the current session on October 5, with a paper outlining recent progress in chemistry, reference to which was made in our issue of a fortnight ago. Meetings are usually held at the Textile Institute, 16, St. Mary's Parsonage. On November 2, a joint meeting with other Manchester societies has been arranged, when Professor W. D. Treadwell, of Zurich, is to lecture on "Electrometric Methods in Analytical Chemistry." The annual dinner will take place at the Queen's Hall on November 23. On December 7, a joint meeting with the Institution of Rubber Industry will be held at which papers on vulcanisation accelerators will be given by G. Martin and Dr. T. Callan; "Fuller's Earth," by A. Brittain, and "Fractional Distillation," by C. Elliott, on January 11, 1924; "Reminiscences of Dr. Caro," by Dr. E. F. Ehrhardt, on February 1; "Some Chemical Qualities of the Living Cell," by Professor F. Gowland Hopkins, on March 7. The annual meeting is to be held on April 4, when a paper on "The Tautomerism of Amidines" will be read by Professor F. L. Pyman; and at the closing meeting on May 2, L. Guy Radcliffe and John Atkinson will give a paper on "Some Organic Sulphur Com-

pounds." The section secretary is L. Guy Radcliffe, College of Technology, Manchester.

South Wales Section.—This is the youngest section of the Society, having come into separate existence from the Bristol and South Wales Section only two years ago. Meetings are held both in Cardiff and Swansea; in the former case at the Technical College, Cathays Park, and at Swansea, at the Technical College, Mount Pleasant. The Cardiff meetings opened with a discussion on the "Smoke Problem," on October 12. The President, Dr. E. F. Armstrong, is to visit the Section on November 8, when he will give an address on "The New Chemistry." On December 7, a paper is to be given by T. G. Watts on "Coke Ovens." Interest in this paper will be strengthened by a visit later to the Maritime Coke Works at Pontypridd. A paper on "Cocoa," by Dr. H. W. Bywaters, will be given on January 11; Discussion on the "Action of Acids on Metals," on February 8; and a paper on "Metal Colouring," by E. A. Rudge, on March 7. The session at Swansea opened on October 19 with a discussion on "Short-cuts in Analysis." On November 16, a paper is to be given by E. A. Tyler; January 18, papers on "Routine Work in an Oil Refinery Laboratory," by T. D. Ambrose, and "Estimation of Sulphur in Petroleum," by Dr. H. B. Thompson; February 15, a paper by L. Taverner and H. J. Williams; March 14, joint discussion with the Faraday Society on "Slags and Fluxes in Melting and Refining"; March 28, annual meeting, and address by the chairman. The secretary of the South Wales Section is Dr. H. E. Cox, 139, Stow Hill, Newport, Mon.

Institute of Chemistry.

The annual dinner of the Institute will be held at the Hotel Victoria, Northumberland Avenue, on Monday, December 10, at 7.30.

Birmingham Section.—The membership of the Birmingham Section of the Institute has now passed the hundred mark. A provisional programme for the session has been drawn up, and it is hoped to receive a visit from the President of the Institute early in the New Year. In November, the general meeting will be held, and an address given by the Section President, Professor G. T. Morgan. A joint dinner has been arranged with the Society of Chemical Industry for December. In February or March, the anticipated address by A. Chaston Chapman will be given. It is expected that joint meetings will be arranged amongst the various local sections of the scientific societies. The Secretary is C. A. F. Hastilow, Chenda, Bittall Road, Barnt Green, Worcestershire.

Bristol Section.—The session was opened by an address by the President at the University of Bristol, on October 11. On November 24, a meeting will be held at Exeter, when papers will be read by A. Marsden and F. Southerden. The Section President, R. D. Littlefield, will address a joint meeting on December 6 at Bristol on "Reminiscences of an Alkali Inspector"; on January 16, a paper on "Some Experiments with Water-finders," by Dr. J. Wertheimer; annual dinner in February; annual general meeting and election of officers, March 15. The local secretary is A. W. M. Wintle, 170, Newbridge Road, St. Anne's Park, Bristol.

Glasgow Section.—The annual meeting of the Section, which meets at the Royal Technical College, was held yesterday (October 25). The provisional programme includes a discussion on November 16; "Ramsay" dinner in December; joint meeting with the Society of Chemical Industry on January 25; and a joint meeting with the Ardeer Chemical Club in February. The secretary, W. M. Cumming, of the Royal Technical College, states that a publicity campaign has been opened in the West of Scotland, and articles on the importance of chemistry are now appearing in the local Press.

London Section.—Particulars of the syllabus are not yet available, but it is interesting to note that the Section has, during the past session, increased materially in number, the actual membership approaching 400. The sections of the Institute of Chemistry are able to levy a separate subscription, and there is in London, a second subscription of 5s. per annum, which indicates the interest of the members in the activities of their own section, the secretary of which is Leslie Collett, c/o the Institute of Chemistry, 30, Russell Square, W.C. 1.

Society of Dyers and Colourists.

London Section. — Arrangements for the forthcoming session are not yet fully completed, but a provisional programme has been prepared. The opening meeting was held on October 25 at the Dyers' Hall, Dowgate Hill, when a paper on "Hydrogen Peroxide Bleaching" was given by I. E. Weber. Further papers include the "Macbeth Artificial Daylight Equipment and the Fade-ometer," by A. A. Dashwood Lang; "Action of Micro-organisms on Fabrics," by Dr. Thaysen; and a paper on "The Use of Tetra Carnit in Stripping and Dyeing."

Leeds Junior Branch.—Meetings of this section are held on alternate Tuesdays in the Colour Chemistry Department of Leeds University. The number of members is being well maintained. In addition to the ordinary list of meetings, it is intended that "Junior evenings" shall form a feature of the session. At these meetings, members in turn give short papers on subjects of general interest, which provide material for discussion. The following papers have been arranged for, but the syllabus is not yet completed. On November 26, "Works Filtration," by Dr. Forster; "Shoddy Dyeing," by T. R. V. Parkin, on February 11; "Sulphur Dyestuffs," by F. L. Goodall, on March 3; and the annual meeting on March 17, when a paper on research work will be read by Professor A. G. Perkin. Later on in the session, visits to works in the vicinity are to be arranged.

Manchester Section.—The secretary of the Manchester Section, L. Thompson, 36, Palm Street, Slade Lane, states that the membership now totals 300, exclusive of 140 junior members, affiliated to the section. Most session meetings are held at the rooms of the Manchester Literary and Philosophical Society in George Street. The first paper was given on September 28, by Dr. Julius Rath, on "Naphthol AS"; followed by a meeting on October 19, when Professor R. Robinson lectured on "The Theory of Quinones." On November 16, a paper will be given on "Changes which Occur in Cotton Fabrics during Calendering and Beetling," by J. Huebner and V. Malwin; December 21, "The Dyeing of Cellulose Acetate Silk," by L. G. Lawrie; January 18, "The Fluorescence of Cellulose," by Dr. S. J. Lewis; February 15, "Some Physical Properties of Yarns," by Dr. A. E. Oxley, and a paper by Dr. R. G. Fargher; March 21, "Bi-polar Electrode Electrolysers for the Production of Bleaching Liquors," by Dr. G. G. Hepburn; April 18, "Identification of Insoluble Azo Colours on the Fibre, and of Azo Colours in Substance," by Dr. F. M. Rowe, and Miss C. Levin.

Institution of Rubber Industry.

London Section.—Meetings of this section are held at the Engineer's Club, Coventry Street, W., at 8 p.m. Two meetings have already been held, and on December 3, a paper on "Accelerators" will be given by Major V. Lefebure; January 7, "Consistency of Rubber and Rubber Compounds," by Dr. S. S. Pickles; February 4, "Rubber Latex in the manufacture of Boards, Leather and Linoleum Substitutes," by F. Kaye; March 3, "Life and Work of Thomas Hancock," by H. Rogers and B. D. Porritt.

Manchester Section.—The opening meeting took place on October 15 at the Midland Hotel, when H. C. Young, opened a discussion on "Rubber Machinery." On December 7, there is to be a joint meeting with the Society of Chemical Industry, when Dr. T. Callan will lecture on vulcanisation accelerators. Further meetings are to be held on January 21, February 18, and March 17.

Meetings have also been arranged to take place in Birmingham and Edinburgh, but full particulars of these are not yet available.

Hull Chemical and Engineering Society.

This society, which usually has a very attractive syllabus, holds its meetings in the Hull Photographic Society's Rooms, Grey Street, Park Street, at 7.45 p.m. On October 30, a paper on "British-made Dyes for Paints and Distempers," is to be given by G. B. Shaw; November 13, "Heating Mediums, Past and Present," by E. G. T. Hill; November 27, "Recent Advances in Colloid Chemistry," by A. V. Slater; December 11, "Recent Advances in the Study of Corrosion," by Dr. J. Newton Friend; January 8, 1924, "X-rays and their Application," by J. Pryce-Jones; January 22, "The Testing of Materials," by G. F. O'Riordan; February 5, kinematograph exhibition of living micro-organisms, with explanations by A. R. Tankard; February 19, "Manufacture and Testing of Portland Cement," by Miss D. J. Butterfield; March 4, joint meeting with the Chemical Engineering Group; March 18, "Anthracene and its derivatives," by Dr. W. Thevenaz; April 1, presidential address, "The Constitution of Coal," by A. R. Warnes.

ITEMS OF INTEREST.

Acetylene Congress in Paris.—The Eighth International Acetylene and Auto-Welding Congress will be held in Paris at the Grand Palais on December 13.

Committee on Food Preservatives.—It is announced that the Committee, which has already held a number of private sittings, will open the public inquiry on November 1.

Gifts for Research.—The General Electric Company of New York has given 5,000 dollars, and the British Thomson-Houston Company £250., for promoting original investigations at the Cavendish Laboratory.

British Coal Output.—The coal output at the mines of Great Britain for the week ended October 13 was 5,626,000 tons, against 5,528,400 tons for the previous week, and 5,254,900 tons for the corresponding week last year.

Tariff Notes.—Importation and exportation of opium and other habit-forming drugs is prohibited in Southern Rhodesia.—The duties on refined petroleum imported into British Guiana have been increased.—Anthraquinone may now be imported into Tunis duty free.

Canada and the Industrial Property Convention.—Canada has adhered to the Industrial Property Convention with effect from September 1, 1923. An Order in Council has been made applying to Canada the provisions of Section 91 of the Patents and Designs Acts, 1907 to 1919.

Norwegian Cellulose Products Exports.—According to official statistics, exports from Norway of cellulose and paper during the first seven months of this year amounted to 551,000 tons, which is 79,000 tons more than for the same months last year and 28,000 more than in 1913.

Chemical Industry Club.—The annual dinner of the Club takes place on Monday, November 26 next, at 7 for 7.30 p.m., at the Connaught Rooms. The price of the ticket is 15s., gratuities included, but exclusive of wine. The room in which the dinner will be held is capable of seating about 150.

New Water-resistant Glue.—The United States Bureau of Standards, in reporting experiments dealing with the use of glue in coating paper, says that results indicate that the water resistance of glue-bound coating containing chrome alum compares favourably with that of casein-bound paper containing no formaldehyde.

Artificial Silk Prices.—It was announced in the Press during the week that Courtaulds were about to reduce the price of their artificial silk by 33⅓ per cent., presumably to meet the competition of the British Celanese Company. This statement has been proved incorrect, but based upon the fact that Courtaulds are introducing into the market a new and cheaper form of artificial silk yarn for the jumper-knitting trade.

Amended Qualifications for Teachers.—The following qualifications are among those now accepted by the President of the Board of Education as the "equivalent" of a University degree for the purpose of regulating the pay of teachers under the Burnham agreement: Associateship of the Institute of Chemistry, provided that the Associate has passed the Institute's examination for Associateship; Membership of the Pharmaceutical Society, provided that the Qualifying and Major Examinations have been passed and followed by three years' professional experience; Associateship of the Royal College of Science; Associateship of the Royal School of Mines; and Associateship of the City and Guilds of London Institute.

The Metric System in Chemical Industry. — Under the auspices of the Widnes Scientific Society, on Wednesday week, Mr. A. E. Malpas, chief engineer to the United Alkali Company, gave a lecture on "The Metric System, with Special Reference to Chemical Manufacture." The lecturer stated that the outstanding advantage of the system from the chemical and scientific point of view was the numerical equivalence of the unit of weight (the gramme) and the unit of volume (the cubic centimetre) at unit density. Mr. Imison, who took part in the discussion, said that the metric system had been scrapped at the works of the United Alkali Company, and disagreed with the lecturer's contention that the metric system and the English system could not be used concurrently with efficiency.

Unemployment Return.—The number of registered unemployed in Great Britain on October 15 was 1,253,000, or 2,372 more than in the preceding week, but 231,978 fewer than on January 1 last.

Salters' Institute Grants.—The Salters' Institute of Industrial Chemistry has awarded 64 grants in aid to chemical assistants occupied in factory or other laboratories in or near London, to facilitate their further studies.

Belgian Metallurgical Activity. — The Belgian metallurgical works at Ougres-Marihaye have obtained a contract for 15,000 tons of rails for the South of Spain. The same company has just restarted two blast furnaces.

Rise in Dyers' Wages.—Following the rise in the cost of living as recorded in the *Labour Gazette*, the wages of operative dyers in Yorkshire and Lancashire will be increased to the extent of about 5 per cent. as from the first pay day in November.

New Lead Find in Derbyshire.—A new vein of lead ore near Matlock has been successfully claimed by Mr. T. Wright, formerly a director of the Mill Close Lead Mines. The christening ceremony was performed by the Barmaster, Mr. George Eagle, on Saturday last.

Mishap at Smethwick Glassworks. — An explosion occurred in a tank containing about 40 tons of molten glass at the works of Chance Bros. and Co., glass manufacturers, Smethwick, early this week. The works brigade, however, were able to deal with the fire that ensued.

Protection and British Sugar Beet. — Sir Robert Sanders, Minister of Agriculture, speaking at Bridgwater on Monday night, said the one bright spot in the situation regarding arable land was the success of the policy respecting sugar beet, because that was one part of our arable cultivation which enjoyed a protective duty.

The Life of Wrought-iron Boilers. — According to the annual memorandum issued by the Manchester Steam Users' Association, exhaustive boiler tests carried out by the Association have demonstrated that wrought iron does not deteriorate with age. Owners of old wrought-iron boilers need, therefore, have no fear that their pressures must be reduced, unless, of course, they have suffered waste and corrosion.

Government Inquiry on Unemployment.—The Ministry of Labour are undertaking an inquiry from employers regarding unemployment, with the object of obtaining at first hand from industrial concerns an estimate of the probable extent of unemployment during the coming winter. The form sent out asks each industrial concern to indicate how many workpeople it employed in the week ended October 13, 1923 (full or short time), how many during a representative week in May, 1920, how many could be employed if sufficient work were available to keep the entire works in full operation, and how many the firm expects to have in employment in January, 1924.

The Present Artificial-silk Position.—In a paper read to the annual conference of the Textile Institute at Leicester last week, Mr. P. E. King, of Leeds University, stated that Chardonnet silk is still being manufactured in France and America. Cuprammonium silk is also being made in Germany, but on the Continent the tendency is for viscose to supplant cuprammonium, and plants operating on the latter are being converted to viscose. Viscose forms the largest proportion of the total production of artificial silks, and is being made in ever-increasing quantities in this country, and especially in America. It is also produced in France, Germany, Italy, and several other countries. The manufacture of acetate silk is making headway in America. Mr. King estimated the total world production of artificial silk in 1922 at 79,738,000lb., the following amounts being contributed by the various individual countries: United States, 23,500,000lb.; England, 15,340,000lb.; Germany, 12,584,000lb.; Belgium, 6,292,000lb.; France, 6,292,000lb.; Holland, 2,516,000lb.; Austria, 1,573,000lb.; Switzerland, 1,887,000lb.; Hungary, 1,888,000lb.; Italy, 6,292,000lb.; Poland, 943,000lb.; and Czecho-Slovakia, 692,000lb. During this year, added Mr. King, it was estimated that the American production would be 7½ million lbs. more than the 1922 figure. "There is a growing belief," said the lecturer, "that artificial substitutes for silk will ultimately replace the natural fibre."

American Paint Works to Make Own Linseed Oil.—It is reported from America that the paint department of the E. I. du Pont de Nemours and Co. is considering the erection of a large linseed-oil factory at its Philadelphia plant. The firm use nearly a million gallons of oil per year, and has had the project under consideration for some time.

Sale of Copper by Portuguese Mint.—The authorities of the Portuguese Mint are inviting offers for 500 tons of electrolytic copper, in ingots, to be sold in five lots of 100 tons each. Offers must be lodged with the Administrator-General, Mint (Casa di Moeda e Valores Selados), Lisbon, not later than forty-five days from October 2, 1923. Further particulars may be obtained from the above address.

Objections to New Railway Rates.—Between fifteen hundred and two thousand objections have been lodged with the Railway Rates Tribunal against the schedule of standard charges presented by the railway companies. The objectors cover the whole ground, for a number have challenged the entire schedule, while practically every item is objected to separately.

Manufacturing Perfumer's Affairs.—At the London Bankruptcy Court, on Friday last, the public examination was concluded of Robert Henry Myer, 27, Lansdown Gardens, S.W., and carrying on business as the Ross Supply Company at 186, Wandsworth Road, S.W., manufacturing perfumer. The statement of affairs filed by the debtor showed gross liabilities amounting to £415., of which £411. was expected to rank against the estate for dividend. The net assets were returned at £196., thus leaving a deficiency of £215.

Colour Users' Brochure.—A pocket brochure, containing much useful information, has just been issued by the Publicity Committee of the Colour Users' Association. It includes lists of members of the various groups in the Association, American dyestuffs statistics, procedure in making applications for licences, German dyewares statistics, the Dyestuffs (Import Regulation) Act, 1920, details regarding reparation dyestuffs, and many other items of value to colour users and the dyeing industry generally. The contents are arranged in a convenient manner for reference.

Swedish Match Combine.—The Swedish match combine, Svenska Taendsticksaktiebolaget, announces that a new American company, the International Match Corporation, has been founded. More than half the share capital, which totals 28,000,000 dollars, is to be held by Taendsticks-aktiebolaget, which, in return, is transferring to the new company the greater part of its shares in foreign match industries. The remaining capital of the American company will be employed in the purchase of match mills in various countries of South America, the Far East, and in Canada. The new company will be controlled by the Svenska Taendsticksaktiebolaget.

COMING EVENTS.

Society of Chemical Industry (Glasgow Section).—Meeting, **Friday, October 26,** at **7.15 p.m.,** at the Institution of Engineers and Shipbuilders, 39, Elmbank Crescent, Glasgow. Paper: "The Industrial Chemist," by W. E. Moodie (chairman of the Section).

Physical Society.—Meeting, **Friday, October 26,** at **5 p.m.,** at the Imperial College, South Kensington, S.W. Papers: "The Fine Structure of Some Sodium Salts of the Fatty Acids in Soap Curds," by S. H. Piper and E. N. Grindley; "X-ray Analysis of Solid Solutions," by Dr. E. A. Owen and G. D. Preston; "Cohesion," by Dr. H. Chatley.

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, October 26,** at **7 p.m.,** at 36, George Street.

British Association of Chemists.—Annual meeting, **Saturday, October 27,** at **3 p.m.,** at the University, Bournbrook, Birmingham. Annual dinner at Queen's Hotel, at **6.30 p.m.**

Hull Chemical and Engineering Society.—Meeting, **Tuesday, October 30,** at **7.45 p.m.,** at the Hull Photographic Society's Rooms, Grey Street. Paper: "British-made Dyes for Paints and Distempers," by G. B. Shaw.

Society of Chemical Industry.—Joint Societies' dinner, on **Wednesday, October 31,** at **7.30 p.m.,** at Hotel Victoria, Northumberland Avenue, W.C. 2. Application for tickets (limited to 300) to be made to the General Secretary of the Society of Chemical Industry.

Society of Chemical Industry (Newcastle-on-Tyne Section).—Meeting, **Wednesday, October 31,** at **7.30 p.m.,** at Armstrong College. Paper, "Milk," by H. R. Whitehead.

Society of Chemical Industry (Bristol Section).—Meeting, **Thursday, November 1,** at **7.30 p.m.,** at the University, Woodland Road. Paper: "Some Aspects of the Paint Trade: Fine-colour and Lake Making," by A. H. Bridges.

Society of Chemical Industry (Manchester Section).—Joint meeting, **Friday, November 2,** at **7 p.m.,** at the Textile Institute, St. Mary's Parsonage. Address: "Electrometric Methods in Analytical Chemistry," by Professor W. D. Treadwell, of Zurich.

LEGAL INTELLIGENCE.

ARBITRATION IN THE CHEMICAL TRADE.

Scrimaglio v. Thornett and Fehr.

In the Commercial Court of the King's Bench, on Wednesday, Mr. Justice Greer commenced the hearing of an action brought by Messrs. Scrimaglio, merchants, of Genoa, against Messrs. Thornett and Fehr, of Leadenhall Street, E.C., which arouse out of a tallow contract and a soda ash deal.

Mr. Jowett, for the defendants, stated that the onus was upon him, as the Court had to try a preliminary point, as plaintiff's claim for £392. overpayment in respect of certain packages of vegetable tallow was admitted, subject to defendant's counter claim which arose upon two contracts by which plaintiff agreed to purchase from defendants 200 tons of soda ash, c.i.f. Genoa. Defendants alleged that the plaintiffs had committed a breach of the agreement by refusing to take up shipping documents that were tendered. In accordance with the terms of the contract, plaintiff's liability in respect of his repudiation was referred to arbitration. Defendants appointed Mr. Charles Mangold as their arbitrator, and, no arbitrator having been appointed by the plaintiff, Mr. Mangold heard the arbitration and awarded the defendants £4,800. damages against the plaintiff. Defendants now claimed this sum. Plaintiff's reply was a denial of liability for repudiation, saying that the only arbitration contemplated was an arbitration in London in the usual way and under the Arbitration Act, which meant by an arbitrator appointed by the Court. It was further said by plaintiff there was no concurrence in the appointment of Mr. Mangold, who had no power to make an award which was bad on its face. Plaintiff further said that arbitration in the usual way in London meant arbitration according to the rules of the British Chemical Trade Association, which meant that the arbitrator was appointed in accordance with their rules. Mr. Justice McCardie had ordered the issue whether Mangold's award was valid to be tried first. Defendant's case was that the habitual rule in the trade was by two arbitrators and an umpire. The British Chemical Trade Association's system was a reasonable one, and if one side failed to appoint an arbitrator, the other side might apply to the committee to appoint an arbitrator to fill the vacancy.

Mr. Emile Fehr, of great experience in the trade, and who said he had acted as arbitrator in thousands of cases, stated that he was a member of the defendant firm. The custom was to appoint two arbitrators and an umpire if the former disagreed.

Mr. Chas. Mangold, who acted as arbitrator in the present case, and is a chemical merchant of Mincing Lane, gave similar evidence, and the hearing was adjourned.

OXIDE, LTD.

A meeting of the creditors of the above was held on October 16. A statement of affairs was presented by the liquidator, Mr. R. Carpenter, which disclosed liabilities of £2,851. 16s. 2d., all due to unsecured creditors. There were also secured creditors, who were the debenture holders, for £500. and interest accrued £7. 4s. 8d. The assets were estimated to realise £1,181. 9s. 5d. After allowing for preferential claims of £8. 3s. 9d., and debenture holders' claim of £507. 4s. 8d., the net assets amounted to £666. 1s., or a deficiency as regarded the unsecured creditors of £2,185. 15s. 2d. The share capital issued and paid up consisted of 2,500 6 per cent. preference shares of £1. each and 2,500 ordinary shares of £1. each, so that the total deficiency as regarded the shareholders was £7,185. 15s. 2d. It was eventually decided to confirm the appointment of Mr. Carpenter as liquidator, with a committee of inspection.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN SEPTEMBER.

(Concluded from page 466.)

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of Sept., 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended September 30.			Value. Month ended September 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Gums and Resins:						
Arabic and Tragacanth ..... cwts.	4,642	3,765	13,934	22,386	15,848	41,784
Kauri ..... ,,	635	2,473	2,845	2,452	12,574	10,463
Rosin..... ,,	93,646	106,219	123,307	68,969	78,258	77,906
Shellac, Seedlac, and Sticklac ... ,,	7,665	8,844	2,982	113,892	120,827	40,341
Oils, Fats and Greases:						
Animal (except Marine Animal): Not Refined Tallow:						
From France .... tons	—	—	—	—	—	—
,, China ..... ,,	—	—	—	—	—	—
,, U.S.A. .... ,,	122	70	553	4,320	2,756	21,095
,, Uruguay .. ,,	286	10	—	10,668	410	—
,, Argentine Republic ,,	1,824	935	376	72,009	35,567	14,222
,, Australia .. ,,	443	2,203	514	19,145	80,319	21,022
,, New Zealand ,,	2,018	1,490	800	76,510	53,894	31,573
,, Other Countries ,,	124	101	385	4,803	4,452	14920
Total ..... ,,	4,817	4,809	2,628	187,455	177,398	102,832
Fish (and Marine Animal)..... ,,	963	3,209	3,426	39,374	111,560	137,400
Mineral, Crude Petroleum..... galls.	11 166 374	137 94 239	35 995 347	186,041	173,649	590,197
Vegetable, other than Essential:						
Castor Oil ..... tons	28	388	509	1,725	18,007	25,087
Coconut Oil, Unrefined ..... ,,	3,011	2,946	2,312	155,692	112,109	105,057
Cotton-seed Oil, Unrefined ..... ,,	210	185	79	7,496	10,183	2,756
Linseed Oil .... ,,	14	70	17	454	2,778	769
Olive Oil, Unrefined ..... ,,	265	54	80	19,085	3,611	5,006
Palm Oil, Unrefined ..... ,,	4,791	6,367	7,200	175,502	202,776	251,917
Palm Kernel Oil, Unrefined ..... ,,	28	—	—	1,388	—	—
Rape-seed Oil ... ,,	108	105	7	6,018	4,554	351
Soya Bean Oil .. ,,	3,249	1,154	1,083	111,755	45,114	37,360
All other Sorts .. ,,	1,523	231	813	85,017	9,899	49,984
Soap Stock ..... ,,	—	95	34	—	2,441	903
Stearine:						
From Belgium .. ,,	65	26	60	4,173	1,435	3,111
,, Other Countries ,,	586	170	335	35,979	8,253	15,732
Total ..... ,,	651	196	395	40,152	9,688	18,843
Bones for Manure tons	644	268	443	6,175	1,683	2,605
Tanning Substances, not elsewhere specified:						
Barks for Tanning cwts.	7,533	99,796	19,946	3,930	47,908	8,589
Sumach ..... ,,	3,945	5,836	4,506	2,836	3,780	3,718
Gambier ..... ,,	7,187	5,182	4,180	11,300	8,544	8,580
Myrobalans ..... ,,	21,483	56,095	40,205	7,886	21,381	16,304
Valonia ..... ,,	5,089	6,379	4,045	3,009	3,210	2,390
Other Sorts ..... ,,	500	2,328	3,265	325	1,650	1,951
Boron Minerals (including Borate of Lime, Borate of Magnesia, and Boracite ... tons	295	2,729	259	3,778	52,160	3,951
Fertilisers:						
Guano, Raw .... ,,	65	438	—	975	4,380	—
Phosphate of Lime and Rock Phosphate ..... ,,	42,249	44,856	32,373	171,606	101,359	52,995
Sulphur, Crude . ,,	—	1,377	9,861	—	5,536	38,365
Fertilisers, not elsewhere specified:						
Basic Slag..... tons	5,824	10,039	7,542	27,138	36,235	22,616
Gelatine, Glue, and Size..... cwts.	7,408	7,842	11,488	39,758	45,570	43,575

Articles.	Quantities. Month ended September 30.			Value. Month ended September 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
Starch, Dextrine, Farina, and Potato Flour:						
Rice Starch ..... cwts.	9,281	7,309	9,483	15,939	11,480	12,524
Other kinds of Starch ..... ,,	132,431	123,942	146,300	108,893	85,034	104,064
Dextrine, and Farina or Potato Flour cwts.	47,667	26,808	53,817	58,148	31,075	39,277
Total ..... ,,	189,379	158,059	209,600	182,980	127,589	155,865
Copper Ore (including Regulus, Matte, Precipitate, Cement, Copper, and Scale):						
From Portugal... tons	—	—	—	—	—	—
,, Spain ..... ,,	3,351	1,392	—	206,504	73,294	—
,, Mexico ... ,,	—	—	—	—	—	—
,, Peru ..... ,,	54	—	—	1,925	—	—
,, Chile ..... ,,	34	—	262	976	—	5,520
,, Cape of Good Hope ... ,,	—	47	—	—	686	—
,, Australia .. ,,	—	—	—	—	—	—
,, Other Countries ,,	5,076	8,016	3,897	299,135	180,818	178,556
Total ..... ,,	8,515	9,455	4,159	508,540	254,798	184,076
Iron Pyrites (including Cupreous Pyrites) tons	19,520	27,148	15,260	49,436	63,860	38,421
Manganese Ore . ,,	3,731	49,437	36,709	24,481	147,834	127,210
Silver Ore, including the value of the Silver contained in Argentiferous Ores and Metals ..... val.	—	—	—	86,542	28,124	24,458
Tin Ore and Concentrates:						
From S. America. tons	1,964	2,604	1,042	166,517	198,509	116,146
,, Brit. South Africa ... ,,	—	46	—	—	3,178	—
,, Other Countries ,,	356	578	606	31,434	51,175	69,169
Total ..... ,,	2,320	3,228	1,648	197,951	252,862	185,315
Lead, Pig and Sheet:						
From Spain ..... tons	4,708	4,834	2,518	106,632	118,508	62,251
,, U.S.A. .... ,,	2,409	500	8,851	55,237	12,325	214,949
,, Mexico ... ,,	—	—	2,305	—	—	56,093
,, Australia .. ,,	2,013	7,945	7,095	46,835	191,033	179,778
,, Other Countries ,,	2,824	3,751	3,891	66,046	92,928	99,565
Total ..... ,,	11,954	17,030	24,660	274,750	414,794	612,636
Mercury ..... lb.	7,800	90,251	44,459	1,470	14,155	5,824
Tin: Blocks, Ingots, Bars and Slabs:						
From Straits Settlements and Federated Malay States .. tons	1,092	970	597	169,905	159,406	122,169
From Australia .. ,,	10	100	40	1,660	16,100	8,012
,, Other Countries ,,	872	663	5	137,377	106,645	1,114
Total ..... ,,	1,974	1,733	642	308,942	282,151	131,295
Zinc, Crude (*i.e.*, Cakes Slabs, Blocks, etc.) tons	4,480	7,308	10,050	112,375	208,384	312,710
Manufactures, not elsewhere specified (including Rolled Sheets, Plates, and Discs) tons	1,892	943	1,069	56,952	34,983	40,865

Celadonite from India.—The London Chamber of Commerce have been advised by the Imperial Mineral Resources Bureau, 2, Queen Anne's Gate Buildings, Dartmouth Street, London, S.W. 1, that they have received a sample of green earth (celadonite) from India which may be of interest to paint manufacturers. Any interested firms are invited to apply to the Imperial Mineral Resources Bureau for further particulars.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN SEPTEMBER.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month of September, 1923, compared with 1921 and 1922. As from April 1, 1923, the export trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended September 30.			Value. Month ended September 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):						
ACIDS:						
Sulphuric ..... cwts.	1,497	1,020	2,983	2,858	2,423	3,611
Tartaric (including Tartrates not elsewhere specified) ..... ,,	565	757	2,003	5,458	5,415	12,676
AMMONIUM COMPOUNDS:						
Chloride ..... tons	294	775	402	12,140	30,554	12,119
Sulphate—						
To France..... ,,	2,796	3,803	3,727	36,360	63,472	54,304
,, Spain and Canaries .... ,,	382	6,781	5,821	5,450	114,877	82,516
,, Italy ..... ,,	—	205	75	—	3,419	1,177
,, Dutch East Indies ..... ,,	7,167	149	700	122,807	2,021	10,594
,, Japan ..... ,,	750	—	9,571	9,313	—	155,221
,, British West India Islands (including Bahamas) and British Guiana ,,	4	441	680	55	7,593	10,809
,, Other C'ntries ,,	1,163	3,494	3,284	16,619	58,011	51,194
Total ..... ,,	12,262	14,873	23,858	190,604	249,393	365,815
BLEACHING POWDER cwts.	6,092	24,376	28,028	5,711	18,625	15,268
COAL TAR PRODUCTS, not elsewhere specified:						
Anthracene..... cwts.	—	—	1,000	—	—	486
Benzol and Toluol galls.	2,192	4,048	142,603	315	687	13,531
Carbolic Acid ... cwts.	5,160	19,907	12,656	12,526	36,829	42,225
Naphtha ..... galls.	7,101	1,446	14,583	951	212	1,162
Naphthalene .... cwts.	3,594	3,800	18,122	3,720	2,177	12,292
Tar Oil, Creosote, etc. ..... galls.	72,363	3,701,914	4,580,427	7,400	95,502	171,196
Other Sorts ..... cwts.	17,771	31,028	22,405	10,911	14,635	18,878
Total ..... val.	—	—	—	35,823	150,042	259,770
COPPER, Sulphate of ..... tons	187	554	116	5,637	14,780	3,091
DISINFECTANTS Insecticides, Weed-killers and Sheep and Cattle Dressings except Tobacco Offal, containing no Dutiable Ingred'nt cwts.	20,697	22,903	43,273	61,074	60,122	113,864
GLYCERINE—						
Crude ..... cwts.	—	266	17,724	—	958	43,779
Distilled ..... ,,	514	8,408	8,195	3,347	33,957	33,523
Total ..... ,,	514	8,674	25,919	3,347	34,915	77,302
POTASSIUM COMPOUNDS:						
Chromate and Bichromate ..... cwts.	915	1,153	3,604	3,262	3,330	9,092
Nitrate (Saltpetre)						
British prepared ,,	1,076	881	882	2,601	1,972	1,840
Other Sorts ..... ,,	4,032	1,754	3,171	11,927	14,726	21,089
Total ..... ,,	6,023	3,788	7,657	17,790	20,028	32,021
SODIUM COMPOUNDS:						
Carbonate (including Soda Crystals, Soda Ash, and Bi-carbonate) .. cwts.	325,169	461,227	473,801	127,667	130,432	122,835
Caustic ..... ,,	55,991	120,791	116,180	67,089	131,350	100,785
Chromate and Bichromate ..... ,,	2,320	2,059	1,927	6,808	4,732	3,949
Sulphate, including Saltcake.... ,,	17,089	185,235	157,456	10,865	38,716	39,036
Other Sorts ..... ,,	60,468	48,099	50,719	85,528	87,191	99,892
Total ..... ,,	461,037	817,411	800,083	297,957	392,421	366,497
ZINC OXIDE ..... tons	30	209	247	1,526	7,416	10,201
CHEMICALS, all other Sorts .... val.	—	—	—	279,717	250,911	316,992
DRUGS, MEDICINES, and MEDICINAL PREPARATIONS:						
Quinine and Quinine Salts... ozs.	98,847	156,591	299,094	20,788	21,238	36,486
Opium, Dried and powdered in the United Kingdom. lb.	545	31	210	405	26	204
Other Sorts ..... val.	—	—	—	149,351	182,819	255,639
Total ..... ,,	—	—	—	170,544	204,083	292,329

Articles.	Quantities. Month ended September 30.			Value. Month ended September 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
DYES and DYESTUFFS (except Dye-woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning Products of Coal				£	£	£
Tar ..... cwts.	4,957	4,993	14,313	59,854	45,118	111,443
Other Sorts ..... ,,	4,343	4,513	7,020	9,694	7,645	9,329
Total ..... ,,	9,300	9,506	21,333	69,548	52,763	120,772
PAINTERS' COLOURS and MATERIALS not elsewhere specified:						
Barytes, Ground (including Blanc Fixe) cwts.	304	4,903	2,735	289	2,507	1,130
White Lead (Basic carbonate) ..... ,,	13,503	17,289	16,944	33,554	38,105	37,048
Paints and Colours Ground in Oil or Water ..... ,,	16,916	15,750	34,251	49,648	39,080	80,132
Paints and Enamels Prepared (including Ready-Mixed) ,,	13,103	17,085	31,536	51,755	61,498	94,103
Other Sorts ..... ,,	33,169	45,580	61,856	77,873	98,802	127,020
Total ..... ,,	76,995	100,607	147,322	213,119	239,992	339,433
CANDLES ..... cwts.	7,341	7,522	11,294	23,856	21,495	23,574
OILS, REFINED—						
*Lubricating Mixed galls.	—	10,539	51,402	—	1,746	6,898
Petroleum:						
Lubricating .... ,,	418,267	523,516	492,034	71,285	67,316	61,595
Other Sorts .... ,,	167,588	3,783,899	2,104,719	11,133	192,123	40,221
SOAP, not containing Spirit:						
Soft ..... cwts.	1,275	1,163	1,827	2,486	1,878	2,824
Hard: Household and Laundry, in bars and tablets:						
To China..... cwts	1	439	2,095	9	1,021	5,210
,, Other Foreign Countries ... ,,	21,818	22,396	30,529	55,383	50,815	58,402
,, British South Africa ..... ,,	18	303	408	94	892	740
,, British East Indies ..... ,,	27,531	25,383	24,032	62,891	53,656	47,025
,, Other British Possessions . ,,	33,451	26,077	30,520	83,959	56,179	63,528
Total ..... ,,	82,819	74,598	87,584	202,336	162,563	174,905
Toilet (including Shaving) ..... ,,	3,414	5,619	4,461	35,934	55,867	38,339
Polishing and Scouring ..... ,,	873	1,022	1,612	2,899	2,759	5,004
Soap, not elsewhere specified ,,	2,108	2,106	7,033	9,772	10,782	31,887
Total of Soap.. ,,	90,489	84,508	102,517	253,427	233,849	252,959
VARNISH ..... galls.	59,198	88,107	116,201	41,444	53,979	66,438
WAX: Paraffin Wax cwts.	22,712	7,342	20,567	29,816	8,477	19,262
OIL-SEED CAKE:						
Cotton-seed Cake tons	45	531	93	450	5,114	1,022
Linseed Cake ... ,,	24	923	374	399	11,692	4,016
Rape-seed Cake . ,,	—	—	—	—	—	—
Soya Bean Cake . ,,	—	500	1,801	—	5,501	17,212
All other Sorts .. ,,	1,840	2,106	3,969	16,557	18,231	23,535
Total ..... ,,	1,909	4,060	6,237	17,406	40,538	45,785
OILS and FATS, refined, edible—Animal (except Marine Animal), refined:						
Lard ..... tons	45	17	42	3,735	1,882	4,011
,, Imitation... ,,	14	22	39	1,016	1,206	2,253
Vegetable (other than Essential), refined:						
Coconut Oil ..... ,,	74	98	86	5,589	4,339	4,948
Cotton-seed Oil .. ,,	643	536	559	34,734	25,996	25,726
Olive Oil ..... ,,	16	3	12	2,183	936	3,488
Palm Oil ..... ,,	2	27	28	98	889	1,047
Palm Kernel Oil . ,,	75	1,249	81	5,018	46,352	2,657
All other Sorts .. ,,	991	514	979	51,252	20,571	42,877
Total ..... ,,	1,860	2,466	1,826	103,625	102,171	87,007
SALT (other than Table Salt):						
To Sweden ..... tons	758	3,591	2,135	2,531	10,521	8,201
,, U.S.A. ..... ,,	444	1,314	425	2,355	4,334	1,638
,, Nigeria ..... ,,	3,812	6,337	2,911	19,671	29,911	12,944
,, Brit. E. Indies ,,	3,378	5,771	15,452	10,155	14,046	31,167
,, Australia..... ,,	431	706	409	1,403	3,004	1,368
,, New Zealand . ,,	50	856	2,586	182	2,929	10,119
,, Canada ..... ,,	2,305	3,605	1,607	6,967	10,415	3,560
,, Other Countries ,,	4,746	4,606	4,762	15,891	15,663	13,443
Total ..... ,,	15,924	26,786	30,287	59,155	90,823	82,440

* Included in "Oils, Refined: Petroleum—Lubricating" prior to 1922

(To be concluded.)

REPORTS OF COMPANIES.

English Beet Sugar Corporation, Ltd.

The annual general meeting was held in London on Tuesday, Mr. J. C. Graham (chairman) presiding. The chairman, in moving the adoption of the report and accounts, said: Your directors have no hesitation in saying that the climate and soil of these islands having proved to be eminently suitable for the cultivation of first-class sugar beet, this new industry cannot fail to be beneficial to the country generally, and that in a short time, if carefully fostered, it will be a leading factor in that resuscitation of agricultural prosperity which is so much desired by statesmen and economists. Dealing with the general aspect of the question, I would point out that the consumer pays no more for home-produced sugar than he does for the imported article, and the quality of English sugar is better than most grades of imported sugars. It has been argued, however, that the British consumer is prejudiced as a taxpayer by reason of the loss of revenue arising from the remission of Excise duty. My reply to that is that against the non-payment of Excise duty must be set off the increased income-tax which will be paid into the National Exchequer as a result of the successful working of the beet sugar industry. And it must be remembered that not only will the farmers and the sugar companies pay income-tax on their profits, but the subsidiary industries will also pay tax on their increased earnings. For example, the railways will have more traffic, the makers of machinery and stores will receive more orders, and the suppliers of fuel, fertilisers, bags, limestone, and many other articles will have a share in the general increase of trade, and I think we may safely assume that all these people will make a profit. Nor must it be forgotten that the owners of sugar factories pay local rates and in many ways add to the prosperity of the district in which the factories are situated.

Looking at the matter from the national point of view, we must surely come to the conclusion that it is good policy in these days of agricultural depression to provide the farmer with a remunerative source of income, the labourer with employment and the trader with orders, besides which I suppose it will be admitted by all parties that it is most desirable that the country should not be dependent upon foreign supplies of sugar in time of war, should war unfortunately occur.

Electrolytic Zinc Company of Australasia, Ltd.

The gross profit for the year ended June 30, after writing £20,000. off investigational research and general development account and carrying £90,000. to reserve for depreciation, was £401,808. (against £93,841. for the preceding year, in which period the plant was only in operation for seven months). After adding £2,614., representing income from property and sundry receipts, and deducting profit and loss items, including £48,000. as provision for income taxes, the net profit was £285,406. Adding £76,593. brought forward there was an available balance of £361,999 This has been disposed of by writing off preference shares and debenture issue expenses, £74,482.; by providing for co-operative council activities at Risdon, £7,500.; by carrying to debenture sinking fund reserve, £12,640.; by carrying to equalisation reserve, £40,000.; and by the payment of dividends Nos. 1 and 3, £149,115., leaving a balance of £78,262. to be carried forward. The output was 31,283 tons electrolytic zinc; silver-lead product containing 4,344 tons lead and 691,052oz silver. The plant was completed during the year and further installations to ensure ample supplies and accumulate a reserve are being proceeded with.

North Broken Hill, Ltd.

The profit and loss account is credited with mine production, £597,215.; adjustment in respect of production previous period, £48,190.; and interest, rent, and dividends, £28,116., making a total of £673,521. Mine expenditure, £295,236.; administration, insurance, debenture interest, etc., £24,140.; provision for taxes and royalties, £49,365.; and reserve for depreciation, £20,000., are deducted, leaving £284,780. carried to appropriation account. This amount, with £30,000., the balance forward, has been appropriated thus:—Dividends Nos. 52 to 54, in all 6s. per £1. share, £180,000.; debenture sinking fund, £13,333.; appropriation for plant expenditure, £52.000., leaving a balance of £69,447. Surplus liquid assets amount to £532,454., exclusive of shares and debentures in other companies which are valued in the balance sheet at £448,525.

Nigerian Tin Corporation, Ltd.

The directors submit accounts for two years to December 31, 1922. Net loss for period amounts to £23,203., from which is deducted credit of £1,510. brought in, leaving debit balance £21,693. Included in this is £2,306. for interest in general settlement with Niger Co. and £10,626. loss on realisation of investments. Directors have written down investments by transfer of £35,878. standing to credit of reserve. Of the £40,000. of debenture stock created in March, 1922, only £23,595. has been issued.

Eastern Chemical Company, Ltd.

Result of working for year to March 31 last, after further writing down of stocks to replacement cost, and allowing for depreciation, was a loss of £10,503. Serious trade depression in India, combined with keen local competition and dumping of German chemical products at prices much below world values and cost of manufacture in India, resulted in a reduced output at company's works and smaller gross profits. Directors are unable to recommend a dividend.

Siamese Tin Syndicate, Ltd.

The net profits for 1922, after writing off £5,787. for depreciation, amounting to £26,278. (against £25,126. for 1921), while £1,964. was brought forward. The directors propose a final dividend of 5 per cent., making 15 per cent. for the year (the same), and after providing £6,000. for taxation, and £2,050. for directors' additional remuneration, there is a balance of £2,192. to be carried forward.

DIVIDENDS.

Borax Consolidated, Ltd.—Interim dividend of 1s. per share or 5 per cent., less tax, on the deferred ordinary shares in respect of the year ended September 30. Dividend for the preceding year was the same.

A. and F. Pears, Ltd.—Profit for year to June 30 last was £99,676. Dividend is proposed on the ordinary of 20 per cent., placing to reserve £5,000., making this fund £135,000., and carrying forward £16,876.

Angela Nitrate Company, Ltd.—Interim dividend of 10 per cent., or 2s. per share, less tax, payable on November 12. A year ago an interim dividend of 5 per cent., less tax, was declared.

Anglo-Chilean Nitrate and Railway Company, Ltd.—Interim dividend on account of 1923 of 1s. per preference share and 1s. per ordinary share, both free of tax, being 5 per cent. on each class (the same as a year ago), payable on November 14.

Nitrate Railways Company, Ltd.—Interim dividend at the rate of 3½ per cent.—*i.e.*, 7s. per share (less tax), payable November 15, upon the ordinary (unconverted) and the preferred converted ordinary shares. No dividend was paid at this time last year.

Pease and Partners, Ltd.—Interim dividend on ordinary of 3 per cent., free of tax, payable November 16.

Salar del Carmen Nitrate Company, Ltd.—The directors have declared an interim dividend of 5 per cent., less income-tax, on account of the profits for the current year.

Olympic Portland Cement Company, Ltd.—Interim dividend of 5 per cent., less tax, in respect of year 1923, payable November 15.

NEW COMPANIES.

Decolourising Materials, Ltd.—Private company. Capital £1,000. Office: 25, Market Street, Manchester.

Oxford Growers Supply Company, Ltd.—Private company. Capital £400. Manufacturers, suppliers, and exporters of fertilisers, etc. Address: 76, Islip Road, Oxford.

W. Craig Mitchell and Co., Ltd.—Private company. Capital £4,000. Chemical manufacturers, etc. Office: 288, Shields Road, Glasgow.

Celite Products Corporation.—Capital 25,000 dollars in 100-dollar shares. Incorporated in U.S.A., July 20, 1923. Importers and exporters of and dealers in infusorial and diatomaceous earth, etc. British address: Windsor House, Victoria Street, S.W., where J. E. Burgess is authorised to accept service.

FERTILISER NEWS.

Nitrate of Soda.—Shipments during the first half of October were rather lower than for the corresponding period of last year. Total exports amounted to 75,000 tons, of which 54,000 was destined for Europe and Egypt, 19,000 to the United States, and 2,000 to other countries. Deliveries from ports in Europe amounted to about 27,000 tons, against 20,000 tons last year. Stocks in ports on October 15, therefore, were about 210,000 tons, which, with about 175,000 tons afloat, makes the visible supply for Europe some 385,000 tons, compared with 312,000 tons at the same date in 1922. Not all the nitrate which is arriving over here has been officially sold, or, indeed, sold at all, the facilities given by the Chilean Government allowing the exportation of large quantities for storage purposes in the consuming countries. It will doubtless be found that unsold stocks will reach a much larger figure in Europe and America before the close of the present season. No new sales have been made by the Producers' Association, as is to be expected with such heavy speculative commitments already entered into by importers. There is very little activity on the Continent at the present high prices, although a leading authority says "the market has been firm, with business at a minimum, the wide fluctuations in Continental currencies having for the time being proved a deterrent to consuming buyers contracting ahead." Labour troubles in Chile are spreading at the ports, and this fact is probably the reason for the smaller shipment figures previously referred to. Strikes are said to be in operation at Iquique, Junin, and Pisagua, mainly, it is to be inferred, on the question of wages. Outside help is being sought, but the general labour shortage will doubtless compel the producers and exporters to increase their handling costs by granting the men's demands. Still another blow for this hardly-used industry! There being nothing to oppose it, however, it will be easy for the producers to raise prices to the unfortunate agriculturists in order to maintain profits. As Dr. Curtis, of the United States, has recently pointed out, the only effective opposition to the nitrate industry is the development of synthetic nitrogen production, and when this takes place the Chilean producers, backed by the Chilean Government, will be able to reduce prices to a level at which it will be very difficult to compete. So far as the United Kingdom is concerned, very little of the nitrate coming in is finding its way to the agriculturalist, owing to the relatively much cheaper sulphate of ammonia, which is in good supply.

Basic Slag and Superphosphate.—Overseas trade in basic slag during September suffered a severe setback, exports dropping from 4972 tons in August to 260 tons in September, while imports rose from 2,978 tons to 7,542 tons. This falling-off reflects the increasing depression in the iron and steel trade, which during the latter part of last year and the earlier part of the present one was in a state of comparative activity. Since May of this year some 33 furnaces have gone out of blast, and the outlook continues to be gloomy. Compared with last year, however, trade has been better on the nine months' totals, 67,536 tons being imported, against 42,264 for the same period last year; while exports amounted to 17,518 tons, compared with 6,086 tons. At the present time inquiry is very fair, and the reduction in prices on the East Coast has resulted in some attention. Exports of superphosphate are a shade better, though trade in this material is mainly on the importing side. The position here is still very difficult, and manufacturers are finding it increasingly difficult to keep on producing at prices which do not suffice to cover actual cost of production. The unstinted importation since the war, from countries where the rate of exchange allows an unfair advantage, has played havoc with the home industry. At the same time, it has to be remembered that before the war the cold breath of competition was felt from Belgium, when British manufacturers made a working arrangement with Continental producers by which the competing with lower-priced imported material was eliminated. The increasing difficulties in the maintenance of this arrangement since the war, however, led to its falling through, with the result that the only hope for the British industry appears to be a tariff on the imported foreign material. Imports of phosphate rock during September totalled 32,373 tons, compared with 31,584 tons in August, and 44,856 tons in September, 1922. Aggregate figures for the nine months were 254,455 tons in 1923, against 287,032 tons in 1922.

Radioactivity of Chilean Nitrate.—In connection with the frequently debated question of the radio-activity of Chilean sodium nitrate, it is interesting to note that F. Diaz de Rada, working at the Institute de Radiactividad at Madrid, has obtained conclusive evidence that such radio-activity exists. After a long series of carefully repeated experiments, he has concluded that every gramme of average "caliche" contains 1.28×10^{-7} milligrammes of active constituent.

SOUTH WALES NOTES.

[Specially Contributed.]

There is a steady continued improvement in the tinplate trade. Contrary to expectations, quotations have a tendency to harden, the chief factor undoubtedly being the stiffening in pig-iron prices. A fair number of orders have been received during the week and several of the factories are now assured of steady work over January next. The request for galvanised and blacksheets is good, and manufacturers are accepting orders for the first quarter of next year. There is a stronger tendency in cokes, and the outlook for the by-product ovens is much better. Sulphate of ammonia is now a very firm market with a very fair export trade. The patent-fuel industry is in a stagnant condition, the prices of pitch having an adverse effect with the situation. Quotations on the basis of £7. 5s. per ton have been firmly adhered to. Creosote remains very firm, while the naphthas are somewhat quiet. There is a better movement for tars, and that for road purposes is quoted at £1. 13s. 9d. put in owners 4-gallon cask; the crude tar is fetching £4. 7s. 9d. per ton on rail at ovens. The Van lead mines near Llanidloes which have been idle for over three years were one of the largest lead concerns in the United Kingdom. The proprietors have decided to sell the plant as "the prospect of British lead and zinc mining being revived on a remunerative basis within a reasonable time seems absolutely hopeless."

During the week, imports included 541 tons copper ore, 104 tons silver ore, and 98 tons lead ores from Arica, 5cwt. chloride of ammonia from Hamburg, 265 tons silica from Antwerp, 54 tons calcium carbide from Amsterdam, 20 tons zinc ashes from Montreal, 27 tons copper ore from Hamburg, 5 tons ferro chrome from Gothenburg to Swansea; 107cwt. zinc oxide from Antwerp, 400 gallons acetic acid from Rotterdam, 90 tons bog ore, 3 tons calcium carbide, and 5 tons gums and resins from Antwerp, 1½cwt. caustic soda, 1 ton toilet soaps, 102cwt. red lead, 60cwt. copal gum from Antwerp, and 3 tons paint compositions from Brussels to Cardiff. Included in the exports were 485 tons sulphate of ammonia to Dunkirk, 500 gallons coal tar, 26 tons naphthalene to Antwerp, and 36 tons green copperas to Montreal from Cardiff.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(Specially Contributed.)

The coal and coking trades are in a fairly satisfactory condition, and, despite the lack of normal activity in the consuming industries, the production is being wholly absorbed. Fuel for local industrial purposes is a slow trade, but the local landsale market is picking up rapidly, and is an average seasonal trade. No change respecting coke is to be reported, but it is to be noted that East Coast coke is in keener request, and the supplies to the furnaces on low-phosphorus iron are nearly 1,000 tons larger than they were a week ago. From that it may be inferred that the proposition of low-phosphorus iron being smelted has been increased. There is, however, no reason to believe that the local coke will be in any less sharper demand. There is undoubtedly a more cheerful tone in the pig-iron market, and the way in which smelters are pressing for coke supplies suggests that makers are strongly under the impression that shortly they will be compelled to put additional furnaces into blast. Everything points at the present time to a greater pressure on the coking plants in a month or two, and it is more than ever evident that the coal and coking industries are in for a busy winter. There will be little need, therefore, for Continental business. Smelters here are paying 29s. to 32s. per ton for coke, according to carbon content, and Continental users 32s. to 36s. per ton, f.o.b.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Ashby Soaps, Ltd., Derby. — Registered October 4, £12,500. deb., to R. Dobson and ano., Manchester.

British Cyanides Company, Ltd., London, E.C. — Registered October 6, deb., to Barclays Bank, Ltd., securing all moneys due or to become due to the bank.

British Oil and Fuel Conservation, Ltd., London, W.C.—Registered October 3, £2,000. (not ex.) mort., to O. Williams, Crossways, Cowbridge.

Lactine, Ltd., Yiewsley, manufacturing chemists.—Registered October 4, £5,000. debs. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £2,000.

Reliance Fuel Company, Ltd., London, E.C.—Registered October 2, £500. mort., to Mrs. M. J. Hopkin, Delfan, Coedcae, Llanelly.

Silver Springs Bleaching and Dyeing Company, Ltd., Timbersbrook.—Registered October 3, £599. 5s. mort., to North Staffordshire Permanent Economic Benefit Building Society, Newcastle-under-Lyme.

Ward (Samuel) and Co., Ltd., London, S.E., paint manufacturers.—Registered October 8, £6,000. debs.

SATISFACTION.

Mabor, Ltd. (late Magnesia Syndicate, Ltd.), London, W. —Satisfaction registered October 6, £400., registered January 23, 1920.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Caustic Lime and Macadam Company, Ltd.—Resolved September 19, confirmed October 5: That the company be voluntarily wound up. T. E. Gardner, City Chambers, Bradford, liquidator.

New Cross Glass Works, Ltd.—C. S. Steel, 34-36, Gresham Street, E.C., appointed receiver September 26.

Tarslag, Ltd.—Resolved September 19, confirmed October 4: That the company be voluntarily wound up. T. Whitehead, Tees Bridge Slag Works, Stockton-on-Tees, liquidator.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Boor, G., and Co., and D. W. Greenhough and Son (Leonard Geo. Boor and Geo. David Greenhough), 65, Fenchurch Street, E.C., chemical and mineral merchants, brokers and agents. September 30. Debts by G. D. Greenhough, who continues. (October 12.)

Buckle, Crossley and Co. (Jno. Wm. Buckle and Geo. Herbert Beanland), Victoria Dyeworks, Cemetery Road, Bradford, piece dyers and finishers. December 31, 1922. Debts by J. W. Buckle. (October 9.)

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Bradley and Bliss, 6, London Street, Reading; manufacturing chemists; £21 2s. 10d. September 4.

Daley, Saml. Fielding, 5, Gorsey Hey, Westhoughton; soap manufacturer; £34. 12s. 4d. September 12.

Hall, Harry H., Old Bent-ho., Littleborough; dyer; £14. 16s. 8d. July 27.

Hall, Mathew, 181, Queen Victoria Street, E.C. (trading as Esitol Chemical Company); £43. 17s. 4d. September 13.

Hermann and Co., Britannia Colour Works, Grimsby; colour makers; £10. 12s. 5d. September 13.

Lewis, Edwd., and Co., Orion, Pontardawe; polish manufacturers; £16. 17s. 10d. September 11.

United Laboratories and Chemical Company, Ltd., 97, Queen Victoria Street, E.C.; £14. 13s. 4d. September 11.

Wilson's Asbestos Cement, Ltd., 79, Queen Street, E.C.; £18. 1s. 10d.; September 14.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 8th to 13th (inclusive).

Filtration or Separation of Liquids. Alexander, H. M. 25,342.
Hardening Products of Condensation from Phenols and Aldehydes. Amalith Chemische Industrie Ges.; Deutsch, L.; and Thorn, I. 25,274.
Products of Condensation from Phenols and Aldehydes. Amalith Chemische Industrie Ges.; Deutsch, L.; and Thorn, I. 25,275 and 25,276.
Material for Treatment of Oils. Bibra, C. J. von; and Prutzmann, P. W. 25,005.
Centrifugal Filters and Separators. Bishop, C. A.; and Lilleshall Co., Ltd. 25,093.
Solders for Aluminium. Brook, F. E.; and Were, E. J. 25,313.
Apparatus for Electrolysis of Water. Casale, L. 25,279.
Obtaining a Deposition of Chromium by Electrolysis. Coignard, A. J. 25,584.
Hydrogenation of Naphthalene. Coke, B. E.; and Maxted, E. B. 25,312.
Purifying Manganese Ores. Dutt, W. 24,968.
Centrifugal Separators. Empson, A. W. 25,587.
Condensation Products of the Anthraquinone Series. Farbwerke vorm. Meister, Lucius, and Brüning. 25,482.
Mono-azo Dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning. 25,483.
Apparatus for Estimating Hydration and Progress of Beating in Paper Pulp. Hargreaves, H. 25,537.
Emulsions of Bismuth Salts. Hoffmann-La Roche & Co., Akt.-Ges., F. 25,478.
Mixing Materials with Rubber Latex. Hopkinson, E. 25,026.
Cellulose Acetate. Levy, L. A. 25,254.
Emulsifying Apparatus. Morris, E. E. 25,334 and 25,335.
Mercurial Phenols. Saccharin-Fabrik Akt.-Ges. vorm. Fahlberg, List, and Co.; and Kluges, A. 25,299.
Explosives. Scott, A. C. 25,140.
Reduction of Slag. Soc. Anon. des Chaux et Ciments de Lefarge et due Teil. 25,360.
Naphthalene Derivatives and Dyestuffs Therefrom. Soc. of Chemical Industry in Basle. 25,043.
Titanium Compounds. Spence and Sons, Ltd., P.; Spence, H.; and Llewellyn, W. B. 25,328 and 25,329.
Soap. Wake, G. R. 24,962.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.

1922.

Cellulose Derivatives. Lilienfeld, Dr. L. 9,465. **177,809** and **177,810**
Artificial Resins and Oleoresins. Wuyts, H. 17,956. **204,754**
Solutions of Cellulose Esters. Nitrogen Corporation. 18,150. **189,416**
Waterproofing Cellulose. Moeller, Dr. F. 21,049. **184,462**
Separation of Proteins and Lactose from Whey. Adeane, C. R. W.; Whetham, W. C. D.; and Harding, L. 23,121. **204,847**
Chromium Oxide from Chrome Iron Ore. Mond, A. L. (*Chemische Fabrik Griesheim-Elektron*). 25,720. **204,886**
Vulcanisation of Rubber. Skellon, H.; Roberts, T. H.; and Clarke, H. B. R. 27,114. **204,902**
Capillary Process of Transferring Liquids Applicable to Chemical Reactions, Photography, Dyeing, Tannery, and the Like. 33,331. **190,148**
Recovering the Solvents Used in the Extraction of Oil and Fatty Bodies. Soc. Générale d'Evaporation Procédés Prache et Bouillon. 33,790. **190,174**
Treatment of Coal Tar. Richards, W. E. W.; and Siluminite Insulator Co., Ltd. 34,642. **204,976**

1923.

Explosives with Liquefied Gases. De Wendel et Cie, Les Petits Fils de F. 1,040. **192,063**
Lecithin from Vegetable Matters. Bollmann, H. 4,707. **205,011**
Reduction of Dioxyperylene. Pereira, H. 15,642. **199,401**
Dinitro Perylene Quinone. Pereira, H. 15,643. **199,720**
Cellulose Derivatives. Lilienfeld, Dr. L. 22,160. **203,346** and **203,347**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Heavy and Light Magnesia Hydrate. Monterumici, R. 24,477. **205,078**
Silicic Acid Gels. Farbenfabriken vorm. F. Bayer and Co. 24,495. **205,081**
Pure Table Salt. Angel, E. G. R. 24,911. **205,103**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Electrolytic Cells. J. P. Scott, Toronto, Canada. British Patent, **202,882,** of 1922.

A gas-generator comprises an anolyte and container 27, Fig. 2, to which all the anode compartments of the cells are separately connected so as to allow a free circulation of electrolyte, maintained by the evolution of gas, within the structure; the cathode compartments are similarly connected to a catholyte container 28. The cells comprise partitions 10 and diaphragms 13 separated by and insulated from frames 14, members 75 running the whole width of the frames, and two rows of rings 29, 30, apertures in the partitions and diaphragms registering with others in the members 75 and with the rings 29, 30 to form ducts (which are made water-tight by washers). A number of superposed layers or inter-woven plies 24 of wire mesh are clamped by bolts 26 to frames 25 on either side of the partitions 10 to constitute bipolar

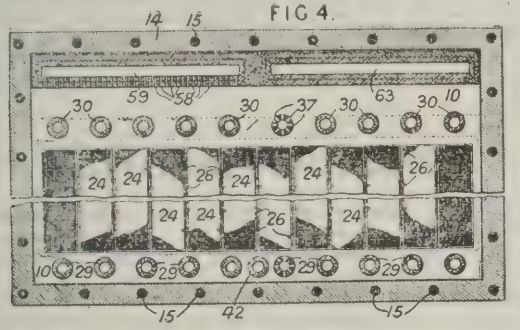

FIG 4.

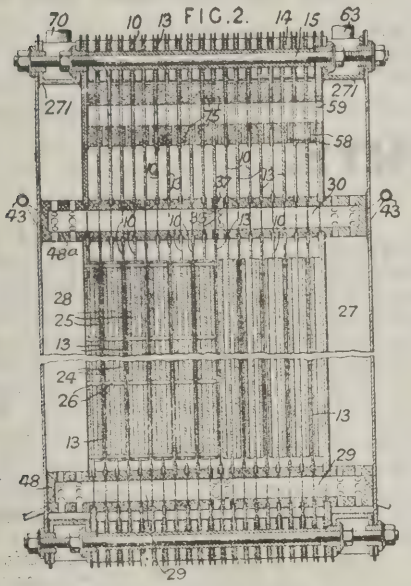

FIG.2.

electrodes. As shown in Fig. 4, the members 75 form a gas-duct 59 connected by passages 58 with the anode compartment of each cell, and a gas-duct 63 connected with the cathode compartments. Each of the ducts formed by the rings 29, 30 is divided by a partition 36 into two parts connected by passages 37 with the anode and cathode compartments. Each of the ducts formed by the rings 29, 30 is divided by a partition 36 into two parts connected by passages 37 with the anode and cathode compartments respectively of one cell only by passages in terminal rings 48, 48a and with the anolyte and catholyte chambers. The chambers 27, 28 are connected at the bottom by a duct 42. All surfaces in contact with the electrolyte except the electrodes are of insulating material. The diaphragms are preferably of pure asbestos cloth densely woven, and their edges may be impregnated with vulcanised soft rubber. The outer walls of the end cells are separated from the outer walls of the chambers 27, 28 by channel frames 271. The whole apparatus is secured together by insulated bolts 15. The gases are withdrawn by pipes 63, 70. The apparatus may be cooled by water-sprays 43. An installation may consist of several units as above described mounted on rails with intervening spaces and connected with common gas mains and electrolyte supply tanks; the units are connected in series.

Washable and Fireproof Paper. Hydroloid, Ltd., Westminster. (Exportingenieure für Papier und Zellstofftechnik Ges., Berlin.) British Patents **202,883** and **202,884,** of 1922.

A washable paper for maps, charts, wall-paper, cheques, etc., is obtained by impregnating raw paper with sizing-material by first passing it through a bath containing animal size, casein, etc., and then pressing the solution into the paper by means of rollers, the paper being hardened by means of alum, etc., applied with the size or subsequently.—A washable paper obtained as described above is rendered fireproof by passing it through a bath containing a solution of ammonium phosphate, ammonium sulphate, or zinc chloride. Specification 169,676 is referred to.

Rapid Manufacture of Soaps. A. Welter, Krefeld, Rheinhafen, Germany British Patent, **202,710,** of 1922.

Soaps are made in from 5 to 60 minutes by mixing fatty acids at a temperature a little above their melting points with approximately but no more than double the weight of calcined soda necessary for complete saponification, and allowing the mass to stand, whereby only bicarbonate of soda and more or less anhydrous soaps result. The mass may be extruded while pasty, or may be cooled and ground, and the powder may be compressed into cakes or briquettes. Part, say 20 per cent., of the soda may be replaced by potash, and up to 20 per cent. of the fatty acid by resin, and the soda must not contain more than 30 per cent. of water. A solvent such as turpentine, carbon tetrachloride, or benzol or its homologues may be mixed with the fatty acid. In an example 1,000 kilos. of molten distilled fatty acids of cotton-seed oil having an acidity number of 202 are mixed with 50 kilos. of turpentine oil and agitated with 400 kilos. of calcined soda at 30° C. In other examples olein, palm oil, fatty acid, and coconut oil fatty acid, are treated at 30-35° C

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Aromatic Sulphonic Acids. Rheinische Kampfer-Fabrik Ges., Dusseldorf, Germany. British Patent, **202,975.** Convention date, Aug. 23, 1922.

Aromatic sulphonic acids having halogens in the aromatic nucleus have their halogen atoms replaced by hydrogen atoms by treatment with hydrogen in aqueous alkaline solution in the presence of a hydrogenising catalyst. The aromatic nucleus may be benzene, naphthalene, anthracene, etc., and other groups, such as alkyl, hydroxy, nitro and amino groups, may be present therein. The hydrogen may or may not be under pressure, and temperatures of 20-300° C. are employed. Suitable catalysts are nickel, cobalt, copper, platinum and palladium, and the metal may be deposited in colloidal form on carriers such as kieselguhr or calcium carbonate. For producing the alkaline solution, hydroxides or carbonates of the alkali or alkaline earth metals are used. Examples are given of the dehalogenation of *p*-brombenzene sulphonic acid, 2-chlor-*p*-cymene-3-sulphonic acid and 2-brom-*p*-cymene-3-sulphonic acid using a nickel catalyst and hydrogen under a pressure of 10-30 atmospheres and of the dehalogenation of 2-brom-*p*-cymene-3-sulphuric acid by treatment with hydrogen at ordinary pressure for several days in presence of a nickel catalyst.

Preparation of Stable Persalts. F. Noll, Düsseldorf, Germany. British Patent, **202,985.** Convention date, August 28, 1922.

The materials, such as sodium carbonate or hydroxide, borax, etc., from which persalts are to be prepared are first treated with a reagent to remove any metal compound which might act catalytically upon the finished product so as to cause liberation of oxygen. The reagent is allowed to act for a sufficient time, such as several days, to ensure that the impurity, which may be in colloidal solution, shall precipitate, and the precipitate is removed by filtration. The reagents mentioned as suitable are alkali monosilicates and disilicates. In the examples a solution of borax and caustic soda is treated with sodium disilicate and allowed to stand

for two or three days at 30-35° C. The filtered solution is cooled to 0-5° C. and hydrogen peroxide is added, the perborate being precipitated; and sodium carbonate solution is purified in a similar manner, filtered, and treated with hydrogen peroxide at 0-5° C. for the production of the percarbonate. Persalts prepared in this manner are stable and do not need the addition of protective substances.

Reducing Iron Oxides. G. Constant, and A. Bruzac, Paris. British Patent, **202,970.** Convention date, August 22, 1922.

Oxides, particularly iron oxide, are reduced by passing a charge of reducing gas into contact with the oxide in a reducing chamber, passing the residual gas into contact with carbon to transform the contained carbon dioxide into carbon monoxide, and passing the regenerated gas again into the reducing chamber, and so on, so that the proportion of carbon monoxide in the gas progressively increases, excess being removed from time to time. In a plant illustrated, the initial charge of gas is obtained from a producer and is passed to a reducing chamber, the residual gas being passed through a cooler, blower, and valve to the producer. The producer is blown at intervals, a holder being interposed in the passage to the reducing chamber to provide continuity during the times when the producer is cut out for blowing. Excess gas is led off through a suitable pipe. Two producers may be used to ensure continuity of reduction, one of the producers being blown while the other is regenerating the gas.

Pumps for Acids. E. A. Gaillard, Barcelona, Spain. British Patent, **202,316.** Convention date, August 12, 1922.

A pump for acids and other liquids has a number of grooves, slots, or recesses on the periphery of the piston or on the inner surface of the cylinder, cut preferably at an angle of 45 degrees to the surface with the openings downwards. One of the upper grooves in the cylinder may have an overflow connection to the suction tank, and the upper end of the cylinder may be flared and provided with an aperture connecting it to the tank.

Resinous Compositions. Consortium für Elektrochemische Industrie Ges., Munich, Germany. British Patent, **201,916.** Convention date, August 7, 1922.

Natural and artificial resins are improved by the addition of organic compounds containing hydroxyl or carbonyl groups, or derivatives of such compounds. Suitable substances are dioxystearic acid, ricinoleic acid, salicylic acid, castor oil, phenol, mesityl oxide, phorone, dioxyabietic acid, etc. They may be incorporated with the resin by the aid of solvents, heat, or pressure. The resin may be hardened by esterification, by the addition of metallic compounds, such as aluminium oxide, or by thermal treatment either before or after the incorporation of the additional substances.

Fireproofing Compositions. A. Eichengrün, Berlin. British Patent, **202,302.** Convention date, August 10, 1922.

A solution of ammonium bromide and an "easily volatilisable" substance such as an ammonium salt of phosphoric, boric, etc., acids, is used as a fireproofing-agent. Materials impregnated with these compounds are placed on or near fires to be extinguished. Hygroscopic substances such as glycerine, glucose, lactic acid, etc., may be added to the solution.

PUBLICATIONS RECEIVED.

International Review of the Science and Practice of Agriculture.—New Series, Vol. 1., No. 3 (July-September, 1923). The quarterly publication of the International Institute of Agriculture at Rome. Price 4s., post free.

Kurzes Lehrbuch der Chemie.—By Professor Carl Oppenheimer, with a preliminary section on general chemistry by Professor Johann Matula, of Vienna. 1923: Leipsig: Verlag Georg Thieme; paper backs, 862 pages, price 25s. (bound 29s.).

Report of the Oxygen Research Committee.—Published for the Department of Scientific and Industrial Research. London: H.M. Stationery Office; price 8s. 6d. net.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Prices are being maintained fairly well in this market, and there are isolated instances of prices hardening, which is due to the prevailing state of affairs in Germany. The question of continued supplies from this source is now a matter of doubt. **Acetic Acid,** 80% pure, about £48.; 80% technical, about £47.; 98% glacial, about £60. in casks and £72. in glass demijohns, ex wharf London; prices on spot are rather easy at the values quoted, but the Continental position points to higher prices before long. **Acetone,** British Government specification, about £124. per ton, in drums; this market keeps very steady, with inquiry good. **Alum,** lump, in casks, about £10. to £10. 10s. per ton, on spot; dealers are offering at these rates, but little business is being done. **Arsenic,** Cornish, white powdered, spot, about £61. 10s.; f.o.r. Cornwall, about £58. per ton; prices are being maintained, and inquiry for export has been good, but actual business is poor; the tone of the market is unsteady. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. to 1s. 6d.; a fair amount of business has been on the market, with quoted prices steady. **Bleaching Powder,** 35—37%, on spot, about £10. to £10. 10s. per ton; dealers are quoting at these rates with not much inquiry. **Barium Chloride,** 98—100%, about £15. per ton; this market remains dull, but prices are steady. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices for home trade keep steady at these rates; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered at £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers' prices for home trade, packages free, carriage paid, are unchanged. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices, for home trade only, are level on the week; dealers are offering some grades at competitive prices. **Citric Acid,** B.P. crystals, about 1s. 4d. per lb., less 5%, nominal; hardly any demand; this market is very weak. **Cream of Tartar,** 99—100%, about 85s. per cwt.; the market is much steadier this week, and tends to harden a little. **Epsom Salts,** commercial crystals, about £4. 10s. per ton, in bags; dealers offering at about this figure find business slow and small. **Formaldehyde,** 40% volume, about £62. to £63. per ton; importers seem to be cutting the market for the limited business about; the market seems likely to be held up, and may perhaps harden. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; inquiry from dealers offering at about this rate is not good. **Lead Acetate,** brown, about £41. 10s.; white, about £42. 10s. per ton; this market is a shade firmer this week, and may advance further. **Litharge,** imported, about £35. 10s. per ton; dealers are doing a little business at about this figure. **Lithopone,** 30% Continental red seal, about £22. 10s. to £23. per ton; the spot position is now very firm, and higher prices are expected. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; imported material is offered on spot at these prices, which may advance. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers' prices are unchanged. **Oxalic Acid,**

6d. per lb.; this market continues on the quiet side, and prices as quoted are none too firm. **Carbonate of Potash,** 90—92%, £26. to £27.; 96—98%, about £29. per ton; this market is holding very well, and is likely to harden before long. **Chlorate of Potash,** crystals and granular, about 2¾d. per lb.; dealers quoted rates show no change; inquiry poor. **Caustic Potash,** 88—92%, about £31. to £32. per ton; the movement in prices is likely to be upwards here; spot stocks are not large. **Permanganate of Potash,** commercial quality, about 9d. per lb.; at this level the market keeps steady, with occasional business being done. **Prussiate of Potash,** yellow, about 10½d. per lb.; dealers have made a further reduction in prices; market still dull and weak. **Sulphate of Potash,** 90%, about £11. per ton, ex ship; this market shows no change on the week. **Mercury,** about £9. 10s. to £9. 15s. per bottle of 75—76lb., net; the spot position remains dull, and prices are rather unsteady. **Red Lead,** imported, about £35. 10s. per ton; dealers quoting at this price find business poor. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £43.; fine white, about £25. to £26. per ton; holders of spot supplies are firm at these prices, and the market is likely to advance. **Saltcake,** ground and unground, home trade, about £4. 10s. per ton; prices for export are somewhat dearer; the market keeps very steady. **Acetate of Soda,** about £24. 15s. per ton, on spot; a few parcels are available, with not much inquiry about. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton; in drums, ex wharf shipping port; dealers' prices are kept up to these levels, with business showing no improvement. British makers' prices to home consumers on contract are at: 70—72%, £17. 17s. 6d.; 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags, carriage paid to destination; British makers continue to quote for home trade only at this price. **Bichromate of Soda,** home trade, 4½d. per lb.; British makers' prices are kept at this old level. **Cyanide of Soda,** export, about 8d. to 8½d. per lb.; British makers' prices are quoted, and are unchanged. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in bags, carriage paid to any station in Great Britain; British makers' quote at this price, for home trade only. **Hyposulphite of Soda,** pea crystals, about £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £10. to £10. 5s. per ton, in casks; spot prices show an advance here, and the market holds firm. **Nitrate of Soda,** about £13. 5s. per ton, f.o.r. or f.o.b.; the position is unchanged on the week. **Nitrite of Soda,** 100%, about £26. 10s. to £27. per ton; this item is inclined to be a little firmer. **Prussiate of Soda,** about 5½d. per lb.; the market quotation is at this lower figure, with but the limited business passing. **Sodium Sulphide,** 60—62% solid, about £14. per ton; broken, about £15. per ton; 60—68% concentrated, about £14. per ton, in casks; dealers' prices are steady, with the market quiet. **Tin Crystals,** about 1s. 4d. per lb.; unchanged on the week. **Tartaric Acid,** B.P. crystals, about 1s. 1½d. per lb., less 5%; this is the market quotation, but any sales would be at a much lower figure for spot goods available. **White Lead,** imported, about £42. per ton; dealers offering imported material at about this figure, with occasional business about. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers continue to quote at about these prices.

Pharmaceutical Chemicals.—The general hardening in the spot position commented upon some weeks ago continues. The many advances in spot prices recorded this week are all due to the critical state of affairs in Germany, where supplies are either much dearer or are unobtainable. **Acetanilid,** crystals and powder, 1s. 11d. to 2s. per lb.; spot holders are quoting at these much higher figures, and are in no hurry to clear. **Acetyl-Salicylic Acid,** B.P., 3s. 1½d. to 3s. 2d. per lb.; a further advance in spot prices is recorded, and this movement may continue. **Benzoic Acid,** B.P., 2s. 4d. to 2s. 6d. per lb.; owing to scarcity of inquiry, these prices are more or less nominal. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. per ton; spot supplies are offered at this price, with the demand poor. **Salicylic Acid,** B.P., 2s. 3d. to 2s. 4d. per lb.; at these rates the spot position is very firm, and may advance before long. **Tannic Acid,** leviss, 3s. 4d. to 3s. 6d. per lb.; this market keeps a very steady tone, with a fair volume of business being done. **Amidopyrin,** about 14s. 6d. per lb; dealers are holding firm at this rate; inquiry is small. **Ammonium Bromide,** B.P., 7¼d. to 7½d. per lb.; this market continues to improve, although business is rather slow. **Benzonaphthol,** about 5s. per lb., nominal; the market has been idle. **Betanaphthol,** resublimed, 1s. 11d. to 2s. per lb.; inquiry remains poor, but prices are rather firmer on spot. **Benzaldehyde 03,** about 3s. per lb.; at this old figure the spot position keeps quite steady. **Calcium Lactate,** 1s. 9d. per lb.; dealers are quoting at about this figure, with not much doing. **Chloral Hydrate,** duty paid, 4s. 2d. to 4s. 3d. per lb.; the spot price has hardened, and may advance still further. **Creosote,** B.P., about 2s. 6d. per lb.; the spot position keeps very steady at this price. **Creosote Carbonate,** about 8s. 6d. per lb.; dealers' prices are maintained at this price, with business lacking. **Guaiacol Carbonate,** about 10s. 9d. to 11s. per lb.; a further material advance is recorded here, with the market firm. **Hexamine,** 4s. per lb.; the spot price seems quite steady at this price, and an advance would not be an unexpected happening. **Hydroquinone,** 3s. 6d. to 3s. 9d. per lb.; dealers are quoting at these higher rates this week, but it is doubtful if much business has been done at these higher levels. **Methyl Salicylate,** 2s. 8½d. to 2s. 9½d. per lb.; at these prices the spot position is firm, and something in the way of an advance is probable. **Methyl Sulphonal,** about 15s. per lb.; little inquiry for this article is made, with spot holders quoting at unchanged rates. **Paraformaldehyde,** 3s. 8d. to 3s. 9d. per lb.; slightly higher prices are being quoted on spot. **Paraldehyde,** 1s. 5½d. to 1s. 6d. per lb.; the tone on spot is stronger, and prices tend to advance. **Phenacetin,** 6s. 8d. to 6s. 9d. per lb.; a sharp advance in spot values is recorded here, and still higher rates are predicted. **Phenazone,** 7s. 10d. to 8s. per lb.; a further advance in spot values is recorded, and this movement is likely to continue. **Phenolphthalein,** 7s. 6d. to 7s. 9d. per lb.; spot quotations are made at these higher rates. **Potassium Bromide,** B.P., crystals and granular, 6¾d. to 7d. per lb.; the tone on spot is much healthier, and prices are moving upwards. **Potassium Permanganate,** B.P., 9½d. per lb.; spot prices are well held at this level, with a fair inquiry being received. **Potassium Sulphoguaiacolate,** about 5s. 9d. to 6s. per lb.; holders of spot supplies have put their prices up to these levels. **Resorcin,** about 5s. 6d. to 5s. 9d. per lb.; the tendency here is for a slight advance in spot values. **Sodium Bromide,** B.P., crystals and granular, 7¾d. to 8d. per lb.; although there has been little improvement in business, the spot position is much healthier this week. **Sodium Salicylate,** B.P., crystals, 2s. 9d. to 2s. 10d.; powder, 2s. 8d. to 2s. 9d. per lb.; the spot position keeps firm at these rates, and any movement is likely to be towards higher rates. **Sulphonal,** about 14s. 9d. per lb.; this market is perhaps a shade firmer this week, but there is little doing. **Terpin Hydrate,** about 1s. 9d. per lb.; at this rate the spot market is very steady. **Thymol,** about 15s. per lb.; spot offers from dealers are kept at this level, with business slow.

Coal-tar Products, Intermediates, Etc.—A number of reductions in prices is recorded this week. Business has been very poor, and many items are still unsteady. Pyridine and pitch are bright features. **Aniline Salt,** about 9½d. per lb., casks free; the spot price is steady at this figure, with inquiry poor. **Aniline Oil,** about 9d. per lb., drums free; after the reduction notified last week the spot position is steadier. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; this market is not at all active; prices quoted are about the same. **Benzol,** about 1s. 3½d. to 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; this market remains dull, with prices unsteady. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; the market has again been quiet, and quoted rates are unchanged. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; prices quoted are unaltered, but the market is dull and weak. **Naphtha,** about 1s. 2d. per gallon; a sharp reduction in prices is recorded, with the market quiet. **Solvent Naphtha,** 90/160, 1s. 3d. per gallon, drums extra; this market has remained dull, and quoted rates are weak. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; business remains slow, with quotations unchanged; market weak. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; this market is unchanged on the week. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; this market keeps very steady at this old price. **Creosote Oil,** about 9¼d. per gallon, f.ob.; prices are again a shade weaker, with business very slow. **Carbolic Acid,** crystals, about 1s. 1½d. per lb., f.o.b.; slightly cheaper rates are being quoted here, with matters very dull. **Naphthalene,** about

£19. per ton; this market has weakened, with lower prices now being quoted; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; candles, £28.; tablets, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; this market remains quiet. **Pyridine** has again advanced on spot, and the tone remains firm at the higher rate of 22s. per gallon. **Hexamethylene** is a firm market, and quotations are fully maintained at 3s. 9d. to 4s. per gallon, with an advance likely. **Pure Methyl Alcohol,** about £90. per ton, in drums ex wharf London; this item keeps very steady at this level, and inquiry has been fair. **Pitch,** about 140s. per ton, f.o.b. East Coast; prices and the tone of the market has improved considerably; business has not been great, but supplies appear to be restricted.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £59. 15s. to £59. 17s. 6d., cash; £60. 10s. to £60. 12s. 6d., three months; electrolytic, £63. 10s. to £64. 10s. **Tin**: Standard, £204. 10s. to £204. 15s., cash; £202. to £202. 5s., three months; Straits, £205. 10s.; English, £205. 5s. **Lead,** soft foreign, £28. 15s., prompt; English, £30.; chemical sheet, 36s. 6d. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 5s.; hard, £28. **Antimony,** English regulus, 99%, £32. 5s. to £33. 10s.; special brands, £38. 10s. to £39. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. 10s. **Bismuth,** 10s. **Platinum,** 500s. per oz. **Wolfram,** spot, 12s. to 12s. 3d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand for heavy chemicals continues quiet both for home and export account, and values all round remain in buyers' favour. The quotations for alkali products are maintained at recent rates, but so far little or no business for forward delivery has been arranged. **Bleaching Powder,** softwoods, is quiet at £11. 5s., on rails makers' works. **Chlorates** are moving off slowly: **Potash** at 3d., and **Soda** at 2¾d., per lb. **Bichromates** are unchanged at 5¾d. and 4¼d. for **Potash** and **Soda** respectively, carriage paid to customers' works. **Glauber's Salt** weak at 70s. per ton, carriage paid. Roasted **Saltcake** is in only small request, and price remains steady at £4. 10s. carriage paid, and £4. 15s. to £5. per ton f.o.b. for export. **Copper Sulphate** is in small demand, and price remains nominal at £25. 10s. to £26., f.o.b. American **Sulphur,** firm at £5. 5s. on rails. **Phosphate of Soda,** lower at £14. 10s. per ton; commercial **Hyposulphite of Soda,** £9. 10s. on rails. **Nitrite of Soda** is firm at £26. 10s., ex store. **Sulphide of Soda,** crystals, in casks, £9. per ton, carriage paid. White powdered Cornish **Arsenic** is steadier at 60s., on rails works, with rather better inquiry. Yellow **Prussiate of Potash,** lower at 11½d. per lb., carriage paid, but **Soda** steady at 5¾d. per lb. **Carbonate of Potash,** 90—92%, easier at £23. 10s., c.i.f.; solid **Caustic,** 88—90%, firm at £29. to £30., ex store. Owing to falling-off in demand, **Acetic Acid** and **Acetate of Soda** have a lower tendency. Grey **Acetate of Lime** continues scarce at £21. 10s., c.i.f.; brown unaltered at £11. 10s., carriage paid. Miscible **Wood Naphtha,** weak at 6s. 3d. per gallon. **Acetone,** lower at £124. per ton. **Lead Salts** are firm; foreign white **Acetate** £41. 10s., brown £45.; and **Nitrate** £42. per ton, carriage paid. **Barium Chloride,** dull at £14. 10s. per ton. **Tartaric Acid,** 1s. 1d. per lb.; **Citric,** lower at 1s. 4½d. **Oxalic Acid,** unchanged at 5¾d. to 6d. per lb., carriage paid. **Permanganate of Potash,** commercial quality, lower at 8½d. per lb., carriage paid.

SWANSEA MARKET REPORT. Wednesday.

Steady demand for **Tinplates,** with firm prices on the basis of £1. 3s. 1½d. per standard box., f.o.b. **Galvanised Sheets** in good request, and quotations firmer on the basis of £19. 7s. 6d. per ton. **Copper** prices easier, with some business done at £60. 7s. 6d. per ton cash, and £61. 2s. 6d. three months. **Tin** cheaper, with prompt at £201. 12s. 6d. cash, and three months £200. 7s. 6d. **Lead** slightly dearer at £27. 17s. 6d. prompt, and £27. 2s. 6d. three months, for foreign; English, £29. 10s. **Spelter** more freely offered, with quiet trade at £33. 7s. 6d. per ton prompt, and £32. 6s. 3d three months. **Zinc Sheets,** £39. 7s. 6d. per ton. **Linseed Oil,** raw, easier at £2. 1s. 9d. per cwt. prompt, and £1. 19s. 6d. three months; boiled, £2. 7s. 3d. **Rape Oil,** £1. 19s. 3d. **Cottonseed Oil** quiet, with common edible at £2. 4s. 3d., and deodorised £2. 7s. 3d. **Cod Oil,** more active at £33. 12s. 6d. per ton. **Olive Oil,** £40. 17s. 6d. per ton. **Turpentine** firm and steady, with American refined at £3. 14s. 9d. per cwt. prompt, and £3. 16s. 6d. three months. **Coconut Oil,** quiet at £2. 4s. 9d. per cwt. for Ceylon. **Palm Oil** steady and in gooo request; softs, £36. 5s. 3d.; mediums, £36. 5s. 3d.; Lagos £36. 15s. 6d., and hards £36. 15s. per ton. **Oxalic Acid** met with better inquiry at 6¼d. per lb. **Sulphate of Ammonia** firm, with export business at £14. 3s. 6d. per ton, f.o.b.; and home prices at £14. 12s. 6d. for 4-ton lots, delivered. **Pitch,** slightly dearer at £6. 19s. 6d. per ton. **Creosote** very firm; 8¾d. per gallon, f.o.r. **Benzol,** 1s. 4½d. per gallon. **Sulphate of Copper,** dull at £26. 2s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda,** quiet but steady at £13. 7s. 6d. per ton, f.o.b. **Bone Meal** rather slow, with prompt Indian 9s. 3d. per cwt., in bags. **Copperas,** very dull at £2. 2s. 6d. per ton, delivery London or equal. **Arsenic** met with better inquiry at £60. 7s. 6d. per ton for white powdered. **Sulphuric Acid,** in fair demand at late rates. **Coal** prices remained steady, and supplies plentiful: Best Admiralty smokeless, £1. 7s. 6d.; seconds, £1. 5s. 3d.; ordinaries, £1. 5s. 6d.; Monmouthshire black vein, £1. 4s. 6d.; coking, small, £1. per ton, all f.o.b. **Patent Fuel,** rather quiet from £1. 9s. to £1. 11s. per ton, f.o.b. **Coke,** fairly active; export qualities, £2. 2s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, on rail at ovens. **Anthracite** has a good demand, but supplies are large: Best large, £2. 5s.; seconds, £1. 15s.; Paris and French nuts, £2. 17s. 6d. per ton, all f.o.b.

LIVERPOOL CHEMICAL MARKET. Wednesday.

A steady demand for chemicals of the heavier class, though on a moderate scale for home-trade uses, has been experienced through the week and continues at date. In the export branch of the trade a very fair business has been done, and shipments have been made more freely. **Bleaching Powder** has had a quietly steady sale; the price for spot and for export is £11. 5s. per ton; special prices are, according to requirements, being quoted for contracts. **Chloride of Calcium** has been rather more in demand, and has had a fair shipment to foreign ports; it is £5. 12s. 6d. per ton. **Caustic Soda** has sold more freely for home-trade use, and has had a fairly active shipment; spot is £19. 7s. 6d. per ton for 76%; special prices are quoted for contracts, according to requirements. **Bicarbonate of Soda** has been in good request for use in the U.K., and is £10. 10s. per ton, carriage paid, for the home trade; shipments on foreign account have again been on a large scale. **Soda Crystals** have sold with some freedom for use in the U.K.; the price is £5. 5s. per ton, carriage paid, to home-trade users. **Nitrate of Soda** has had a moderate sale, and is £13. 5s. to £13. 10s. per ton. **Borax** has had a very fair inquiry; commercial grades are—crystals £25. per ton, powdered £26. per ton; higher grades—crystals £29. per ton, powdered £30. per ton, and superfine £31. per ton, in 2cwt. bags, carriage paid in the U.K. **Saltcake** has again been in good demand, and is £4. 10s. to £5. per ton for home-trade use, and £5. to £6. per ton for export. **Bichromate of Soda** has been in quietly steady request, and is 4¾d. per lb. to stated ports. **Ammonia Alkali** has been well inquired for on home-trade account, and has again been shipped largely for export; it is £7. 10s. per ton, f.o.r. at works, for spot; with special prices for contracts, and £8. per ton for export, varying according to destination. **Hyposulphite of Soda** has been more inquired for, and is £10. per ton, in 2cwt. bags, for commercial, and £15. to £15. 10s. per ton for the photographic quality, in 1cwt. kegs. **Sulphide of Soda** has been quieter, and is £14. 10s. to £15. per ton for solid, and £8. 15s. to £9. per ton for crystals. **Chlorate of Soda** has been but little in request, and is 3d. per lb. **Phosphate of Soda** has been inactive, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been quiet, and is 6d. per lb. **Yellow Prussiate of Potash** has had a very limited inquiry, and the price has eased; it may be given as 1s. to 1s. 0¼d. per lb. **Red Prussiate** has again been in moderate demand, and is 3s. per lb. **Carbonate of Potash** has been quiet, and is £25. to £30. per ton. **Nitrate of Potash**

has been steadily called for, and is £29. to £30. per ton. **Chlorate of Potash** continues to meet with a fair inquiry, and is 3½d. to 4d. per lb. **Caustic Potash** has been rather more in request, and is £29. to £30. per ton. **Permanganate of Potash** has been in moderate demand, and is 9d. to 9½d. per lb. **Bichromate of Potash** has been in fair request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has had a steady inquiry; first quality is £60., and second quality £57. per ton. **Sulphate of Ammonia** has been but little in demand for use in the U.K., but has had a fairly heavy shipment for foreign ports; neutral of 25¾% is £14. 12s. 6d. per ton, and ordinary of 25¼% £13. 9s. 6d. per ton; for November deliveries 2s. 6d. per ton more than the prices given is quoted. **Carbonate of Ammonia** continues to sell rather freely, and is 4d. per lb. **Muriate of Ammonia** has been in moderate demand, and is £32. per ton. **Magnesia** has sold with some freedom; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has had a quietly steady sale; prices are £11. per ton for use in the U.K., and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has again had a fair inquiry, and is £8. to £10. 10s. per ton, according to quality. **Sulphur** has been in very fair demand; flowers are £10. per ton; roll is £8. 10s. per ton; rock, £8. to £8. 10s. per ton; and American, £5. 5s. to £5. 10s. per ton. **Tartaric Acid** has been quieter, and the price is slightly easier; it is 1s. 1½d. to 1s. 2d. per lb. **Cream of Tartar** has had a rather free sale, and is £4. 10s. per cwt. **Boric Acid** has been in good request; commercial is £48. per ton, and powdered £51. per ton; B.P. grades are £54. to £60. per ton. **Citric Acid** has been lethargic, and the price is lower; it may be given as 1s. 5½d. to 1s. 6d. per lb. **Oxalic Acid** has been very quiet, and is 6d. per lb. **White Acetate of Lead** has been quieter, and is £42. to £42. 10s. per ton. **Sulphate of Copepr** has had a very limited sale for home-trade use or for export; it is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has again been in very fair demand; quotations are still irregular; from £60. to £61. per ton may be given as the price of white powdered.

WEST OF SCOTLAND CHEMICALS.

Wednesday.

Business in the Glasgow chemical market has been on the better side during the past week, and there has been a fair demand on home-trade account. The main interest, however, is in the export market, where inquiries have been more numerous. There are no price changes, with the exception of a slight reduction in arsenic and potassium prussiate. Quotations, net at Glasgow, are as follows:—**Alum**, lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic**, white powdered, lower at £66. per ton on spot; a steady market. **Barium Chloride**, £14. 10s. per ton; at this price the market remains steady. **Bleaching Powder**, quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid**, crystals, £48. per ton, makers' prices; demand rather poor. **Borax**, crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton. **Calcium Chloride**, 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted at slightly below this figure. **Citric Acid**, 1s. 6d. per lb., less 5%; little business about at last week's quotation. **Copper Sulphate**, £27. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar**, £4. 3s. 6d. per cwt. for 99% at Glasgow; quotation steady, but inquiry small. **Lead Acetate**, white, £41. 10s. per ton on spot; brown, more inquiry at £43. per ton; Continental material offering at cheaper rates. **Magnesium Chloride**, £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at under this figure. **Oxalic Acid**, quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax**, 2½d. per lb.; a steady export trade. **Potassium Bichromate**, 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate**, lower at 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate**, 1s. 1½d. per lb.; at this price there is a rather better inquiry, with some export business. **Salammoniac**, first and second lump, £60. and £57. per ton respectively; crystals £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre**, £1. 12s. per cwt., net; a better market, with quotation unaltered. **Sodium Bichromate**, 4¾d. per lb.; unchanged. **Sodium Chlorate**, 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate**, 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate**, £9. 15s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic**, 43—44%, 1s. 1d. per lb.; rather easier in tone, and inclined to be dull. **Tartaric Acid**, 1s. 2d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns. ¶	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending October 20.

BARIUM SULPHATE (BLANC FIXE)—
Bremen, 46 cks.

BARYTES—
Antwerp, 300 bgs.; Bremen, 613 bgs.; Hamburg, 700 bgs.

BASIC SLAG—
Antwerp, 40 bgs.

BITUMEN—
Antwerp, 2 cks.

CALCIUM CARBIDE—
Trondhjem, 6,690 drms.

CARBON BLACK—
Boston, 20 cs.
New York, 3 cs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 130 cks., 1,336 pkgs.

CREAM OF TARTAR—
Bordeaux, 40 brls., 52 cks.

DEXTRINE—
Hamburg, 200 bgs.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 200 bxs.
Logwood
New York, 120 cs.

GLUCOSE—
Hamburg, 100 brls.

GLUE—
Antwerp, 23 bls.
Boston, 6 brls.

GUANO—
Faroe, 274 bgs.

LITHOPONE—
Hamburg, 40 cks., 28 brls.

OCHRE—
Lisbon, 8 bgs.

POTASH (*otherwise undescribed*)—
Bremen, 6 cks.
Hamburg, 21 drms.

POTASSIUM NITRATE—
Antwerp, 20 kgs.

PYRITES—
Huelva, 3,565 t.

ROSIN—
Lisbon, 613 brls.

SALT—
Bremen, 1,600 bgs.

SHEEP DIP—
Buenos Aires, 4 drms.

SOAP—
Melbourne, 600 cs.
New York, 25 cs.

SODIUM NITRATE—
Corral, 11,661 bgs.

STEARINE—
Buenos Aires, 143 cks.
Montreal, 85 trcs.

SULPHUR—
Catania, 924 pkgs.

TALLOW—
Buenos Aires, 121 pps.

TANNING MATERIALS—
Quebracho
Buenos Aires, 6,092 bgs.
Sumac
Palermo, 250 pkgs.
Wattle
Durban, 3,502 bgs., 177 pkgs.

WHITE LEAD—
Bremen, 38 cks.; Genoa, 55 cks.

ZINC OXIDE—
Antwerp, 20 brls.

GOOLE.

Week ending October 20.

CALCIUM CARBIDE—
Antwerp, 6 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 5 brls.

FORMIC ACID—
Hamburg, 96 crbys.

HYDROGEN PEROXIDE—
Hamburg, 19 crbys.

GRANGEMOUTH.

Week ending October 20.

ACETIC ACID—
Rotterdam, 6 cks.

ACID (*otherwise undescribed*)—
Rotterdam, 5 cks.

CALCIUM CARBIDE—
Christiania and Drammen, 240 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 6 cks.

CREAM OF TARTAR
Rotterdam, 50 kgs.

LITHOPONE
Rotterdam, 10 cks.

PHOSPHATE (BONE)
Rotterdam, 525 bgs.

POTASH (*otherwise undescribed*)
Hamburg, 60 cks.

TALLOW
Christiania and Drammen, 290 brls.

GRIMSBY.

Week ending October 20.

CHEMICALS (*otherwise undescribed*)
Hamburg, 4 cks.

DYESTUFFS (ARTIFICIAL)
Unspecified
Dieppe, 10 cks.

FERRO PHOSPHORUS
Hamburg, 11 cks.

FORMIC ACID
Hamburg, 222 pkgs.

KAINIT
Antwerp, 71 t.
Hamburg, 250 t.

MANGANESE ORE
Hamburg, 10 brls.

HULL.

Week ending October 20.

ACETIC ACID
Rotterdam, 2 t. 19 c.

AMMONIUM NITRATE
Hamburg, 50 t.

CALCIUM CARBIDE
Amsterdam, 113 t.; Antwerp, 10 t.; Christiania, 2 t. 16 c.; Hamburg, 2 t.; Rotterdam, 2 t. 10 c.

CAUSTIC POTASH
Hamburg, 10 t.

CHEMICALS (*otherwise undescribed*)
Antwerp, 10 c.; Christiania, 4 t. 2 c.; Dunkirk, 2 t.; Hamburg, 10 t. 2 c.

COAL TAR PRODUCTS
Pitch
Puerto, 1,293 t.

DEXTRINE
Amsterdam, 9 t. 17 c.
Harlingen, 5 t.

DYESTUFFS (ARTIFICIAL)
Alizarine
Rotterdam, 60 lb.
Unspecified
Amsterdam, 1,100 lb.
Rotterdam, 120 lb.

FERRO CHROME
Antwerp, 7 t.; Gothenburg, 5 t. 6 c.; Trondhjem, 10 t.

FERRO SILICON
Christiania, 26 t.
Gothenburg, 32 t.

GLUE
Antwerp, 10 c.; Bremen, 5 t. 14 c.; Hamburg, 5 c.

IRON OXIDE
Malaga, 2 t. 12 c.

KAINIT
Antwerp, 113 t.

MINERAL WHITE
Trieste, 10 t.

SOAP
Rotterdam, 9 t. 17 c.

STEARINE
Antwerp, 14 t.

SULPHUR
Catania, 10 t.
Galveston, 300 t.

TALLOW
Christiania, 20 t.

TANNING MATERIALS
Valonia
Cyprus, 93 t.

TAR OIL (WOOD)
Helsingfors, 1 t. 15 c.

TURPENTINE
Gefle, 6 c.

LEITH.

Week ending October 20.

ACETIC ACID
Rotterdam, 10 cks.

BLEACHING POWDER
Hamburg, 39 drms.

CALCIUM CARBIDE
Amsterdam, 220 drms.
Rotterdam, 140 drms.

CARBON BLACK
Philadelphia, 50 cs.

CASEIN
Dunkirk, 134 bgs.

CREAM OF TARTAR
Amsterdam, 300 kgs.
Rotterdam, 100 kgs.

DEXTRINE
Amsterdam, 10 bgs.

DYESTUFFS (ARTIFICIAL)
Unspecified
Amsterdam, 7 cks.

GLUCOSE
Philadelphia, 770 brls.

GLUE
Dunkirk, 3 bgs.
Rotterdam, 100 bgs.

LITHOPONE
Amsterdam, 629 cks.

MAGNESITE
Rotterdam, 20 bgs.

METHYL ALCOHOL
Philadelphia, 46 drms.

METHYL CHLORIDE
Dunkirk, 2 cylds.

OLEINE
Rotterdam, 10 brls.

OXALIC ACID
Rotterdam, 1 ck.

PARAFFIN WAX
Philadelphia, 107 brls.

POTASSIUM BINOXALATE
Rotterdam, 5 cks.

POTASSIUM SALTS (*otherwise undescribed*)
Antwerp, 100 t.

RED LEAD
Amsterdam, 39 cks.

SOAP
Copenhagen, 22 cs.
Philadelphia, 600 bars.

TURPENTINE
Nantes, 30 cks.

WHITE LEAD
Nantes, 3 brls.

ZINC OXIDE
Philadelphia, 250 brls.
Rotterdam, 50 cks.

LIVERPOOL.

Week ending October 20.

ACETIC ACID
France, 20 cks.

ACETONE
Germany, 1 ck.

AMMONIUM CHLORIDE
Germany, 14 cks.

ARGOLS
France, 375 bgs.
Spain, 195 bgs.

ARSENIC
Japan, 411 cs.
U.S., 40 cs.

BARIUM SULPHATE (BLANC FIXE)
Germany, 3 cks.

BAUXITE
France, 1,324 bgs.

BEESWAX
U.S., 5 cs.

BISMUTH
Chile, 1 t.

BISMUTH ORE
Chile, 28 t. 10 c.
Peru, 15 c.

BORATE OF LIME
Holland, 45 bgs.

CARBON BISULPHIDE
Germany, 84 drms.

CARBON BLACK
France, 40 brls.

CASEIN
Argentine, 167 bgs.

CAUSTIC POTASH
Germany, 60 drms.

CREAM OF TARTAR
Spain, 56 cks.

DYESTUFFS (NATURAL)
Fustic
France, 10 cks.
U.S., 25 brls.
Logwood
France, 25 cks., 88 cs.
U.S., 55 brls.
Quercitron
U.S., 200 bxs.

FERRO PHOSPHORUS
Japan, 360 bgs.

FERRO TITANIUM
Italy, 1 ck.

FERTILISER (DRIED BLOOD)
Argentine, 1,215 bgs.

FORMALDEHYDE
Germany, 34 crbys.

GLUE
Brazil, 3 cs.
U.S., 25 bxs., 20 brls.

IRON OXIDE
Spain, 300 bgs., 7 cks., 14 brls.

LITHARGE
France, 40 cks.

MAGNESITE (CALCINED)
Holland, 50 bgs.

MAGNESIUM SULPHATE
Belgium, 11 bgs.

MANGANESE ORE
India, 7,666 t.

NAPHTHA (WOOD)
Germany, 36 drms.

OCHRE
France, 117 cks.
Spain, 25 brls.

PARAFFIN SCALE
U.S., 375 brls., 432 bgs.

PARAFFIN WAX
Burma, 400 bgs.

PHOSPHATE ROCK
Tunis, 2,200 t.
U.S., 278 t.

PLUMBAGO
Germany, 7 t. 13 c.
U.S., 1 cs.

POTASSIUM CHLORIDE
Germany, 1,000 pkts., 1,200 bgs.

POTASSIUM SULPHATE
Germany, 400 bgs.

PYRITES
Spain, 3,558 t.

RED LEAD
Germany, 17 cks.

ROSIN
U.S., 5,325 brls.

SALAMMONIAC CRYSTALS
Germany, 7 cks.

SALT
Germany, 5 t.

SELENIUM
U.S., 8 cs.

SOAP
Australia, £1,888.; France, £225.; Germany, £6.; U.S., £860.

SODA
France, 34 cs.

SODIUM CHLORATE
Germany, 500 cks.

SODIUM NITRATE
Chile, 16,276 bgs.

SODIUM SILICO FLUORIDE
Holland, 5 bgs.

SPERMACETTI WAX
Chile, 30 cs.

STEARINE
Belgium, 38 bgs.; Germany, 67 bgs.; Holland, 63 bgs.

SULPHUR
Italy, 34 brls.

TALLOW
Argentine, 15 tcs., 568 cks., 110 pps.; Australia, 381 cks.; Brazil, 238 pps.; U.S., 208 brls.; Uruguayo, 52 cks., 413 tcs.

TANNING MATERIALS
Chestnut
France, 196 cks., 960 bgs.
Italy, 740 cks.
Myrabolans
India, 2,000 pkts.
Quebracho
Italy, 70 brls.
Sumac
Italy, 340 bgs.
Sicily, 950 bgs.

TAR (WOOD)
Sweden, 26 brls.
U.S., 100 brls.

TIN ORE
Bolivia, 863 t.; Chile, 286½ t.; W.C. Africa, 302 t.

TIN OXIDE
Belgium, 6 cks.

TITANIUM WHITE
Norway, 38 brls.

TURPENTINE
Danzig, 31 cks.
U.S., 896 brls.

WAX (*otherwise undescribed*)
U.S., 50 cs.

WHITE LEAD
Holland, 6 drms., 11 cks.; Germany, 102 cks.; Italy, 11 cs.

ZINC DUST
U.S., 825 t.

ZINC OXIDE
Holland, 20 cks.

ZINC WHITE
Holland, 48 cks., 100 kgs.

LONDON.

OFFICIAL AMENDMENTS.

In Return for Week ending September 15, 1923.

ALBUMEN
China, £1,950.
should read
,, £950.

From Return for Week ending August 25, 1923, deduct

COAL TAR PRODUCTS
Creosote
France, £935. Sender

From Return for Week ending September 15, 1923, deduct

PARAFFIN WAX
Spain, 2 t. 8 c. Leach

In Return for Week ending September 8, 1923

SOAP
Canada, £1,450. Gerhard & Hey
should read
,, £863. ,,

Week ending October 20.

ACETIC ACID
Belgium, 51 cks. Reitmayer, Calburn, Kindersley
France, 25

ACETONE
Czecho-Slovakia, 25 t. 3 c. V. Blagden
S.C.S. State, 19 16 Mann

ACID (*otherwise undescribed*)
Germany, 4 pkgs. Brit. Drug Houses

ALBUMEN
China, £1,200. Baxter, Hoare
,, £2,844. Fellows, Morton & Clayton
,, £1,870. B. J. Howlett
U.S.A., £2,185. R. Warner

ALUMINIUM SULPHATE
France, 1,000 pkgs. J. Bailey
Spain, 100 L. Clegg

AMMONIUM CHLORIDE
Germany, 10 cks. Petri

ARGOLS
France, 1,382 pkgs.
Portugal, 112

ARSENIC
Germany, 10 c. Petri
Japan, 8 t. 4 c.

BARIUM PEROXIDE
France, £377. G. T. Symons

BARYTES
Belgium, 250 bgs. Felton &
,, 182 cks. Crepin
Germany, 76 cks.
,, 36 brls. G. Elliott
,, 200 bgs. W. Harrison
Spain, 65 t. Macandrews
,, 500 bgs.

BEESWAX
Aden, 9 pkgs. Major & Field
Germany, 20 bgs.

BORATE OF LIME—
U.S.A., 98 t. Borax Consol

BORAX—
U.S.A., 75 t. A. J. Humphrey & H. Grey

CALCIUM CARBIDE—
Holland, 10 c.
Norway, 100 t. C. J. Quirk
,, 52 J. Spurling
S.C.S. State, 75
Switzerland, 25

CARBON BISULPHIDE—
Germany, £184. H. W. Winter

CARBON BLACK—
U.S.A., 12 cs. Berlandia

CARNAUBA WAX—
Brazil, 223 bgs. Poth Hille
,, 111 Gerhard & Hey
,, 400 Weber, Smith, & Hoare
,, 625

CASEIN—
France, £400. Guesdon
N.Z., £835. J. Nathan

CAUSTIC POTASH—
Germany, 27 drms. Bush, Beach & Gent.
,, 122 M. Steel
,, 34

CERESINE WAX—
Austria, 252 bgs. T. H. Mins

CHEMICALS (*otherwise undescribed*)
Czecho-Slovakia, £13. T. P. Priestley
France, £2,599. Burton Baker
,, £7. E. A. Kimpton
Germany, £6. Europ. & Gen. Exp.
,, £32. E. Friedlander
,, £57. H. W. Winter
,, £99. Brit. Drug Houses
,, £20. J. Schurmann
,, £76. Johnson
,, £86.
Holland, £42. W. H. Muller
Sweden, £9.

CHEMICALS (*otherwise undes*)—
——— £164.

CHLOROPHYLL—
Germany, £155. Stephens

COAL TAR PRODUCTS—
Naphthalene
Belgium, £38. H. H. Poole
Unspecified
U.S.A., £200. J. Johnson

COBALT OXIDE—
Canada, £1,000. Chance & Hunt
,, £1,866. Hughes & Hughes

COUMARINE—
——— £130.

DEXTRINE—
Germany, 4 t. 5 c.
Holland, 11 14
,, 19 Rubeck, Thew
Poland, 14 9
U.S.A., 4 6 H. C. Hackney

DYESTUFFS (ARTIFICIAL)—
Unspecified
Brit. India, £90.
France, £120. Ajax Aniline Dye
Germany, 3 pkgs. Pronk
Davis
,, £838. Stott & Hotopf
,, 769 pkgs.
Holland, £310. H. Johnson
Italy, £124. Roberts, Brining

DYESTUFFS (NATURAL)
Cochineal
France, 2 pkgs. Weigel, Leygonie
Cutch
Burmah, 100 pkgs.

FERTILISERS (*otherwise undes.*)—
Belgium, 50 t. W. Smith
,, 180 Lawes Chem. Manure
,, 251 t.
Denmark, 150 Hollingshurst
France, 1 P. Le Brun

FUSEL OIL—
Spain, 5 cks.

GELATINE—
Belgium, £11.
France, £958. Symons
Germany, £188. Crowe
,, £430. E. Friedlander
Switzerland, £67. Europ & Gen. Exp.

GLUE—
Belgium, £17.
France, £13. Van Oppen
,, £347. Symons
,, £77. A. J. Malicet
Germany, £88. Union Glue & Gel.
,, £210. H. Smart
,, £8. W. Patterson
Holland, £73. W. H. Muller
,, £83. P. Ingenlath
Hungary, £640. ,,
U.S.A., £42. H. C. Hackney
,, £410. Knight & Morris

GLYCERINE—
Holland, £76.

ISINGLASS—
Brazil, 4 cs. S. Figgis
,, 10
,, 15 pkgs.
Brit. India, 13 cs.
Japan, 10 bls.

KIESELGUHR—
Algeria, 40 t. G. H. Stephenson
Germany, 30 W. L. Payne

LITHOPONE—
Belgium, 20 cks. Taylor & Cox
Holland, 40 W. H. Muller
,, 40 F. T. H. Nye
Spain, 100 brls. Macandrews

MAGNESITE—
Holland, £220.

MINERAL COLOURS (*otherwise undescribed*)—
Spain, 10 brls. Macandrews
,, 10 S. Branwell

MONTAN WAX—
Holland, 40 bgs.

OCHRE—
U.S.A., 9 brls. L. Berger

OZOKERITE—
Austria, 371 bgs. T. H. Mins

PARAFFIN WAX—
Burmah, 50 t.
,, 25 Asiatic Petr.
Poland, 9 17 c. Poth Hille
,, 30
U.S.A., 196 Anglo-Amer. Oil
,, 55

PHOSPHORUS—
Canada, £879. H. Barrett

PITCH (*otherwise undescribed*)—
Finland, 10 brls. Stromwall

PLUMBAGO—
Germany, 252 bgs. H. Johnson
Madag'car, 1,000 Morgan Crucible
U.S.A., 12 brls. Anderson, Green
,, 5 kgs. H. Johnson

POTASSIUM CARBONATE—
Germany, 21 cks. Petri
,, 21 pkgs. ,,
,, 35

POTASSIUM CHLORATE
Sweden, 1,968 pkgs. Litchfield & Saundy
,, 80 pkgs. J. J. Masters

POTASSIUM NITRATE—
Brit. India, 2,072 pkgs. G. H. Green

POTASSIUM PERMANGANATE—
Germany, 2 drms. Petri

PRUSSIAN BLUE—
France, 10 cks. H. H. Poole
Germany, 15 Stancourt & Muir

RED LEAD
Belgium, 40 cks. T. & W. Familoe
Germany, 60 W. H. Muller

ROSIN—
France, 100 cks. Bigland & Jeffries
,, 7 Jenson & Nicholson
,, 50 W. J. Gardiner
Portugal, 53 W. R. Green

SHELLAC—
France, 5 c.
Brit. India, 1 t. 9 H. Battin
,, 1 2 Swanlac
,, 1 2 Litchfield & Saundy

SOAP—
Belgium, £40. S. Kalisky
,, £104.
Canada, £1,279. Gerhard & Hey
Denmark, £154.
France, £7. Escombe, McGrath
,, £84.
Germany, £136. S. Kalisky
,, £100. A. Potter
,, £349.
,, £151. C. W. Hartrodt
,, £15. Amer. Exp.
Holland, £611. Litchfield & Saundy
U.S.A., £1,160. Swifti
Victoria, £2,100. L. T. Smith
U.S.A., £2,098. H. C. Hackney
,, £639. Knight & Morris

SODA ASH—
Belgium, 30 t. J. Bailey
U.S.A., 3 19 c. H. W. Peabody

SODA CRYSTALS—
Belgium, 5 t. P. Winn

SODIUM ACETATE—
Belgium, 9 t. 17 c.

SODIUM HYPOSULPHITE—
Germany, 9 t. 17 c. Johnson

SODIUM SALTS (*otherwise undes.*)
Germany, 13 t.
Italy, 4 c.

SODIUM-SILICATE—
Germany, 9 t. 9 c. W. W. Jones, Dooly

STEARINE—
Belgiun, 63 bgs. A. Garnham
Germany, 136
N.S.W., 29 cks. Loders & Nucoline

SULPHUR—
U.S.A., £30. E. A. Kimpton

SUPERPHOSPHATE—
Belgium, 50 t. Lawes Chem. Man.

TALLOW—
Belgium, 30 brls.
N.Z., 16 pkgs.
,, 232 t. 1 c.
,, 61 cks. Weber
,, 98 t. 11 c. Smith & Hoare
,, 28 10 F. W. Renaut
,, 10 2 Goad, Rigg

TANNING MATERIALS—
Chestnut
France, 148 pkgs.
Gambier
Java, 170 pkgs.
Myrabolans
Brit. India, 2,716 pkgs.
Sumac
Italy, 475 pkgs.
Unspecified
Switzerland, 47 pkgs.

TAR (*otherwise undescribed*)
Germany, 10 cks. Johnson
Finland, 56 brls.
Poland, 200
,, 100 White Sea & Baltic
,, 209 Russian Produce
Sweden 100 Mordaunt
,, 50 (pt.) ,,

TARTARIC ACID
Germany, 20 kgs. Monk & Mills

TURPENTINE
Poland, 45 drms. Sale

ULTRAMARINE—
Belgium, 1 ck. W. A. Rose

WHITE LEAD
Belgium, 54 cks. T. & W. Farmiloe
Japan, 1
Holland, 1 drm. Chance, Hunt

ZINC OXIDE
Belgium, 128 cks. M. Ashby
Holland, 90 F. T. H. Nye

MANCHESTER.

Week ending October 20.

ACETIC ACID—
Amsterdam, 25 cks.
Hamburg, 170 crbys.

ANTIMONY SALTS (*otherwise undes.*
Rouen, 8 cks.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 35 cks.

BARYTES—
Bremen, 31 cks., 50 bgs.

BORO CARBON—
Bordeaux, 200 bgs.

CALCIUM CARBIDE—
Amsterdam, 600 drms.

CARBON BLACK—
New York, 200 cs.

CAUSTIC POTASH—
Hamburg, 25 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 47 kgs., 100 cks.
New York, 5 cs.

DEXTRINE—
Amsterdam, 70 bgs.
Norfolk, 1,760 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 87 pkgs.
Rouen, 2 cks.

DYESTUFFS (NATURAL)
Logwood
New York, 230 cks.

FORMALDEHYDE—
Montreal, 56 brls.; New York, 5 brls.; Philadelphia, 133 brls.

FORMIC ACID—
Hamburg, 168 crbys.

GELATINE—
Rouen, 10 bls.

GLUCOSE—
New York, 20 brls.

GLUE—
Antwerp, 15 bls.; Amsterdam, 1 ble.; Rotterdam, 20 bgs.

GLYCERINE—
Rotterdam, 5 pkgs.

LITHOPONE—
Antwerp, 8 cks.
Hamburg, 20 cks.

MAGNESITE—
Amsterdam, 200 bgs.
Rotterdam, 247 bgs.

MAGNESIUM SULPHATE
Rotterdam, 100 bgs.

MINERAL COLOURS *otherwise undescribed*
Bremen, 50 bgs.

OLEINE—
Antwerp, 2 cks.

OXALIC ACID
Rotterdam, 15 cks.

PARAFFIN WAX
New York, 100 bgs.
Philadelphia, 124 brls.

PHOSPHORUS
Montreal, 94 drms.

POTASSIUM CARBONATE—
Hamburg, 6 brls.

POTASSIUM NITRATE—
Antwerp, 100 bgs.

POTASSIUM PRUSSIATE—
Rouen, 7 cks.

ROSIN—
Bordeaux, 200 cks.
Mobile, 1,000 brls.

SALT—
Hamburg, 150 bgs.

SALTPETRE—
Rotterdam, 75 bgs.

SILVER SALTS (*otherwise undes.*)—
Philadelphia, 33 cks.

SOAP—
Philadelphia, 1,007 bxs.

SODIUM ACETATE—
Rouen, 50 bgs.

SODIUM BICHROMATE—
Baltimore, 75 cks.

SODIUM CHLORATE—
Rouen, 100 cks.

SODIUM PHOSPHATE—
Amsterdam, 33 cks.
Hamburg, 37 brls.

STEARINE—
Antwerp, 55 bgs.

TANNING MATERIALS—
Unspecified
New York, 20 brls.
Norfolk, 55 brls.

TURPENTINE—
Pensacila, 650 brls.

WAX (*otherwise undescribed*)—
Baltimore, 125 brls. : New York, 20 brls.

WAX (*otherwise undescribed*)—
Philadelphia, 975 brls.

ZINC DUST—
Antwerp 224 cs., 40 cks.

ZINC OXIDE—
Antwerp, 40 cks.

NEWCASTLE-ON-TYNE

Week ending October 20.

ACETIC ACID—
Rotterdam, 27 cks.

BARYTES—
Antwerp, 250 bgs.

CALCIUM CARBIDE—
Christiania, 713 drms.
Rotterdam, 780 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 30 cks.

FORMIC ACID—
Rotterdam, 30 cks.

GLUE—
Antwerp, 139 pkgs., 1 crt.

PYRITES—
Bergen, 1 cs.

SALTPETRE—
Rotterdam, 20 cks.

WHITE LEAD—
Antwerp, 19 cks.
New York, 33 cks.

ZINC OXIDE—
Rotterdam, 5 cks.

N. & S. SHIELDS.

Week ending October 20.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending October 20.

CHEMICALS (*otherwise undescribed*)
Alexandria, 100 pkgs. : Beira, 20 pkgs. ; Delagoa Bay, 405 cs. ; Durban, 255 pkgs. ; Natal, 36 pkgs. ; New York, 2,050 pkgs. ; Valparaiso, 6 cks. ; Vera Cruz, 150 pkgs.

COAL TAR PRODUCTS—
Creosote
Delagoa Bay, 2,520 galls.
Naphthalene
New York, 4 c.
Tar
Beira, 10 c. ; Durban, 2 t. 10 c., and £28. ; Natal, 2 t. ; Pto. Mexico, £20.
Unspecified
Oporto, £104.

PARAFFIN WAX—
Pt. Said, 10 t.

SHEEP DIP—
Beira, 18 t. 19 c.
Delagoa Bay, 9 t. 10 c.
Kilindini, £34.
Natal, 9 t. 10 c.

SOAP—
Ahwaz, 2 t. 6 c. ; Alexandria, 1 t. 4 c. ; Beira, 4 t. 2 c. ; Durban, 1 t.

SODA ASH—
Oporto, 1 t.

SULPHURIC ACID—
Bagdad, 2 t. 10 c.

WAX (*otherwise undescribed*)—
Alexandria, £44.

GRANGEMOUTH.

Week ending October 20.

CHEMICALS (*otherwise undescribed*)
Bergen, 1 t. 18 c.
Christiania, 5 cks., 8 drms.
Trondhjem, 5 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 2 t. 10 c.

PITCH (*otherwise undescribed*)—
Christiania, 72 brls.
Christiansand, 45 t.

HULL.

Week ending October 16.

ACID (*otherwise undescribed*)—
San Francisco, 35 drms.

AMMONIUM SULPHATE—
Amsterdam, a qty.

CHEMICALS (*otherwise undescribed*)
Alexandria, 120 drms. : Abo, 70 pkgs. ; Amsterdam, 11 cs., 20 cks., 1 pkg., 20 drms. ; Copenhagen, 4 cs., 57 cks., 6 drms. ; Gothenburg, 78 pkgs. ; Genoa, 55 drms., 4 cs. ; Hamburg, 38 cks., 195 cs., 274 pkgs.

CHEMICALS (*otherwise undescribed*)
Norrkoping, 17 cks., 6 kgs.
Reval, 2 cs.
Rotterdam, 7 drms.

COAL TAR PRODUCTS—
Creosote
Tacoma, 19 drms.
Naphthalene
Rotterdam, 490 bgs.
Pitch
Baltimore, 20 brls. ; Dunkirk, 180 t. : Hamburg, 11 cks.

FERRO MANGANESE—
Portland, 50 t.

FERTILISERS (*otherwise undes.*)—
Baltimore, 2,239 bgs.

GLUE—
Abo, 7 bgs.

GLYCERINE—
Amsterdam, 100 drms.

LITHARGE—
Vancouver, 29 cks.

SOAP—
Amsterdam, 500 cs. ; Gothenburg, 1,020 cs. ; Lisbon, 50 drms., 40 cs. ; Malta, 10 cs. ; Piraeus, 5 brls., 20 cs. ; Rotterdam, 30 bls. ; Stockholm, 1 cs. ; Vancouver, 50 cs.

TURPENTINE—
Copenhagen, 6 cks.

LEITH.

Week ending October 20.

IODINE—
Dunkirk, 4 overcasks.

PARAFFIN WAX—
Antwerp, 48 bgs.
Dunkirk, 34 bgs.

SHEEP DIP—
Reykjavik, 4 cs. ; Skafteros, 100 drms. ; Vik, 75 drms., 5 cs.

SOAP—
Budardal, 4 cs. ; Hafnarfjord, 1 ck. ; Olafsvik, 2 cks. ; Reykjavik, 8 cks. ; Stokkeseyri, 1 ck.

SODA—
Budardal, 5 bgs.
Westmanno, 10 bgs.

LIVERPOOL.

Week ending October 18.

ACETIC ACID—
Auckland, 1 c., £10.
Algoa Bay, 1 c., £10.

ALBUMEN—
Kotka, 2 t. 1 c., £103.
Melbourne, 5 c., £44.

ALUM—
Hamburg, 10 t. 1 c., £181.
Singapore, 1 t., £18.

ALUMINIUM SULPHATE—
Drammen, 5 t., £38. ; Kotka, 200 t., £1,837. ; Vera Cruz, 50 t., £462.

AMMONIA (ANHYDROUS)—
Lisbon, 5 c., £49.

AMMONIUM CARBONATE—
Aarhus, 3 t., £75. ; Bilbao, 1 t. 9 c., £38. ; Buenos Aires, 2 t. 9 c., £82. ; Copenhagen, 3 t., £75. ; Calcutta, 2 t., £67 ; Constantinople, 1 t. 14 c., £46. ; Cartagena, Spain, 2 t., £48. ; Christiania, 1 t., £29. ; Hamburg, 1 t. 19 c., £46. ; Hong Kong, 1 t., £36. ; New York, 7 t. 1 c., £186. ; Nantes, 10 c., £15. ; Norrkoping, 14 c., £18. ; Rotterdam, 1 t., £23. ; Trondhjem, 10 c., £14. ; Valencia, 10 c., £15.

AMMONIUM CHLORIDE—
Bombay, 5 t., £203. ; Bilbao, 5 t. 5 c., £174. ; Bourgas, 2 t., £84. ; Durban, 1 t. 8 c., £60. ; Karachi, 10 c., £18. ; Marseilles, 2 t. 17 c., £89. ; Philadelphia, 15 t. 4 c., £561. ; Valencia, 3 t. 4 c., £110. ; Valparaiso, 2 t. 19 c., £99.

AMMONIUM SULPHATE—
Hong Kong, 60 t., £960. ; Las Palmas, 60 t., £865. ; Naples, 116 t. 2 c., £1,646. ; Palermo, 19 t. 19 c., £288. ; Patras, 20 t., £295. ; Pt. Louis, 50 t., £786.

ANTIFOULING PAINT—
Bombay, 2 t. 10 c., £251. ; Dunedin, 2 t., £252. ; Fremantle, 10 c., £11. ; Pt. Said, 4 c., £23. ; Punta Arenas, 19 c., £107. ; Sourabaya, 6 t. 17 c., £585.

ARSENIC—
Christiania, 17 c., £61.
Malmo, 11 c., £34.

ARSENIOUS ACID—
Melbourne, 2 c., £166.

BARIUM CHLORIDE—
Bordeaux, 5 t., £80.

BITUMEN—
Valparaiso, 19 t. 1 c., £450.

BLEACHING POWDER—
Algoa Bay, 3 t., £35. ; Bangkok, 1 t., £12. ; Bombay, 55 t., £669. ; Calcutta, 11 t. 4 c., £133. ; Callao, 1 t., £12. ; Durban, 2 t., £24. ; Iquique, 1 t. 3 c., £14. ; Montreal, 14 t. 8 c., £131. ; Madras, 4 c., £18. ; Patras, 1 t. 10 c., £16. ; Perth, 1 t., £12. ; Tampico, 15 t. 3 c., £223. ; Vera Cruz, 2 t., £24.

BOILER COMPOSITION—
Christchurch, 2 t., £14. ; Colombo, 15 c., £11. ; Durban, 1 t. 10 c., £67. ; Pto. Colombia, 1 t., £11. ; Wellington, 2 t., £14.

BORAX—
Barcelona, 1 t., £25. ; Kingston, 4 c., £5. ; Madras, 2 t. 10 c., £63. ; Santos, 1 t. 19 c., £52. ; Sekondi, 1 c., £3 10s.

BORIC ACID—
Barcelona, 2 t. 6 c., £121. ; Colombo, 2 c., £5 5s. ; Calcutta, 3 c., £9. ; Cartagena, Spain, 10 c., £25. ; Durban, 1 c., £4. ; Vera Cruz, 1 c., £3.

CALCIUM CARBIDE—
Lagos, 13 c., £16.

CALCIUM CHLORIDE—
Fremantle, 72 t. 10 c., £436.
Melbourne, 27 t. 2 c., £162.

CELLULOSE ACETATE—
Montreal, 2 c., £26.

CHEMICALS (*otherwise undescribed*)
Adelaide, 1 t. 1 c., £12. ; Alexandria, 1 t., £26. ; Bombay, 6 t. 5 c., £156. ; Bilbao, 2 t., £21. ; Calcutta, 10 t., £250. ; Constantinople, 10 c., £28. ; Gijon, 1 t., £11. ; Lyttleton, 2 t., £52. ; Melbourne, 8 t. 5 c., £674. ; Montreal, 6 t., £36. ; Piraeus, 2 t., £52. ; Sydney, 14 t., £359. ; Teneriffe, 5 t. 5 c., £13. ; Vancouver, B.C., 1 t., £11. ; Wellington, 2 t., £54.

CHLORINE—
Calcutta, 13 c., £22.

CHROME ALUM—
Malmo, 2 t., £36.

CHROMIUM ACETATE—
Vera Cruz, 1 t. 13 c., £107.

CITRIC ACID—
Melbourne, 1 t., £157. ; New Plymouth, 3 c., £30. ; Sydney, 10 c., £79.

COAL TAR PRODUCTS—
Carbolic Acid
Adelaide, 1 c., £9. ; Bombay, 2 c., £22. ; Calcutta, 10 c., £68. ; Fremantle, 2 c., £14. ; Kobe, 5 t., £618. ; Melbourne, 4 c., £31. ; New York, 1 c., £17. ; Sydney, 2 t. 17 c., £131. ; Tientsin, 1 c., £12. ; Switzerland, 3 t., £392.
Creosote
Durban, 8 c., £10. ; New York, 14 t. 9 c., £666. ; Perth, 9 c., £15. ; Rotterdam, 2 t. 15 c., £68.
Dinitrochlorbenzol
Dairen, 10 t. 3 c., £799.
Naphthalene
Algoa Bay, 4 t. 15 c., £83.
Orthocresol
Switzerland, 2 t. 1 qr., £314.
Paranitrochlorbenzol
Swirzerland, 3 c., £22.
Tar
Bombay, 1 t., £28. ; Bathurst, 1 t. 1 c., £12. ; Falklands, 2 t. 9 c., £25. ; Lagos, 4 c., £15. ; Maranham, 1 t. 4 c., £12.
Unspecified
Champerico, 19 c., £49. ; New York, 4 t., £676. ; San Francisco, 25 t. 15 c., £1,193.

COBALT OXIDE—
Leghorn, 1 c., £45.
Oporto, 2 qrs., £18.

COBALT SULPHATE—
Santos, 5 c., £87.

COPPER SULPHATE—
Algoa Bay, 4 c., 2 qrs., £6. ; Beyrout, 14 c., £19. ; Cape town, 9 c., £13. ; Dunedin, 1 t., £27. ; Fremantle, 9 t., £238. ; Monte Video, 9 t. 17 c., £243. ; Pt. Said, 14 t. 15 c., £365. ; Soerabaya, 200 t., £499. ; Trondhjem, 1 t. 1 c., £26. ; Wellington, 3 t. 5 c., £83.

CREAM OF TARTAR—
Auckland, 1 t., £86. ; Melbourne, 3 t., £264. ; Sydney, 10 c., £45.

CRYOLITE—
Buenos Aires, 1 t. 9 c., £50.

DISINFECTANTS (*otherwise undes.*)
Amsterdam, 3 c., £80. ; Antwerp, 11 c., £64. ; Bombay, 27 t. 16 c., £146. ; Boston, 66 t. 18 c., £2,842. ; Bolivia, 4 c. 2 qrs., £13. ; Cape Coast, 7 c., £17. ; Callao, 1 t., £96. ; Colombo, 4 t. 1 c., £134. ; Durban, 2 t. 9 c., £92. ; East London, 8 c., £53. ; Karachi, 3 pkgs, £18. ; Lyttleton, 25 t., £889. ; La Guaira, 5 c., £45. ; Maranham, 7 c., £34. ; Montreal, 3 t. 8 c., £136. ; New York, 104 t. 7 c., £4,201. ; Oamaru, 2 c., £13. ; Rangoon, 8 t. 5 c., £412. ; San Francisco, 10 t. 3 c., £389. ; Sekondi, 4 c. 2 qrs., £15. ; Wellington, 12 c., £112.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 16 t. 6 c., £1,618.
Indigo
Shanghai, 42 t. 14 c., £5,972.
Tientsin, 35 t. 14 c., £4,980.
Unspecified
Auckland, 1 c., £12. ; Adelaide, 3 c., £29. ; Accra, 1 qr., £14. ; Boston, 1 c., £38. ; Buenos Aires, 2 c., £26. ; Bordeaux, 10 c., £180. ; Calcutta, 1 c., £34. ; Danzig, 5 t. 10 c., £505. ; Dunedin 1 t. 2 c., £325. ; Hamburg, 2 t. 6 c., £481. ; Lyttleton, 5 c., £73. ; Melbourne, 1 t. 9 c. 2 qrs., £531. ; Montreal, 2 t. 11 c., £275. ; Madras, 2 t., £280. ; Oamaru, 8 c., £74. ; Pernambuco, 1 t. 9 c., £344. ; Sydney, 1 t. 12 c., £389. ; Shanghai, 1 t., £203. ; Wellington, 1 qr., £10.

DYESTUFFS (NATURAL)—
Annatto
New York, 2 t., £177.
Logwood
Singapore, 8 c., £34.
Orchil
New York, 3 t. 9 c., £134.
Unspecified
Rio de Janeiro, 15 c., £63.

FORMALDEHYDE—
Adelaide, 1 t., £35.

GLYCERINE—
Antwerp, 2 t. 18 c., £197. ; Cape Town, 10 c., £45. ; Christchurch, 1 t., £93. ; Dunedin, 10 c., £47. ; Durban, 1 t., £78. ; East London, 10 c., £46. ; Kobe, 49 t. 4 c., £3,920. ; Oamaru, 10 c., £47. ; Pacas Mayo, 4 c. 2 qrs., £23. ; Salonika, 1 t., £72. ; Shanghai, 10 t. 15 c., £689.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
Buenos Aires, 6 c., £196.

HYDROCHLORIC ACID—
Beira, 1 t. 4 c., £27.

HYDROFLUORIC ACID—
Bahia, 8 c., £48.
Melbourne, 6 c., £51.

IODOFORM—
Abonema, 11¼ lb., £15.
Accra, 9 lb., £15.

LACTIC ACID—
Auckland, 14 c., £29.
Calcutta, 4 c. 3 qrs., £10.

LEAD ACETATE—
Auckland, 5 t. 1 c., £218.
Sydney, 10 c., £19.

MAGNESIA (CALCINED)—
Sydney, 1 t., £46.

MAGNESITE (CALCINED)—
Bahia, 1 t., £125.

MAGNESIUM CARBONATE—
Sydney, 10 c., £23.

MANGESIUM SULPHATE—
Abonema, 1 c., £2. ; Bathurst, 2 qrs., £1. ; Bonny, 1 c., £2 5s. ; Calabar, 1 c., £1 5s. ; Duala, 3 qrs., £1. ; Durban, 1 c., £1. ; Lagos, 1 c., £1 5s. ; Pt. Harcourt, 7 c., £10. ; Suez, 2 c., £2 5s. ; Sierra Leone, 11 c., £14. ; Trinidad, 3 c. 1 qrs., £3. ; Winnebah, 5 c., £7. 5s.

MANGANESE BORATE—
Sydney, 5 c., £24.

NICKEL SULPHATE—
Tientsin, 2 t. 10 c., £85.

OXALIC ACID—
Melbourne, 1 t., £59.

PHOSPHORUS—
P. Colombia, 3 c., £25. ; Launceston, 1 c., £10. ; Santos, 9 c., £52.

PITCH (*otherwise undescribed*)—
Auckland, 64 t. 7 c., £2,299. ; Calcutta, 23 t. 8 c., £576. ; Hamburg, 1 t. 4 c., £16. ; Lyttleton, 10 t. 11 c., £383.

PLATING SALTS—
Shanghai, 2 c., £23.

POTASSIUM IODIDE—
Pt. Harcourt, 2 c. 2 qrs., £268.

POTASSIUM PERMANGANATE—
New York, 1 c., £15.

POTASSIUM PRUSSIATE—
Karachi, 2 c., £21.
Tarragona, 10 c., £57.

POTASSIUM SILICATE—
Bilbao, 1 t., £23.

SALAMMONIAC—
Bourgas, 6 c., £17. ; Melbourne, 5 c., £14. ; Piraeus, 2 t. 1 c., £119. ; Varna, 9 c., £24.

SALICYLIC ACID—
Mombasa, 2 qrs., £12.

SALTCAKE—
Three Rivers, 3,507 t., £15,781.

SHEEP DIP—
Auckland, 1 t. 12 c., £97. ; Buenaventura, 4 c., £23. ; Buenos Aires, 77 t. 7 c., £4,010. ; Cape Town, 5 t. 10 c., £250. ; Comadoro Riverdavia, 4 t. 14 c., £175. ; Durban, 2 t. 19 c., £197. ; Fremantle, 4 t., £258. ; New York, 14 c., £49. ; Pt. Madryn, 7 t. 1 c., £287. ; Punta Arenas, 45 t. 15 c., £1,750. ; Pt. Deseado, 11 t. 11 c., £760. ; Pt. Howard, 2 t. 19 c., £167. ; Pt. Stanley, 2 t. 7 c., £112. ; Rio Gallegos, 3 c., £13. ; Santa Cruz, 4 t. 14 c., £400. ; San Julian, 16 c., £75. ; Wellington, 16 c. 9 c., £696.

SULPHUR—
Nelson, N.Z., 3 c., £11.

SULPHURIC ACID—
Pernambuco, 6 c. 2 qrs., £15.
Shanghai, 11 c., £27.

SUPERPHOSPHATE (BONE)—
Kingston, 19 t. 12 c., £128.

TANNING MATERIALS—
Unspecified
Auckland, 1 qr., £14. ; Algoa Bay, 2 t. 5 c., £40. ; Bergen, 12 t. 6 c., £147. ; Boston, 5 t., £120. ; Copenhagen, 4 t. 11 c., £103. ; Danzig, 3 t., £180. ; Durban, 1 t. 2 c., £23. ; Drammen, 5 t. 12 c., £71. ; Hamburg, 3 t. 5 c., £75. ; Melbourne, 5 t. 15 c., £183. ; Malmo, 1 t. 12 c., £26. ; Mossel Bay, 2 t. 17 c., £22. ; Montreal, 13 t. 3 c., £220.

TARTARIC ACID—
Adelaide, 5 t. 10 c., £807. ; Christchurch, 2 c., £15. ; Melbourne, 3 t. £266. ; Madras, 2 c., £14.

THIONYL CHLORIDE—
Hamburg, 2 c., £18.

TIN OXIDE—
Buenos Aires, 2 t., £446.
Santander, 4 c., £50.

TRICHLORETHYLENE—
Madras, 4 t. 10 c., £200.

VANADIC ACID—
Dunkirk, 14 c., £600.

VANILLIN—
Amsterdam, 1 c. 2 qrs., £127. ; Melbourne, 4 c., £459. ; Sydney, 1 c., £117.

VERDIGRIS—
Melbourne, 5 c., £25.

WOOD PRESERVATIVE—
Auckland, 9 c., £37. ; Kingston, 7 c. 2 qrs., £24. ; Rangoon, 8 t. 5 c., £412.

ZINC CHLORIDE—
Amsterdam, 10 t., £98. ; Bombay, 3 t. 17 c., £97. ; Calcutta, 6 t. 17 c., £173. ; Lisbon, 1 t., £27.

ZINC OXIDE—
Bilbao, 4 c., £15. ; Manila, 10 c., £22. ; New York, 7 t. 2 c., £285.

Week ending October 19.

BASIC SLAG—
Boston, 15 t.

CALCIUM CHLORATE—
Bombay, 37 pkgs. ; Brisbane, 8 drms. ; Wellington, 8 pkgs.

CAUSTIC SODA—
Adelaide, 65 drms. ; Auckland, 49 drms. ; Bari, 17 drms. ; Batavia 85 drms. ; Beira, 5 cs. ; Bombay, 115 drms. ; Bremen, 30 drms. ; Brisbane, 22 pkgs. ; Buenos Aires, 1,041 pkgs., 80 drms. ; Ceara, 61 drms. ; Christiania, 105 t., 40 drms. ; Christiansand, 17 pkgs. ; Copenhagen, 55 drms. ; Durban, 258 drms. ; Genoa, 41 drms. ; Gothenburg, 20 drms. ; Hamburg, 290 drms. ; Hong Kong, 168 drms. ; Jaffa, 17 drms. ; Karachi, 1,320 drms. ; Kobe, 868 drms. ; La Guaira, 38 drms. ; Linde, 20 drms. ; Messina, 17 drms. ; Moji, 28 drms. ; Monte Video, 90 drms. ; Montserrat, 10 drms. ; Montreal, 200 drms. ; New York, 50 drms. ; Oporto, 10 drms. ; Pernambuco, 185 drms. ; Piraeus, 183 drms. ; Probolingo, 3 drms. ; Riga, 69 drms. ; Samarang, 120 drms. ; Santos, 500 cs., 195 drms. ; Shanghai, 504 drms. ; Sierra Leone, 11 cs. ; Sydney, 127 drms. ; St. John's, N.F., 10 drms. ; Stockholm, 20 drms. ; Sydney, 7 drms. ; Timaru, 10 cs. ; Trinidad, 9 drms. ; Townsville, 10 cs. ; Vancouver, 73 drms. ; Varna 300 drms. ; Wellington, 35 drms.

CHROMIUM ORE—
Gothenburg, 10 t.

FERRO MANGANESE—
Baltimore, £977. ; Buenos Aires, 40 t. ; Gothenburg, 5 t. ; Lyttleton, 5 t. ; Stockholm, 50 t.

FERRO VANADIUM—
Dunkirk, 6 pkgs. ; Hamburg, 15 c. ; Rouen, 1 t.

GLUE, SIZE, AND GELATINE—
Auckland, 10 pkgs. ; Bombay, 12 cks., 29 pkgs. ; Boston, 140 pkgs. ; Calcutta, 42 pkgs. ; Ferrol, 13 cks. ; Madras, 30 cks., 10 bgs. ; Manzanillo, 10 bgs. ; Maracaibo, 2 bgs. ; Montreal, 40 brls., 60 bgs. ; New York, 30 bgs. ; Paita, 5 bgs. ; Shanghai, 80 tins.

POTASH (*otherwise undescribed*)—
Melbourne, 8 drms.

SALT—
Abonema, 50 t. ; Accra, 7 t. ; Antwerp, 150 t. ; Auckland, 131 t. ; Barbados, 13 t. ; Beira, 10 t. ; Bergen, 7 t. ; Bombay, 5 t. ; Brisbane, 31 t. ; Buenos Aires, 14 t. ; Calcutta, 3,516 t. ; Christiania, 105 t. ; Christiansand, 25 t. ; Drammen, 20 t. ; Falster, 10 t. ; Mombasa, 20 t. ; Montreal, 239 t. ; Nelson, 73 t. ; Opobo, 40 t. ; Pt. Antonio, 2 t. 10 c. ; Pt. Maria, 7 t. 10 c. ; St. Anne's Bay, 2 t. ; St. John's N.F., 20 t. ; Savannah la Mar, 20 t. ; Svendborg, 10 t. ; Warri, 691 t. ; Wellington, 25 t.

SOAP—
Abonema, 200 pkgs. ; Accra, 862 bxs. ; Alexandria, 1,205 pkgs. ; Amboina, 100 bxs. ; Antofagasta, 141 pkgs. ; Auckland, 55 bxs. ; Bandjermassin, 90 cs. ; Bangkok, 682 pkgs. ; Barbados, 204 bxs. ; Barcelona, 5 pkgs. ; Batavia, 127 pkgs. ; Beira, 12 pkgs. ; Belawan, 1,512 pkgs. ; Bombay, 3,024 pkgs. ; Boston, 4 cs. ; Buenos Aires, 805 cs. ; Callao, 2 kgs. ; Calcutta, 610 bxs. ; Cape Town, 25 bxs. ; Cape Coast, 388 bxs. ; Cape Palmas, 30 pkgs. ; Colombo, 534 pkgs. ; Colon, 25 pkgs. ; Copenhagen, 34 bxs. ; Corral, 50 cs. ; Dar-es-Salaam, 5 cs. ; Demerara, 970 pkgs. ; Durban, 175 pkgs. ; Funchal, 52 bxs. ; Gibraltar, 89 pkgs. ; Gothenburg, 12 pkgs. ; Grand Lahou, 20 pkgs. ; Grenada, 150 pkgs. ; Halifax, N.S., 100 pkgs. ; Hong Kong, 135 pkgs. ; Iddo, 225 pkgs. ; Karachi, 62 pkgs.

SOAP—
Kilindini, 157 pkgs. ; Lagos, 1075 bxs. ; L. Palmas, 588 bxs. ; Lisbon 11 cs. ; Lome, 65 bxs. ; Malacca, 270 bxs. ; Madras, 627 pkgs. ; Malta, 50 pkgs. ; Marseilles, 1 cs. ; Mauritius, 5 cs. ; Menado, 50 cs. ; Melbourne, 11 pkgs. ; Mombasa, 57 cs. ; Montreal, 2 cs. ; Monte Video, 1 cs. ; Moulmein, 2 cs. ; Nelson, 5 bxs. ; Opobo, 1,000 bxs. ; Palembang, 32 cs. ; Panama 375 bxs. ; Penang, 1 cs. ; Pt. Gentil, 40 cs. ; Pt. Harcourt, 551 bxs. ; Pt. Said, 119 pkgs. ; Pt. Sudan, 66 cs. ; Rangoon, 2,025 pkgs. ; Riga, 25 cs. ; Sabang 20 cs. ; Samarang, 250 cs. ; Sandakan, 65 bxs. ; San Fernando, 555 bxs. ; Sekondi, 1 ck. ; Seychelles, 21 bxs. ; Shanghai, 673 pkgs. ; Sierra Leone, 3 cs. ; Singapore, 1,860 bxs. ; Sourabaya 335 cs. ; Sydney, 33 pkgs. ; St. John's, N.F., 1,161 pkgs. ; St. Lucia, 1 cs. ; Talara, 4 cs. ; Tanga, 28 cs. ; Teneriffe, 295 bxs. ; Tjilatjap, 40 cs. ; Tocopilla, 55 cs. ; Tumaco, 700 bxs. ; Trinidad, 3,026 bxs. ; Wellington, 2 cs. ; Winnebah, 160 bxs.

SODA ASH—
Adelaide, 9 pkgs. ; Alexandria, 100 bgs. ; Auckland, 124 pkgs. ; Bombay, 3,000 bgs. ; Brisbane, 8 pkgs. ; Buenos Aires, 1,420 pkgs. ; Calcutta, 12,304 pkgs. ; Callao, 50 pkgs. ; Ceara, 4 pkgs. ; Christiansand, 100 bgs. ; Copenhagen, 1,050 pkgs. ; Delagoa Bay, 75 pkgs. ; Drammen, 50 pkgs. ; Durban, 500 pkgs. ; Hamburg, 1,100 bgs. ; Karachi, 7,000 bgs. ; Kobe, 1,623 bgs. ; Maranham, 189 cks. ; Medellin, 45 bgs. ; Melbourne, 1,787 pkgs. ; Moji, 3,787 bgs. ; Norrkoping, 50 bgs. ; Oporto, 6 cs. ; Riga, 80 bgs. ; Rio de Janeiro, 184 pkgs. ; Rotterdam, 1,000 bgs. ; Saltpond, 200 bgs. ; Shanghai, 3,371 cks. ; Sourabaya, 1,000 bgs. ; Stockholm, 100 bgs. ; Sydney, 631 bgs. ; Vancouver, 114 pkgs.

SODA CRYSTALS—
Aden, 20 pkgs. ; Batavia, 20 kgs. ; Bombay, 100 kgs. ; Demerara, 48 pkgs. ; Karachi, 100 pkgs. ; Pt. of Spain, 25 pkgs.

SODIUM BICARBONATE—
Alexandria, 100 kgs. ; Auckland, 733 pkgs. ; Bari, 47 kgs. ; Brisbane, 199 pkgs., 7 kgs. ; Buenos Aires, 200 cks. ; Cape Town, 35 pkgs. ; Constanza, 150 pkgs. ; Copenhagen, 45 pkgs. ; Danzig, 10 cks. ; Dar-es-Salaam, 100 pkgs. ; Delagoa Bay, 50 pkgs. ; Demerara, 25 pkgs. ; Halifax, N.S., 100 pkgs. ; Karachi, 1,000 pkgs. ; Kilindini, 25 kgs. ; Kobe, 1,938 pkgs. ; Leghorn, 85 pkgs. ; Malta, 20 kgs. ; Melbourne, 529 pkgs. ; Moji, 1,723 bgs. ; Newcastle, 59 pkgs. ; Odense, 4 cks. ; Piraeus, 40 pkgs. ; St. Lucia, 10 kgs. ; Sydney, 739 kgs. ; Stockholm, 85 kgs. ; Trinidad, 45 kgs. ; Sydney, 20 kgs. ; Valparaiso 100 kgs. ; Wellington, 310 kgs.

SODIUM BISULPHITE—
Matanzas, 20 drms.
Monte Video, 10 drms.

SODIUM HYDROSULPHITE—
Dunedin, 20 pkgs. ; Singapore, 4 cks. ; Sydney, 20 kgs.

SODIUM HYPOSULPHITE—
Auckland, 20 pkgs.
Rouen, 40 kgs.

SODIUM PHOSPHATE—
Calcutta, 9 kgs.

SODIUM SALTS (*otherwise undes.*)
Christiania, 34 cks.

SODIUM SILICATE—
Adelaide, 172 pkgs. ; Boston, 50 cks. ; Calcutta, 57 bgs., 26 drms. ; Durban, 37 pkgs. ; Geelong, 7 cks. ; Montreal, qnty. ; Pto. Cabello, 25 drms. ; Rio de Janeiro, 10 pkgs. ; Sydney, 16 pkgs. ; Wellington, 3 pkgs.

SODIUM SULPHIDE—
Auckland, 11 drms. ; Genoa, 66 pkgs. ; Melbourne, 7 drms. ; Sydney, 78 drms., 10 cks.

SODIUM SULPHITE—
Melbourne, 28 cks.

STEARINE—
Paita, 50 bgs.

TALLOW—
Copenhagen, 29 trcs.

LONDON.

OFFICIAL AMENDMENT.

From return for week ending July 4, 1923, deduct—

DISINFECTANTS (*otherwise undes.*)
Ahwaz, 10 c., £25.

Week ending October 17.

ACETIC ACID—
Mauritius (F.), 5 cs., £23.

ACETONE—
Gothenburg (F.), 16 drms., £628.

ACETYL SALICYLIC ACID—
Bombay, 3 cs. (pt.), £15.; Fremantle, 1 cs., £9.; Melbourne, 1 cs., £17.; Shanghai, 2 cs. (pt.), £8.

AMMONIA—
Accra, 5 cs., £9.; Amsterdam, 6 cs., £11.; Antwerp, 20 cs., £100.; Bombay, 24 cs., £45.; Buenos Aires, 18 cs., £44.; Calabar, 4 cs., £7.; Calcutta, 5 cs., £9.; Canton, 6 cs., £23.; Cape Town, 30 cs., £51.; Durban, 18 cs., £32.; Karachi, 8 cs., £14.; Madras, 3 cs., £5.; Monte Video, 4 cs., £13.; Pt. Elizabeth, 36 cs., £71.; Shanghai, 2 cs., £5.; Singapore, 16 cs., £29.; Suva, 9 cs., £16.

AMMONIA (ANHYDROUS)
Rotterdam, 20 cylds., £156.
Singapore, 1 cyld., £14.

AMMONIUM BROMIDE
Melbourne, 1 cs., £7.

AMMONIUM CARBONATE—
Antwerp, 2 t. 14 c., £70.; Calcutta, 5 c., £23.; Cape Town, 2 c., £6.; Dunkirk, 1 t. 19 c., £58.; Genoa, 6 t. 18 c., £180; Hamburg, 7 t., £152.; Helsingborg, 1 t. 10 c., £46.; Mauritius, 3 c., £8.; Paris, 12 t. 17 c., £306.; Penang, 9 c., £24.; Rouen, 1 t., £32.; Singapore, 1 t. 10 c., £93.

AMMONIUM CHLORIDE—
Auckland, 1 t. 10 c., £50.; Canton, 5 kgs., £14.; Dar-es-Salaam, 10 kgs., £19.; Rotterdam, 1 ck., £13.

AMMONIUM NITRATE—
Antwerp, 89 t. 16 c., £2,314.; Piraeus, 12 t. 15 c., £312.; Rouen, 20 t., £520.

AMMONIUM SULPHIDE
Alexandria, 7 cs., £7.

AMYL ACETATE
Melbourne, 1 cs., £5.

ANTIMONY SULPHIDE—
Copenhagen, 2 cks., £23.
Pt. Alegre, 10 cks., £14.

ARSENIC—
Otago, 5 drms., £21.; Santos, 50 drms., £191.; Trieste (F.), 200 cs., £580.

ARSENIC SULPHIDE—
New York, 4 cks., £22.

BARIUM CARBONATE
Sydney, 4 cks., £16.

BENZOIC ACID—
Lyttleton, 1 cs., £5.
Paris, 4 cks., £50.

BISMUTH CARBONATE—
Cape Town, 3 cs. (pt.), £7.; Christchurch, 1 cs. (pt.), £18.; Melbourne, 2 cs., £139.; Wellington, 1 cs. (pt.), £18.

BISMUTH NITRATE—
Hamburg, 1 cs., £10.

BISMUTH SALTS (*otherwise undes.*)
Calcutta, 1 ck., 1 cs. (pt.), £120.

BISMUTH SUBNITRATE
Bushire, 1 cs. (pt.), £6.

BISULPHITE OF LIME
Sydney, 1 c., £8.

BONE MEAL—
Channel Is., 17 t. 16 c., £130.

BORIC ACID—
Alexandretta, 2 c., £7.; Bagdad, 6 c., £20.; Bombay, 1 t. 5 c., £84. Calcutta, 5 c., £19.; Canton, 1 t., £70.; Cape Town, 1 t., £51.; Cologne, 1 t. 19 c. (F.), £96.; Singapore, 2 c., £7.; Wellington, 4 c., £34.

BORAX—
Benkoelen, 1 t. 11 c., £122.; Delagoa Bay, 2 c., £5.; Durban, 10 c., £26.; Rotterdam, 1 t. 10 c. (F.), £39.

CALCIUM CARBIDE—
Accra, 6 c., £5.; Bagdad, 4 c., £9.; Callao, 2 t., £35.; Channel Islands, 10 c., £9.; Dar-es-Salaam (F.), 2 t., £29.; Nukualofa (F.), 10 c., £8.; Sekondi, 7 c., £9.; Pt. Swettenham (F.), 2 t. 9 c., £37.

CALCIUM CHLORIDE—
Townsville, 29 drms., £64.

CARBON (RETORT)—
Boulogne, bulk, 141 t., £318.

CAUSTIC POTASH—
Wellington (F.), 3 drms., £7.

CAUSTIC SODA—
Cape Town, 1 t., £27.; Jamaica, 1 c., £14.; Melbourne, 1 t. 6 c., £40.; Townsville, 9 t. 16 c., £183.

CHEMICALS (*otherwise undescribed*)
Adelaide, 5 cs., £225.; Alexandria, 14 cs. (pt.), £131.; Alexandria, 2 cs. (pt.), (F.), £6.; Auckland, 7 pkgs., £33.; Beira, 7 pkgs., £90.; Bombay, 5 pkgs. (F.), £13.; Brisbane, 24 cs., £210.; Bushire, 3 cs. (pt.), £5.; Calcutta, 20 cs. (pt.), £61.; Calcutta, 2 cs. (F.), £8.; Canton, 7 pkgs., £14.; Cape Town, 8 pkgs., £14.; Christchurch, 2 cs., £6.; Cologne, 80 pkgs., £193.; Colombo, 6 pkgs., £7.; Dar-es-Salaam, 2 cs., £13.; Delagoa Bay, 2 cs., £6.; Delagoa Bay, 1 cs. (F.), £6.; Dunedin, 10 cs. (pt.), £51.; Durban, 8 cs. (pt.), £15.; Fremantle, 12 pkgs., £186.; Gothenburg, 13 pkgs., £26.; Haifa, 4 pkgs., £29.; Hankow, 20 cs. (pt.), £43.; Hankow, 50 pkgs., £125.; Helsingfors, 10 pkgs. (F.), £48.; Hong Kong, 9 cs. (pt.) £130.; Jamaica, 13 cs., £69.; Karachi, 1 drm., £7.; Kilindini, 5 cs. (pt.), £5.; Lyttleton, 4 cs. (pt.), £17.; Madras, 31 pkgs., £126.; Malta, 8 pkgs., £13.; Manzanillo, 30 pkgs., £75.; Manzanillo, 30 pkgs. (F.), £75.; Mauritius, 12 pkgs., £14.; Melbourne, 29 pkgs. (pt.), £340.; Napier, 2 cs., (pt.), £12.; New York, 2 cs. (pt.), £6.; Otago, 12 cs., £306.; Punta Arenas, 5 pkgs., £7.; Rotterdam, 50 pkgs., £130.; Rotterdam, 25 pkgs. (F.), £275.; Santos, 370 pkgs., £979.; Singapore, 6 pkgs., £14.; Suez, 6 pkgs., £18.; Sydney, 118 pkgs. (pt.), £1,737.; Teneriffe, 3 cs., £12.; Tiflis, 20 pkgs., £50.; Toronto, 2 ds. (pt.), £16.; Trinidad, 4 pkgs., £7.; Wellington, 31 pkgs. (pt.), £197.; Winnepeg, 2 cs. (pt.), £15.

CHROMIUM OXIDE—
Melbourne, 2 cks., £35.

CITRIC ACID—
Accra, 1 c., £8.; Antwerp, 10 c., £83.; Auckland, 11 c., £91.; Barbados, 1 c., £12.; Barcelona, 1 t., £166.; Cape Town, 10 c. (F.), £85.; Christchurch, 1 cs., £7.; Durban, 1 c. (F.), £6.; Durban, 10 c., £89.; East London, 3 c., £32.; Fremantle, 5 c., £42.; Gijon, 10 c., £83.; Hong Kong, 10 c., £95.; Jamaica, 1 c., £9.; Lyttleton, 5 c., £42.; Melbourne, 10 c., £83.; Perth, 1 t., £166.; Pt. Elizabeth, 1 c. (F.), £11.; Pt. Elizabeth, 2 c., £18.; Swatow, 1 c., £12.; Sydney, 1 t., £166.; Vera Cruz, 5 c., £42.; Wanganui, 1 c., £8.; Wellington, 3 c., £28.; Westport, 1 c., £9.

COAL TAR PRODUCTS—
Carbolic Acid
H. Kong, 1 cs. £8.; Malta, 34 pks., £82.; Sydney, 3 cks., £17.

COAL TAR PRODUCTS—
Dinitrotoluol
Piraeus, 2 cks., £45.
Mirbane Oil
Durban, 2 drms., £7.
Suva, 2 drms., £9.
Naphtha
Wellington, 5 drms., £9.
Naphthalene
Jamaica, 15 cs., £50.
Sydney, 20 cks., £45.
Pitch
Antwerp (bulk), 500 t., £3,813.; Boulogne, 25 cks., £86.; France, (bulk), 260 t., £1,664.; Melbourne, 1 brl., £9.; Nukualofa, 5 cs., £5.; Pt. Said, 46 cks., £100. Sierra Leone, 4 cks., £5.; Switzerland, 14 cks., £34.
Tar
Beira, 60 drms., £7.; Durban, 1 cs. £7.; Wellington, 20 drms., £8.

COBALT ACETATE—
Antwerp (F.), 1 cs., £25.

COBALT OXIDE—
Amsterdam (F.), 2 cs., £180.; Brussels, 5 cs., £251.; Genoa (F.), 7 pkgs., £1,938.; Paris (F.), 1 cs., £75.; Paris, 28 cs., £1,951.

COBALT SULPHATE—
Sydney, 5 kgs., £89.

COPPER SULPHATE—
Lagos, 4 c., £6.

CREAM OF TARTAR—
Adelaide, 7 t. 10 c., £639.; Auckland, 10 c., £43.; Brisbane, 1 t. 15 c., £152.; Cairns, 5 c., £32.; Cape Town, 4 c. (F.), £27.; Channel Islands, 1 c., £5.; Delagoa Bay, 1 c. (F.), £7.; Dunedin, 5 c., £22.; East London, 1 c., £5.; Fremantle, 1 t., £87.; Hobart, 1 t. 10 c., £130.; Lyttleton, 9 t. 10 c., £868; Melbourne, 13 t., £1,126.; Mossel Bay, 5 c. (F.), £34.; Pt. Elizabeth, 2 c. (F.), £18.; Sydney, 14 t., £1,214.; Townsville, 1 t., £87.; Wanganui, 1 t., £87.

CUPROUS OXIDE—
Paris, 1 drm., £13.

DISINFECTANTS (*otherwise undes.*)
Auckland, 1 t. 18 c., £40.; Bangkok, 4 t. 3 c., £140.; Barbados, 1 c., £11.; Belewan, 3 t. 1 c., £113.; Bermuda, 15 c., £23.; Bombay, 3 t. 8 c., £138.; Calcutta, 4 t. 16 c., £155.; Canton, 12 c., £21.; Cape Town, 7 t. 6 c., £244.; Christchurch, 6 t. 6 c., £988.; Colombo, 4 t. 4 c., £233.; Dar-es-Salaam, 1 c., £7.; Delagoa Bay, 5 t. 17 c., £136.; Demerara, 7 c., £11.; Durban, 3 c., £7.; Famagusta, 5 c., £15.; Gibraltar, 3 t., £28.; Haifa, 1 c., £5.; Hong Kong, 1 t. 12 c., £19.; Jamaica, 5 t. 12 c., £171.; Karachi, 1 c., £7.; Kilindini, 8 c., £36.; Medan, 4 c., £8.; Penang, 12 c., £32.; Pt. Elizabeth, 2 t. 6 c., £88.; Rangoon, 19 c., £28.; Rio de Janeiro, 2 t. 19 c., £165.; Sekondi, 2 c., £8.; Shanghai, 10 c., £15.; Sydney, 1 t. 13 c., £117.; Winnebah, 7 c., £16.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 30 kgs., £180.
Unspecified
Adelaide, 1 cs., £10.; Barbados, 3 cs. (pt.), £13.; Durban, 1 cs., £7.; Jamaica, 1 cs. (pt.), £9.; Melbourne, 17 pkgs. (pt.), 1 ck., £283.; Nukualofa, 1 cs., £10.; Penang, 1 cs., £16.; Sydney, 4 pkgs., £52.; Suva, 3 kgs., £43.; Wellington, 12 kgs., £176.

ETHER—
Alexandretta, 1 cs., £5.; Bagdad, 4 cs., £13.; Bushire, 3 cs., £6.; Canton, 1 cs., £9.; Lyttleton, 2 cs., £16.; Montreal, 3 cs., £34.; Tientsin, 1 cs., £5.

FERTILISERS (*otherwise undes.*)—
Barbados, 15 t., £151.; Beira, 2 t., £24.; Bermuda, 1 t., £15.; Channel Islands, 2 t. 17 c., £41.; Grimstad, 2 t., £50.; New York, 2 t. 14 c., £70.; Stockholm, 1 t., £25.

FORMALDEHYDE—
Barbados (F.), 1 brl., £16.; Barcelona, 5 cks., £75.; Cape Town (F.), 1 ck., £41.; Gibraltar, 2 cs., £15.

GLYCERINE—
Amsterdam, 6 t. 1 c., £300.; Bagdad, 2 c., £9.; Bushire, 1 c., £7.; Calcutta, 2 c., £24.; Canton, 2 c., £11.; Hong Kong, 1 t., £92.; Monte Video, 1 c., £5.; Riga, 10 c., £47.

GUANO—
Demerara (F.), 50 t., £813.

HYDRIODIC ACID—
Otago, 1 drm., £6.

HYDROCHLORIC ACID—
Alexandria, 2 c., £5.; Benkoelen, 1 t. 2 c., £50.; Colombo, 13 c., £15.

HYDROCYANIC ACID—
Melbourne, 2 cs., £15.

HYDROFLUORIC ACID—
East London, 1 cs., £7.
Pt. Elizabeth, 1 cs., £8.

HYDROGEN PEROXIDE—
Antofagasta, 3 cs., £8.
Colombo, 1 cs., £6.

HYPOPHOSPHOROUS ACID
Sydney, 2 cs., £14.

IODIDES (*otherwise undescribed*)
Alexandria, 1 cs. (pt.), £48.
Calcutta, 1 cs. (pt.), £50.

IODINE—
Bombay, 1 cs. (pt.), £26.; Brussels (F.), 1 cs., £47.; Cape Town, 1 cs. (pt.), £26.; Calcutta, 1 cs., £96.; Naples, 2 cs., £124.; Paris (F.), 60 kgs., £4,380.; Rio de Janeiro, 1 cs., £73.

IODINE (RESUBLIMED)—
Brussels, 14 cs. (pt.), £588.
Melbourne, 1 cs. (pt.), £104.

IRON AMMONIUM CITRATE—
Bombay, 5 cs. (pt.), £16.

IRON HYPOPHOSPHITE—
Sydney, 3 cs., £28.

IRON PERCHLORIDE—
Melbourne, 5 crts., £7.

IRON SULPHIDE—
Lyttleton, 1 cs., £16.

LEAD ACETATE—
Fremantle, 23 kgs., £49.

MAGNESIA—
Auckland, 10 cs., £24.
Singapore, 2 cs., £5.
Sydney, 50 cs., £121.
Wellington, 10 kgs., 10 cs., £48.

MAGNESIUM CARBONATE—
Auckland, 1 cs., £6.; Calcutta, 1 cs., £5.; Rio de Janeiro, 10 cks., £60.; Sydney, 20 cs., £33.; Trinidad, 1 cs., £6.; Wellington 2 cs., 1 tank (pt.), £14.

MAGNESIUM SULPHATE—
Auckland, 10 c., £13.; Barbados, 10 c., £10.; Bombay, 5 c., £6.; Brisbane, 2 t. 9 c., £56.; Buenos Aires, 3 c., £6.; Cairns, 12 c., £13.; Canterbury, 5 c., £6.; Canton, 5 c., £5.; Cape Town, 5 c., £6.; Christchurch, 9 c., £27.; Delagoa Bay, 5 c., £6.; Demerara, 10 cks., £8.; Durban, 15 c., £19.; Gisborne, 11 c., £13.; Greymouth, 5 c., £6.; Melbourne, 9 t. 1 c., £206.; Montreal, 2 t. 10 c., £34.; Mossel Bay, 6 c., £8.; Pt. Elizabeth, 2 c., £6.; Rockhampton, 4 t. 6 c., £93.; Singapore, 11 c., £8.; Suva, 5 c., £6.; Townsville, 1 t. 3 c., £26.; Wellington, 1 t. 1 c., £25.

MERCURY BICHLORIDE—
Montreal, 2 cs., £83.

MERCURY OXIDE—
Bushire, 1 cs. (pt.), £12.

METHYL ACETONE—
Copenhagen, 7 drms., £148.

METHYL SALICYLATE—
Brisbane (F.), 1 cs., £8.
Durban, 1 cs., £5.
Melbourne (F.), 1 cs., £9.
Sydney, 4 cs., £55.

NICKEL SALTS (*otherwise undes.*)—
Kobe, 2 cks., £25.

NITRIC ACID—
Alexandria, 1 c., £6.
Singapore, 1 c., £10.

OXALIC ACID—
Calcutta, 1 cs., £5.

PHOSPHATE OF LIME—
Cape Town, 10 c., £18.

PHOSPHORIC ACID—
Lyttleton, 6 cs., £37.
Melbourne, 1 cs., £7.

PICRIC ACID—
Singapore, 1 cs., £6.

PLATINUM CHLORIDE—
Melbourne, 1 cs., £1,123.

POTASSIUM BICARBONATE—
Wellington, 2 kgs., £6.

POTASSIUM BROMIDE—
Hobart, 1 ck., £5.
Paris, 8 cs., 5 cks., 15 pkgs., £230.

POTASSIUM CARBONATE—
Suva (F.), 1 ck., £10.
Sydney (F.), 4 cks., £34.

POTASSIUM CHLORIDE—
Colombo, 4 cs., £12.

POTASSIUM CITRATE—
Bombay, 5 cs. (pt.), £15.; Calcutta, 1 cs. (pt.), £7.; Christchurch, 1 cs. (pt.), £6.; Durban, 1 cs. (pt.), £7.; Hobart, 4 cs., £54.; Montreal, 3 cs., £46.

POTASSIUM CYANIDE—
Canton, 8 cs., £93.
Singapore, 2 cs., £24.

POTASSIUM IODIDE—
Accra, 1 cs., £24.; Antwerp, 1 cs., £86.; Auckland, 1 cs., £88.; Bangkok, 1 cs., £52.; Bombay, 1 cs., £88.; Brisbane, 1 cs., £88.; Brussels, 13 cs. (pt.), £286.; Calcutta, 2 cs. (pt.), £42.; East London, 1 cs. (pt.), £7.; Naples, 7 cs., £398.; Otago, 1 cs., £90.; Rio de Janeiro, 2 cs., £190.; Wellington, 2 cs. (pt.), £11.

POTASSIUM METABISULPHITE
Adelaide, 3 cs., £9.

POTASSIUM OXALATE—
Lyttleton, 1 kg., £8.

POTASSIUM PERMANGANATE—
Adelaide, 2 drms., £8.; Auckland (F.), 1 cs., £5.; Lyttleton (F.), 3 cs., £11.; Otago, 2 cs., £8.; Suva, 1 ck., £11.; Wellington, 2 drms., £8.

POTASSIUM PRUSSIATE—
Fremantle, 2 kgs., £14.
Sydney, 6 kgs., £29.

POTASSIUM SULPHATE—
Demerara, 30 bgs., £37.

SALAMMONIAC—
Auckland, 1 brl., £6.; East London, 2 kgs., £6.; Lyttleton, 1 ck., £14.

SALICYLATES (*otherwise undes.*)—
Shanghai, 1 cs. (pt.), £7.
Sydney, 9 cs., £351.

SALICYLIC ACID—
Jamaica, 1 kg., £7.
Wanganui, 1 kg., £12.

SALTPETRE—
Fremantle, 2 t. 10 c., £105.; Melbourne, 2 c., £7.; Mossel Bay, 3 c., £6.; Pt. Elizabeth, 9 c., £21.; Sydney, 10 c., £20.

SHEEP DIP—
Cape Town, 5 t. 5 c., £140.; Durban, 5 t. 17 c., £158.; East London, 2 t. 4 c., £56.; Pt. Elizabeth, 2 t. 4 c., £56.

SILVER NITRATE—
East London, 1 cs. (pt.), £11.

SODA ASH—
Penang, 1 t. 5 c., £26.
Townsville, 10 t. 17 c., £88.

SODA CRYSTALS—
Bangkok, 5 c., £20.; Barbados, 10 c., £7.; Mauritius, 6 c., £5.

SODIUM ACID PYROPHOSPHATE
Sydney, 2 c., £8.

SODIUM ARSENITE—
Durban, 3 t. 16 c., £274.

SODIUM BENZOATE—
Dunkirk, 4 c., £49.
Mauritius, 1 cs. (pt.), £7.

SODIUM BICARBONATE—
Accra, 12 c., £7.; Alexandria, 2 c., £7.; Brussels, 9 c., £13.; Calcutta, 12 c., £37.; Cape Town, 5 c., £8.; Constantinople, 10 c., £26.; Delagoa Bay, 4 c., £6.; Durban, 11 c., £17.; Montreal, 9 c., £26.; Mossel Bay, 6 c., £9.; Pt. Elizabeth, 4 c., £6.; Rockhampton, 6 t., £66.; Vancouver, 7 c., £17.

SODIUM BISULPHATE—
Sydney, 1 c., £8.

SODIUM BISULPHITE—
Antwerp, 2 t., £36.; Buenos Aires, 10 t., £180.; Copenhagen, 5 t., £95.; Paris, 5 c., £5.; Penang, 2 t., £11.; Sourabaya, 2 t. 1 c., £45.

SODIUM CARBONATE—
Benkoelen, 8 c., £11.

SODIUM CITRATE—
Melbourne, 1 c., £5.
Montreal, 1 t. 1 c., £206.

SODIUM CYANIDE—
Durban (F.), 2 t. 19 c., £220.; Haifa, 8 c., £65.; Townsville, 2 t., £240.

SODIUM HYDROSULPHITE—
Nevis, 1 c., £11.

SODIUM HYPOSULPHITE—
Pt. Sudan, 5 c., £6.

SODUIM IODIDE—
Auckland, 1 cs. (pt.), £7.; Brussels, 3 cs. (pt.), £25.; Melbourne, 1 cs. (pt.), £6.; Naples, 8 c., £755.

SODIUM SALICYLATE—
Bagdad, 1 c., £14.; Christchurch, 1 c., £7.; Melbourne, 1 c., £13.

SODIUM SALTS (*otherwise undes.*)
Calcutta, 1 cs. (pt.), £8.

SODIUM SILICATE—
Durban, 8 c., £12.; Pt. Elizabeth, 1 t. 9 c., £49.; Townsville, 6 t. 1 c., £56.

SODIUM SULPHATE—
Durban, 20 cs., £5.

SODIUM SULPHITE—
Demerara, 11 c., £8.; Lyttleton, 1 t., £29.; Sydney, 1 t. 4 c., £36.

SODIUM SULPHITE (ANHYDROUS)
Penang, 10 c., £14.

SODIUM TARTRATE—
Canton, 2 c., £12.
Sydney, 1 t., £72.

SPENT OXIDE—
Amsterdam, qty., £437.

SULPHUR DIOXIDE—
Alexandria, 12 cylds., £37.

SULPHURIC ACID—
Accra, 14 c., £37.; Bagdad, 2 c., £15.; Calcutta, 6 t. 4 c., £223.; Colombo, 1 t. 10 c., £36.; Haifa, 2 t. 6 c., £310.; Madras, 2 c., £10.; Sekondi, 2 t. 4 c., £40.

TARTARIC ACID—
Adelaide, 1 t. 15 c., £216.; Auckland, 7 c., £43.; Bermuda, 1 c., £5.; Brisbane, 3 t. 5 c., £397.; Cape Town, 1 c. (F.), £9.; Dunedin, 7 c., £42.; Durban, 1 c. (F.), £9.; East London, 2 c., £15.; Fremantle, 1 t., £122.; Hong Kong, 10 c., £78.; Lyttleton, 5 c., £31.; Melbourne, 9 t. 10 c., £1,159.; Montreal, 5 c., £37.; Mossel Bay, 1 c. (F.), £9.; Paris, 2 t., £235.; Perth, 1 t. 10 c., £183.; Pt. Alma, 10 c., £61.; Pt. Eliazbeth, 6 c., £39.; Pt. Elizabeth, 2 c. (F.), £18.; Rotterdam, 5 c., £31.; Vera Cruz, 2 c., £12.; Wellington, 2 c., £18.; Westport, 1 c., £7.

THORIUM NITRATE
Sydney, 2 cs., £85.

TIN OXIDE—
Brussels, 3 cks., £70.

TITANIUM POTASSIUM OXALATE
Cape Town, 2 cks., £16.

ZINC OXIDE—
Buenos Aires, 3 cks., £10.; Bergen, 15 cks., £37.; Copenhagen, 170 cks., £593.; Dunedin, 1 cs., £5.; New York, 9 cs., £56.; Puerto de Progreso (F.) 10 c. £23.; Sydney, 2 cs., £12.; Tampico, 30 cks., £130.; Toronto, 3 cks., £34.

Week ending October 20

BEESWAX
Sydney, 2 t.

CARNAUBA WAX
Antwerp, 1 t.

CERESINE WAX
Sydney, 2 t.

FULLER'S EARTH—
Antwerp, 10 t.; Boston, 60 t.; Durban, 10 t. 10 c.; Seville, 10 t.

GLUE, SIZE, AND GELATINE—
Calcutta, 12 t. 2 c.; Dunkirk, 2 t.; Durban, 2 t. 8 c.; Kobe, 5 t.; La Guaira, 2 c.; Lyttleton, 1 t. 10 c.; Madras, 1 c.; Melbourne, 2 t. 1 c.; Montreal, 10 t.; New York, 31 t.; Paris, 31 t. 9 c.; Pt. Elizabeth, 1 t. 10 c.; Riga, 1 t.; St. John, N.B., 20 t.; Singapore, 2 c.; Stockholm, 6 c.; Shanghai, 2 t. 11 c.; Sydney, 2 t. 7 c.; Wellington, 7 c.; Yokohama, 5 t.

LEAD RESIDUE—
Hamburg, 9 t. 1 c.

PARAFFIN WAX—
Antwerp, 2 t.

PLUMBAGO—
Dunedin, 10 c.; Madras, 10 c.; Santander, 1 t. 2 c.; Tanga, 4 c.

QUININE—
Bombay, 13,664 oz.; Calcutta, 2,023 oz.; Demerara, 1,600 oz.; Italy, 6 oz.; Karachi, 708 oz.; Kilindini, 2,280 oz.; Launceston, 440 oz.; Piraeus, 952 oz.; Sydney, 12 oz.

SALT—
Fiji Islands, 6 c.; Madras, 1 t. 19 c.; Punta Arenas, 10 c.; Sourabaya, 1 t. 6 c.; Wellington, 25 t.

SOAP—
Ahwaz, 1 t. 4 c.; Amsterdam, 1 t. 7 c.; Antwerp, 6 c.; Axim, 3 t. 13 c.; Bangkok, 2 t. 7 c.; Bombay, 4 t. 5 c.; Bremen, 4 c.; Brussels, 9 c.; Calcutta, 2 c.; Cristobal, 5 t. 6 c.; Cuba, 14 c.; Delagoa Bay, 1 c.; Dunedin, 1 c.; Durban, 7 c.; Iquique, 16 c.; Jamaica, 25 t. 19 c.; Kobe, 1 t. 19 c.; Lisbon, 2 c.; Madras, 1 t. 19 c.; Malta, 4 c.; Mauritius, 4 c.; Melbourne, 17 c.; Moji, 2 c.; Montreal, 5 t. 16 c.; New York, 2 t. 10 c.; Paris, 18 c.; Piraeus, 5 c.; Pt. Elizabeth, 4 c.; Pt. Said, 2 c.; Pt. Swettenham, 4 c.; San Francisco, 13 c.; Sapele, 1 t. 5 c.; Singapore, 11 c.; Stockholm, 1 c.; Sydney, 6 c.; Toronto, 1 t. 3 c.; Trinidad, 9 c.; Valparaiso, 8 c.; Yokohama, 2 t. 3 c.

TALLOW—
Danzig, 20 t. 12 c.; Duisburg, 9 t. 3 c.; Hamburg, 20 t.; Havre, 15 t. 1 c.; Nantes, 12 t. 11 c.

TAR (STOCKHOLM)—
Rockhampton, 2 t. 6 c.

WAX (*otherwise undescribed*)—
Melbourne, 1 t. 10 c.

WHITE LEAD—
Adelaide, £108.; Barbados, £14.; Channel Islands, £48.; Christchurch, £96.; Dunedin, £114.; Durban, £271.; East London, £38.; Hobart, £59.; Invercargill, £20.; Irish Free State, £208.; Hong Kong, £5.; Karachi, £54.; Lyttleton, £166.; Maryborough, £46.; Melbourne, £367.; Mitylene £9.; Monte Video, £17.; Paris, £185.; Perth, £84.; Piraeus, £89.; Pt. Elizabeth, £107.; Pt. Said, £10.; Singapore, £101.

MANCHESTER.

Week ending October 23.

ALUM—
Montreal, 29 cks.

AMMONIA ALUM—
Sydney, 9 cks.

AMMONIUM CARBONATE—
Paris, 50 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
Gothenburg, 10 cks.
Malmo, 10 cks.

AMMONIUM SULPHATE—
France, 2,850 bgs.

CAUSTIC SODA—
Bagdad, 10 drms.

CHEMICALS (*otherwise undescribed*)
Basra, 100 kgs.; Busra, 10 cylds.
France, 10 kgs.; Germany, 95 cks.; Mersina, 50 kgs., 34 drms.; Montreal, 26 cks.; Mohammerah, 27 brls.

CHROME ALUM—
Danzig, 94 cks.
Rotterdam, 28 cks.

COAL TAR PRODUCTS—
Unspecified
Basle, 21 cks.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Magog, 2 cks.
Unspecified
Alexandria, 80 kgs.; Bombay, 2 bgs., 3 cks.; France, 2 cks., 1 kg.; Germany, 32 pkgs.

DYESTUFFS (NATURAL)—
Unspecified
Danzig, 20 bxs.

GLUE AND SIZE—
Alexandria, 20 bgs.; France, 46 brls.; Montreal, 200 bgs.; Tripoli, Syria, 20 bgs.; Tunis, 25 bgs.

IRON OXIDE—
Boston, 10 cks.
France, 28 cks.

MAGNESIUM SULPHATE—
Bushire, 10 cs.

SALT—
Montreal, 1,600 sks.
Quebec, 1,600 sks.

SOAP—
India, 20 cs.
The Hague, 25 cs., 10 bxs.

SODIUM SALTS (*otherwise undes.*)
Danzig, 30 cks.

ULTRAMARINE
Bagdad, 15 cs.

ZINC OXIDE—
Cairo, 3 cks.

NEWCASTLE-ON-TYNE

Week ending October 20.

ANTIMONY—
Antwerp, 6 cks., 1 trc.
Hamburg, 15 cks., 14 cs.

BLEACHING POWDER—
Gothenburg, 45 cks.

CARBON (RETORT)—
Genoa, 59 t.

CAUSTIC SODA—
Bremen, 173 drms.; Christiania, 70 drms.; Gothenburg, 17 drms.; Hanburg, 173 drms.

GLUE—
Christiania, 10 bgs.

LITHARGE—
Antwerp, 8 cks.; Christiania, 12 cks.; Gothenburg, 15 cks.; Hamburg, 200 kgs., 100 cks.

MAGNESIA—
Antwerp, 80 cs.; Hamburg, 15 cs.; Montreal, 1 t.

RED LEAD—
India, 20 cs.
Christiania, 26 cks.
Gothenburg, 44 cks.
Hamburg, 135 cks.
Montreal, 2 t.

SOAP—
Bergen, 2 brls., 1 cs.
Gothenburg, 150 cs.

SODIUM SULPHITE—
Antwerp, 4 cks.

WHITE LEAD—
Antwerp, 21 kgs.
Hamburg, 60 cks.

N. & S. SHIELDS.

Week ending October 20,

NIL.

PRICES CURRENT.

WEDNESDAY, OCT. 24, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. *at makers' works, but it must be understood that the prices in different localities may vary.*

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	£3- / &		46/-
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	4½
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	1
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	3
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	6	17	6
Pyridin	gallon	1	2	6
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17 18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	12	6
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	61	0	0
Barium Carbonate (native), 92 94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	80	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	10	0
Formaldehyde, 40%	ton	65	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	41	10	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	42	0	0
Lime Acetate (brown)	*ton	11	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge (British)	ton	38	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	3
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	3
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	23	10	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8½
Potassium Prussiate (yellow)	lb.	0	0	11½
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	50/-	&	57/-
Sodium Acetate	ton	24	5	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	14	10	0
Sodium Prussiate	lb.	0	0	5¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	0	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	7	6
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	4
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	£115	0	0
Antimony	ton	35	0	0
Copper	ton	60	5	0
Lead (Chemical Sheet), delivered	cwt.	1	16	6
Lead (Foreign Pig)	ton	28	15	0
Nickel	ton	130	0	0
Silver	oz.	0	2	7⅛
Tin, English Ingots	ton	202	5	0
Zinc (Spelter)	ton	33	7	6
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	43	0	0
Linseed, Raw	*ton	45	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	13	9

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only.

THE

CHEMICAL TRADE JOURNAL

AND

CHEMICAL ENGINEER.

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CONTENTS.

	PAGE
Current Topics:—	
The Interpretation of the Safeguarding Act	511
The Progress of the B.A.C.	512
Arbitration in the Chemical Trade	512
Government Remuneration of Scientific Talent	512
The Rare Alkali Metals	513
Sodium Sulphate in Canada	515
Bleaching with Hydrogen Peroxide	515
British Association of Chemists	517
Correspondence	518
The Future of the Analytical Chemist	519
Our Bookshelf	519
Combined Grinding and Mixing	520
The Estimation of Selenium in Glass	520
British Empire Exhibition	521
Fatality at a Chemical Works	521
Items of Interest	522
Coming Events	523
Exports of Chemical and Allied Products in September	524
Chemical Trade of the Netherlands	524
Legal Intelligence	525
Trade Inquiries	526
Reports of Companies	526
Revised Railway Charges	526
Fertiliser News	527
Cumberland Coking and By-product Industries	527
South Wales Notes	527
Gazette News	528
New Companies	528
The Patent List:—	
Applications for British Letters Patent	528
Complete Specifications Accepted	528
Complete Specifications Open to Public Inspection before Acceptance	529
Abstracts of Latest Complete Specifications	529
Publications Received	530
Thirty-five Years Ago	530
Market Reports:	
London "Open Market" Report	530
London Metal Market	532
Manchester Chemical Market	532
Swansea Market Report	532
Liverpool Chemical Market	532
West of Scotland Chemicals	533
Imports of Chemical Products	533
Exports of Chemical Products	536
Prices Current	540

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CURRENT TOPICS.

THE INTERPRETATION OF THE SAFEGUARDING ACT.

DURING the past fortnight a point of considerable importance to chemical merchants and importers has arisen in connection with the interpretation by the Customs authorities of the Safeguarding of Industries Act (Part I). One of the clauses to the Act states that "The value of any imported goods, for the purpose of the Act, shall be taken to be the price which an importer would give for the goods if the goods were delivered to him freight and insurance paid, in bond at the port of importation, and duty shall be paid on that value as fixed by the Commissioners." In the past the Customs have adopted a logical interpretation of this clause, and have made it a general practice to accept importers' c.i.f. invoices as evidence of "the value of the goods in bond"; and the amount of duty levied has been based on such invoices. Early last week, however, a circular was issued by H.M. Customs in London to all Dock Officers in Great Britain instructing them to scrutinise all invoices submitted by importers, and that all cases where the "invoice value" of the goods specified thereon appears to be below the fair market price, should be referred to the Customs' Headquarters in London for consideration. These instructions have already been translated into action, and in several cases where the Customs have admitted the importers' invoices as being perfectly *bona-fide*, and where they were also quite satisfied that the price stated is the actual price paid, additional duty has been levied on the grounds that the invoice price was not a "fair market price" at the date the goods were landed in this country. It appears that the reason given for this action on the part of the Customs authorities is that they have had occasion recently to suspect the genuineness of invoices in certain isolated cases. Whilst, however, it may be true that such falsified invoices have been submitted in a few cases, there is no ground for believing that this is a practice adopted by any but a very small minority of merchants. It is rather strange that if the Customs believe that they are legally empowered under the Act to disregard *bona-fide* invoice prices, and to estimate their own prices for the purpose of levying duty, they have not taken advantage of these powers before now. It is common knowledge that the 33⅓ per cent. import duty has proved a very inadequate protection, and that duty-paid imported chemicals have been able to undersell

the home-produced products in a large number of cases. For our own part, however, much as we may sympathise with the attitude of the Customs, we cannot see how they are empowered under Part I of the Safeguarding of Industries Act to adopt their present attitude, since special provisions for these and similar cases are made under Part II. of the Act. There is nothing in the Act to prevent a scheduled article being charged double duty under both Parts; but neither is there any provision whereby a Part II. duty can be levied on an article prior to a Special Order having been obtained under Part II. The dislocation caused in chemical merchants' business by the new Customs' decision has already been considerable, and the British Chemical and Dyestuffs Traders' Association is pressing for the withdrawal of the instructions, but so far the efforts have been without avail. On Monday a deputation from the Association argued the whole matter out with the Customs for over two hours, but the latter would not modify their position. It seems that the only course will be to take a test action to the referee, and this, we understand, is the probable intention of the Association.

THE PROGRESS OF THE B.A.C.

Few organisations have had to encounter such a succession of difficulties during their early years as has the British Association of Chemists, and it is no mean tribute to the energy and executive ability of the council and officers, and to the enthusiasm of the members, that the Association was able to produce such a favourable report and balance sheet at the sixth annual meeting at Birmingham last Saturday. The past year, as the president, Dr. Levinstein, stated, has probably been the most critical one in the history of the Association, and a favourable balance sheet, even though resultant to some extent on a curtailment in the Association's activities, is a very satisfactory achievement. The policy of the council in not increasing the annual subscription is, we think, a wise one, and it is to be hoped that the appeal of the Association for an increase in membership will meet with the success it merits. In the establishment of the Unemployment Benefit Fund, the Association adopted a bold policy, and although the scheme is, after all, still in the experimental stage, the results so far achieved are highly promising. The original idea of an organisation principally to safeguard the economic interests of the chemist was viewed with misgivings in some quarters, and the registration of the Association as a trade union enhanced these misgivings among the older chemists. It is safe to assume, however, that these fears—which never rested on any solid foundation—have now vanished, and chemists are realising that a movement having as its principal objective the raising of the economic status of the chemist, affords also a practical method of raising his social, professional, and political status. The relations between the British Association of Chemists and the Institute of Chemistry occasioned much discussion at the Birmingham meeting. We suspect there is a certain amount of feeling amongst the members of the former body that the latter is not doing all it might to help the younger and non-competitive organisation. We ourselves can make no comment on this point, but cannot help recalling that it was the inception of the B.A.C. some seven years ago that aroused the Institute to activity from a state which could only be described as moribund.

ARBITRATION IN THE CHEMICAL TRADE.

The judgment of Mr. Justice Greer in the case *Scrimaglio* v. *Thornett and Fehr*, gives a decision on a rather important point in arbitration law, so far as it relates to the chemical trade. A contract was entered into between the plaintiffs and the defendants which contained the arbitration clause: "Any dispute arising out of the contract shall be settled by arbitration in London in the usual way." A dispute did arise, and the defendants interpreting the words "the usual way" to mean under the rules formulated by the British Chemical Trade Association, according to which each side appoints an arbitrator, and the two arbitrators, if they differ, appoint an umpire, did appoint their arbitrator. The plaintiffs, however, did not appoint one, and the defendants' arbitrator delivered his award, which the plaintiffs refused to accept. The plaintiffs held that the words "in London in the usual way" meant under the Arbitration Act, and by an arbitrator appointed by the court. Mr. Justice Greer, in giving his decision in favour of the defendants, stated he was satisfied that the arbitration clause referred to the chemical trade, and hence to the procedure of the British Chemical Trade Association. Leave to appeal has been granted, and it is thus possible that the decision may be reversed; but, as the matter stands, it is now established that unless special provision to the contrary is made in a contract, the B.C.T.A. procedure is the one implied.

GOVERNMENT REMUNERATION OF SCIENTIFIC TALENT.

A fortnight ago, commenting in these columns on the address of Lord Salisbury to the Imperial Conference, we made some reference to his remarks on the remuneration of scientific men in the Government service, and pointed out that his words as reported in the Press might give the impression that the Government were willing to exploit scientific talent by giving it a lower rate of remuneration than it could obtain in the service of private industry. Lord Salisbury now informs us—in a letter we publish on another page—that he was referring not to the permanent scientific staff of the Department, but to the distinguished men who serve on the Advisory Council and similar bodies, and who in many cases forego voluntarily the honorarium offered them. We are pleased to publish Lord Salisbury's remarks, and to learn that the impression we gained, rather naturally, from the report of his speech does not represent the true facts.

THE RARE ALKALI METALS.

LITHIUM, RUBIDIUM, AND CAESIUM.

By "Investigator."

IN 1817 a new earth was discovered by Arfvedson and termed "lithia" by the discoverer, because, unlike soda and potash, it was not at the time recognised as a constituent of plant ash. Caesium and rubidium were discovered by Bunsen and Kirchhoff in Dürkheim water in 1860 and 1861, the former being the first element to be detected spectroscopically. On account of their strong resemblance to potassium compounds, those of caesium and rubidium had long escaped detection, until differentiation was possible with the aid of the spectroscope.

By the method of positive ray analysis, F. W. Aston and J. J. Thomson (*Nature*, 1921) have now revealed the composite nature of lithium and rubidium, the former consisting of isotopes of masses 6 and 7, the latter of isotopes of masses 85 and 87. Caesium, however, has not been resolved. According to Hahn and Rothenbach (*Chem. Zentr.*, 1919), like potassium, the salts of rubidium are radioactive, but no activity could be detected in caesium salts. Compared with thorium, the activity is only one-tenth, although greater than that of potassium, while the product of the radioactive change should be a strontium isotope. The periodic classification of the elements predicts the existence of an alkali metal of higher atomic weight than caesium. In the search for this new element, Dennis and Wyckoff (*J. Amer. Chem. Soc.*, 1920), subjected a large quantity of caesium chloride to fractional crystallisation and precipitation, but no evidence of its presence was obtained.

The Occurrence of Lithium.

Contrary to the expectations of its discoverer, lithium is present in land- and marine-plant ashes, notably in tobacco ash, to the extent of 0.07 per cent. Milk, blood, and human organs, particularly the lungs, also contain lithium compounds. As lithium chloride, the element occurs in most mineral springs and in sea water, some Cornish wells containing as much as 30 grains per gallon; while, together with strontium, it is present to an even greater extent in the Italian Salsomaggioro water. Data with regard to the principal lithium-bearing minerals are contained in the following table:—

Mineral.	*Occurrence.*	*Li_2O Content.* Per Cent.
Lepidolite or lithia mica, $9SiO_2$, $3Al_2O_3$, K_2O, $4LiF$.	Rozena (Moravia), and Pala, California.	6
Petalite $30SiO_2$, $4Al_2O_3$, Na_2O, $2Li_2O$..	Uto Island, Sweden, Maine, U.S.A.	5
Spodumene, $15SiO_2$, $4Al_2O_3$, $3Li_2O$..	S. Dakota, U.S.A. ..	5–7
Amblygonite and Montrebrasite, $AlPO_4$, LiF, $AlPO_4$, $4LiOH$.	Montrebras, France, California.	10
Triphylite and Lithiophylite, $LiMnPO_4$ $LiFePO_4$.		8–9½

Zinnwaldite, another lithia-bearing mica, is usually found in tin-mining areas, particularly those of Cornwall, while Arfvedson first discovered lithia in the petalite present in the iron mines of Utö Island, near Stockholm. A glassy variety of the latter mineral, known as castorite, is found in the island of Elba. Spodumene frequently occurs in South Dakota in the form of large prismatic crystals, one gigantic specimen yielding 37 tons of the mineral. Kunzite, a variety of spodumene, finds application as a gem-stone. The fluorphosphate amblygonite very often resembles felspar in appearance.

Lithium Extraction from Silicate Minerals.

In the separation of lithium chloride from non-phosphatic minerals, such as lepidolite, the finely powdered material is mixed with concentrated sulphuric acid, and the resulting agglomerate calcined in a reverberatory furnace to yield sulphates and silica. While still warm, the mass is lixiviated with water, and the solution treated with the calculated quantity of potassium sulphate necessary to form alum with the aluminium sulphate. Not being very soluble, the potassium alum separates out as a fine meal, while any residual aluminium salts are precipitated as alumina by the addition of milk of lime. Barium chloride, in correct quantity, is now added, with the result that the solution will consist substantially of lithium and potassium chlorides—if lepidolite was the raw material,—together with small amounts of sodium and calcium chlorides. After evaporation to dryness, the lithium and calcium chlorides are dissolved out with absolute alcohol, the alcohol is evaporated, and the calcium and any heavy metal salts are removed by treatment with ammonium carbonate and sulphide respectively. The filtered solution is then taken to dryness, and the residue freed from ammonium salts by heating.

In a modification of this process, after decantation from the alum, whiting is added and the solution boiled, when the residual alum is precipitated as alunite by the aluminium hydroxide formed. After removing magnesium and heavy metals as hydroxides with milk of lime, the concentrated solution of sulphates is treated with potassium carbonate, and the sparingly soluble lithium carbonate collected.

According to a recent specification, a lithium-potassium ore is heated with potassium sulphate to a temperature of about 800° C. After lixiviation, the solution of sulphates is treated with sufficient ammonia to throw out iron, aluminium, and magnesium as hydroxides, and to render the potassium sulphate insoluble. From the clear solution, the lithium is obtained as carbonate (*U.S. Pat.* 1,430,877, of 1922).

Lithium Salts from Minerals Containing Phosphates.

A mixture of amblygonite and sodium bisulphite is heated in cast-iron retorts, any silicon fluoride and hydrofluoric-acid vapours being collected. After extracting the mass, the clear liquor is freed from aluminium, iron, and copper by the addition of sufficient sodium carbonate for the purpose. On further treatment with sodium carbonate, the lithium is thrown out of the filtrate as lithium carbonate. In the case of triphylite (substantially lithium manganous phosphate), the material is dissolved in hydrochloric acid, and, after oxidation with nitric acid and neutralisation, the phosphoric acid is removed by precipitation with a ferric salt. To the filtrate, barium sulphide is added to precipitate the manganese, any excess of barium is removed with ammonium carbonate, the clear liquor evaporated to dryness, and the residue heated to drive off ammonium compounds. The residues from the foregoing processes are rich in phosphates, and find application as fertilisers.

A very direct extraction process, due to Zell, consists in heating the lithium ore with carbon in a current of acetylene, so that the volatile lithium hydrogen carbide is formed. On decomposing this with water, the products are acetylene and lithium hydroxide. According to Willard and Smith's recent investigation (*J. Amer. Chem. Soc.*, 1922), lithium can be separated effectively from sodium in one operation by treating a solution of the mixed perchlorates in *n*-butyl alcohol with an alcoholic solution of hydrochloric acid, when only sodium chloride is precipitated.

Occurrence and Extraction of Caesium and Rubidium.

Caesium occurs free from rubidium, to the extent of about 30 per cent., in pollucite, a rare aluminium silicate found in Elba. As chloride, it is present in certain mineral waters, notably in that from the Wheal Cliff Mine (Yorks). Usually it is found, together with rubidium, in lithium ores, certain lepidolites containing about 0.4 and 0.2 per cent. of caesium and rubidium respectively. To isolate them the alums obtained as a by-product in lithium extraction are subjected to fractional crystallisation, potassium alum being 22 times more soluble than the caesium compound. With antimony chloride, caesium chloride forms a sparingly soluble double chloride $SbCl_3.6CsCl$, a property which is utilised in the separation of caesium from rubidium. A large variety of minerals contain rubidium, although carnallite, which contains about 0.025 per cent., is the chief source. In the extraction of potassium chloride from this mineral, the mother liquors are treated with aluminium sulphate, and the sparingly soluble rubidium alum crystallised out. Although very widely distributed in plant-life, rubidium cannot replace potassium as a plant food.

Isolation and Properties of the Metallic Elements.

Owing to the low volatility of metallic lithium, it cannot be obtained by igniting the carbonate with carbon or the hydroxide with iron, the older methods applicable to sodium and potassium. The usual method, a modification of that used by Bunsen, is to electrolyse fused lithium bromide containing 10—15 per cent. of the chloride, with a current of 100amps. at 10 volts, the cathode being carbon and the anodes iron rods. Another method, due to Kahlenburg, is to electrolyse a pyridine solution of lithium chloride, when the solvent unites with the liberated chlorine, leaving the metal unaffected.

Rubidiun. can be isolated by heating a mixture of the carbonate, carbon, and chalk in a still, or by distilling the chloride with metallic calcium in an iron retort. A similar process is applicable in the case of caesium, but this element is most readily obtained by heating the hydroxide with aluminium in a nickel still. Electrolytic methods, such as the electrolysis of a mixture of the cyanide with barium cyanide, using aluminium electrodes, can also be used.

Lithium metal is the lightest solid known, and will float on paraffin. With increasing atomic weight the density rises, but the melting-point falls. Thus the specific gravities (at 15° C.) and the melting-points are 0.59, 1.5, 1.9, and 180° C., 38.5° C., 26.5° C. for litnium, rubidium, and caesium respectively. The order of reactivity is that of increasing atomic weight—caesium, the most electro-positive element, decomposing water with violence at very low temperatures, to form the hydroxide, which is the strongest known base. Lithium, on the other hand, tarnishes much less rapidly than the other alkali metals.

All three metals combine with hydrogen to form hydrides. These compounds yield formates with carbon dioxide, amides and hydrogen with ammonia, phosphine with phosphorus, nitrides and amides with nitrogen, and hydrogen with water. By the last reaction, 1 gramme of lithium hydride (LiH) will yield the large volume of 2.8 litres of hydrogen. Lithium will combine with nitrogen, even at ordinary temperatures, to form black lithium nitride Li_3N, a compound which unites with hydrogen with the formation of the very hydroscopic lithamide $LiNH_2$. The latter is decomposed by water with the liberation of hydrogen and ammonia.

Like sodium, lithium forms several amalgams, and can be alloyed with antimony, tin, and lead. These alloys have higher melting-points than either of the constituent metals, and constitute powerful reducing agents. Recently a large range of lithium-aluminium alloys has been patented as being suitable for constructional purposes, one such composition consisting of aluminium (85 per cent.), zinc (12 per cent.), lithium (½ per cent), together with copper, manganese, or nickel (*Brit. Pat.* 147,903, of 1920).

The More Important Lithium Compounds.

As is to be expected from the first element of a group, the compounds of lithium are abnormal, in that they show many differences from the compounds of the rest of the group. In many respects lithium resembles calcium, and acts as a bridge between the alkali-metal group and that of the alkaline-earth metals.

Lithium oxide can be obtained by heating the nitrate. It dissolves slowly in water to form lithium hydroxide, a substance which is not so deliquescent as the corresponding compounds of sodium and potassium. Also, unlike the latter, it is insoluble in alcohol. Lithium hydroxide is usually prepared from the carbonate by boiling with milk of lime. Two carbonates are formed, $LiHCO_3$ and Li_2CO_3, the bicarbonate being the more soluble of the two, the carbonate being only sparingly soluble. In both these respects lithium behaves more like calcium than the other alkali metals. Thus on adding a solution of sodium carbonate to lithium-chloride solution, lithium carbonate separates out, a property utilised in the extraction of lithium from its ores. The normal carbonate is less soluble in hot water than in cold. Lithium carbonate can be prepared from the chloride by adding a hot concentrated solution to an ammoniacal solution of ammonium carbonate. It is quite insoluble in alcohol, decomposes at 600° C., and melts more readily than the sodium and potassium compounds. The commercial product usually contains 98.5 per cent Li_2CO_3.

Like calcium chloride, but unlike the chlorides of the other metals of the alkali group, lithium chloride is deliquescent, and, on heating, tends to become basic through loss of hydrochloric acid. It will dissolve in alcohol, resembling calcium chloride in this respect, but differing from the other chlorides. Ether will also dissolve lithium chloride, a property not possessed by the chlorides of sodium, potassium, or calcium. Like the calcium compound, lithium chloride will absorb ammonia at low temperatures (– 18° C.), with the formation of a series of compounds $LiCl.NH_3$ to $LiCl.4NH_3$. Lithium fluoride is much less soluble than the corresponding sodium or potassium compounds, being similar to calcium fluoride in this respect.

Lithium phosphate, Li_3PO_4, like calcium phosphate, is only slightly soluble, and is precipitated when disodium hydrogen phosphate is added to a lithium salt solution. This disparity in solubility, compared with the sodium and potassium salts, is utilised in the separation of lithium from other alkali metals. Lithium sulphate forms a double salt with potassium sulphate, but does not form alums. The latter property is turned to advantage in the extraction of lithium from its ores. There is no acid sulphate.

On fusing lithium carbonate with silica, the resulting silicates do not give amorphous glasses on cooling, as in the case of sodium or potassium carbonates, but the product is crystalline, like most metal silicates. Two varieties of lithium metasilicate—soluble and insoluble—are known. Amorphous silicic acid, dried at 100° C., will dissolve slowly in 5 per cent. lithium hydroxide at ordinary temperatures, the latter resembling sodium and potassium hydroxides in this respect. On heating this solution to about 80° C., however, a white, granular, insoluble silicate is formed, with composition represented by the formula $Li_2SiO_3.H_2O$. The latter compound can also be obtained by treating concentrated sodium metasilicate solution with the equivalent quantity of lithium chloride in the presence of lithium hydroxide and heating to about 80° C.

Some Complex Compounds of Rubidium and Caesium.

The chlorides of rubidium and caesium form double salts with a wide variety of metallic chlorides, many of these having found application in microchemical analysis. Thus, according to Bayer (*Monatsh. Chem.*, 1920), characteristic crystalline double chlorides of the general formula xAgCl.y.RbCl are formed when solutions of rubidium chloride and silver salts are mixed. Part of the silver chloride in these double salts is replaceable by gold chloride, the rubidum-gold-silver chloride which results crystallising in blood-red platelets and prisms. A similar compound is formed with caesium chloride, but this crystallises in cubes and stars. As analogous compounds are not formed with potassium chloride, the formation of these triple salts will serve to detect traces of rubidium or caesium in the presence of potassium. The smallest quantities recognisable by this reaction are 0.1 microgramme* in the cases of gold, rubidium or caesium, and 0.01 microgramme in the case of silver. Rubidium and caesium, like all the alkali metals, form chloroplatinates of the general formula X_2PtCl_6. At ordinary temperatures the solubilities of the rubidium and caesium compounds are of the order of 0.13 and 0.02 respectively, the value for potassium chloroplatinate being 0.7.

In addition to the commoner rubidium alums, a large number of these compounds have been prepared from rubidium sulphate and the sulphates of indium, titanium, iridium, and vanadium. An iron rubidium selenium alum, $Rb_2SeO_4.Fe_2(SO_4)_3.24H_2O$, can be obtained by treating a solution of ferric hydroxide in excess selenic acid with rubidium carbonate. The product forms pale violet crystals which melt to a deep-red liquid at about 45° C. Like potassium, caesium and rubidium form a variety of complex compounds with the halogens, such derivatives as RbClBrI and $CsICl_4$ being known. Rubidium ammonium bromide, $RbBr.3NH_4Br$., has been recommended as a good substitute for potassium bromide as an hypnotic and for other pharmacological purposes.

Applications of Lithium Compounds.

It has been proposed to incorporate lithium alumino-silicates, particularly lepidolite, in glass, to increase the fluidity of the melt and to improve the tensile strength, thermo-resistance, and appearance of the finished product (*U.S. Pat.* 1,261,015, of 1918). With the same objects, a recent patent proposes to use mixtures of lepidolite with zinc oxide or boric acid (*Brit. Pat.* 200,020, of 1922). Lithium minerals containing fluorine have been used to produce the opaque effect in opal glass, while another suggestion is to add lithium silicates to enamels in order to increase their fluidity.

According to the Badische Company (*Brit. Pat.* 173,097, of 1922), lithium formate decomposes at about 400° C. with the formation of methyl alcohol and acetone as the principal products. The decomposition is best carried out in revolving drums, in a current of moist hydrogen and under reduced pressure, the heating-bath consisting of fused salt such as potassium nitrate. The formate is prepared at the start by treating a solution of lithium carbonate (or hydroxide) at above 120° C. with carbon monoxide at a pressure of about 700lb. per square inch, the absorption being represented by the equation:—

* A microgramme is one-thousandth of a milligramme.—Ed., *C.T.J. and C.E.*

$$Li_2CO_3 + H_2O + 2CO = 2HCO_2Li + CO_2.$$

A mixture of carbonate and carbon results from the decomposition, and this is reconverted to formate. Lithium hydroxide is used in certain types of accumulator, the bromides and iodide have found applications in photography, while the chloride is utilised in firework manufacture and the cyanide in X-ray work. The chloride and fluoride also enter into the composition of certain welding fluxes for aluminium (*Brit. Pat.* 170,343, of 1920).

Lithium Compounds in Medicine.

A large proportion of the lithium compounds produced is utilised for the preparation of lithia water (which usually contains 10 grains of lithium carbonate per pint), and medicinal compounds. Formerly such salts as the benzoate, quinate, hippurate, and formate, but particularly the citrate and carbonate, were administered for affections due to the accumulation of uric acid in the system, on account of the high solubility of lithium urate. The adverse effect of lithium compounds on the nervous system, however, has led to their replacement by organic bases—notably piperazine,—which form even more soluble salts with uric acid. Lithium citrate is generally prepared by dissolving lithium carbonate (100 parts) in citric acid (186.5 parts), and can be obtained either as anhydrous non-deliquescent powder or as crystals (with $4H_2O$).

Other notable medicinal compounds are the diuretics, lithium theobromine salicylate, lithium potassium tartrate, and lithium acetate, while lithium glycerophosphates are useful in cases of neurasthenia. Lithium theobromine is four times as active as the free purine base itself, and is prepared by treating lithium hydroxide with excess of the base. The lithium salt of acetylsalicylic acid is prepared by treating lithium carbonate with the equivalent amount of the acid in the presence of organic solvents or a small quantity of water (*Brit. Pat.* 171,281, of 1920). To improve the keeping quality, 5 per cent. of sodium bicarbonate may be incorporated in the tablets.

American Production of Lithium Minerals.

According to a report of the Geological Survey of the United States, the output of lithium minerals for certain years was as follows, there being evidence of a much-increased production: —

	Short Tons.	Value.
1903	1,150	£4,800
1904	575	£1,000
1919	6,287	—

The output in 1919 was nearly ten times greater than in 1916, the bulk of the material being mined in California and South Dakota.

SODIUM SULPHATE IN CANADA.

EXPLOITATION OF NATURAL DEPOSITS.

SOME interesting information regarding the extensive sodium-sulphate deposits of Western Canada was contained in a paper read by I. H. Cole, of the Canadian Department of Mines, at the annual meeting on October 3 of the Southern Saskatchewan branch of the Canadian Mining and Metallurgical Institute. According to a report by our Toronto correspondent, there are known to be 90 of such deposits in the Province of Saskatchewan, of which only six have been thoroughly investigated by the Department of Mines. These show probable yields of between seventeen and twenty million tons of sodium sulphate, which, if developed, could supply the growing Canadian demand, now met by large importations from Britain and the United States.

The only deposit now being worked is at Muskiki Lake, near Dana, where the Salts and Chemical Company have spent about 500,000 dollars in developing the property. The Bishopric and Lent Company, of Cincinnati, Ohio, are erecting a plant at Frederick Lake, near Expanse, and expect to begin operations shortly. The principal deposits in the southern part of the Province are south of Lake Johnson and in the sandhills of the Empress district north of Swift Current. In the northern part of the Province many deposits occur around Macklin, and a belt extends across the Province with contents estimated at from half a million tons for some of the smaller lakes, to fifteen million tons in some of the larger lakes.

BLEACHING WITH HYDROGEN PEROXIDE.

VALUABLE PRACTICAL PAPER AND DISCUSSION.

LECTURING to the London Section of the Society of Dyers and Colourists on Thursday, October 25, Mr. I. E. Weber, chief chemist to Messrs. B. Laporte, Ltd., of Luton and Bradford, advocated the claims of hydrogen peroxide as a bleaching agent over those of the sulphur dioxide bleach. The principal advantages advanced were that the bleach is more permanent, and that the process is a much more convenient one to work. Speaking of the SO_2 process, which Mr. Weber called bleaching by reduction, it was stated that the sulphur stove has changed little since it was first used, and is still uncomfortable to work because of the suffocating fumes. The SO_2 bleach is not permanent, as after a short time the yellow colour returns to the wool. One theory held is that the sulphurous acid formed by the SO_2, with the moisture in the material to be bleached, combines with the yellow compound to give a colourless bisulphite addition compound which is unstable and breaks up, giving the original colour. A further objection to the stoved white is its effect on dyestuffs, which are readily destroyed by sulphur dioxide. The lecturer said he had known of dyed goods the colour of which had been absolutely spoiled because they were shipped in the same crate as stoved goods.

Hydrogen Peroxide for Cotton Bleaching, a Future Probability.

Dealing with hydrogen peroxide bleaching—an oxidation process as opposed to a reduction process—Mr. Weber said the ideal bleach is one which will destroy the colouring matter and leave the fibres intact, and he claimed that hydrogen peroxide is such a bleach. What hypochlorite had done for the bleaching of cotton, hydrogen peroxide was doing for the bleaching of wool; but even for cotton, hydrogen peroxide was superior to hypochlorite, especially in the fine counts, and the day would no doubt arrive when the price of hydrogen peroxide would allow of its extended use in the bleaching of cotton. The white was a purer white than with the SO_2 bleach, and the fibres did not tender. Further, garments bleached with peroxide do not possess an unpleasant odour when the wearer perspires, and the sterilising properties of the peroxide render the goods capable of being stored without creating mildew. Since merely water is left after bleaching, the goods do not need the rinsing required by other bleaches.

Materials for Bleaching-tank Construction.

After some details of manufacture and methods of testing volume strength, Mr. Weber pointed out that the stability of hydrogen peroxide is unaffected by the weakness or strength of the solution, and discussed the most suitable types of materials to be used in plants for bleaching with this process. Whilst the materials which may be used are many, there are disadvantages in some of them. Wood, for instance, disintegrates owing to the prolonged action of the peroxide, although wooden tanks may be given a new lease of life by pegging them and giving them a coat of half an inch of concrete. Lead-lined vats are sometimes used, but an alkaline solution of peroxide acts on the lead, forming a lead peroxide, which may scale off as dust on to the goods. Enamelled vessels, either enamelled cast iron or steel, make excellent baths. Porcelain, although unacted on by the peroxide, does not stand the wear and tear of the bleaching plant, and is liable readily to crack. A very serviceable bleaching tank can be made of glazed and blue bricks, the glazed bricks being inside and the blue bricks outside. The tank should be built on a concrete bottom, and the joints between the bricks should be thin. Such a bleaching tank should last for years.

For heating up the bath, lead or tin coils should be used. Tin resists the action of weak peroxide solutions well, and repays the initial expense. The coil is laid across the floor of the bleaching tank and is covered with a perforated false bottom to prevent the goods coming into contact with it and so burning them. As to the effect of various metals on hydrogen peroxide, as affecting the materials of which the bleaching tanks are made, Mr. Weber gave the results of tests in this connection. These tests were made on 100 c.c. of a 6.3 volume acid peroxide. The metal and peroxide were placed in a round-bottomed flask to which was attached a

double surface reflux condenser. After heating for half an hour on a water bath, the peroxide was cooled for 15 minutes and tested. The temperature of the peroxide in the flask whilst being heated on the bath was 92° C., and from the detailed figures given it is seen that copper, or alloys of copper, decompose peroxide when it is acid, whilst lead, tin, antimony and nickel are satisfactory. Bearing metals which are alloys of lead, tin and antimony, can be safely used. These tests, as a matter of fact, confirm what is found in practice.

Neutralising the Acidity of Hydrogen Peroxide.

A number of other practical points were then touched upon, relating in turn to the water, the hydrogen peroxide, and the alkali necessary to neutralise the acidity of the hydrogen peroxide. A softened water was recommended, and the importance of keeping iron salts out of the water was emphasised. As to the use of a suitable indicator, the general statement that the solution should be faintly alkaline to litmus was regarded as indefinite, and this very indefiniteness was said to be due to the poor qualities of litmus as an indicator. The lecturer said he had made tests which had convinced him that phenol-red is a much more satisfactory indicator, and should be a help in neutralising the bath. For this latter purpose, a preference was expressed for silicate of soda over ammonia, as in large-scale trials with 300 or 400lb. of wool it was shown that one-third the cost of hydrogen peroxide used in bleaching can be saved by neutralising with silicate of soda.

Difficulties in Leather Bleaching.

Questioned with regard to the bleaching of leather, Mr. Weber said that his experience in this connection, for the production of white gloves, had not so far been successful. One of the troubles was due to the acid used in tanning. For example, in bleaching white woollen rugs, on steeping the leather and wool in the peroxide, the peroxide turned acid, and it required an enormous amount of alkali to neutralise this acid.

Mr. R. B. Brown referred to substances used to improve the stability of the bath for other purposes, such as pyrophosphates, which he believed were used largely in straw bleaching, and asked whether these substances had also found application in the bleaching of wool, silk, and textiles.

Procedure in Straw Bleaching.

Mr. Weber, after commenting on the fact that those concerned with straw bleaching were very jealous of their processes, said that straw bleaching was a much more drastic process than wool bleaching. In straw bleaching there were a large number of operations which did not take place in wool bleaching, and therefore the quantity of pyrophosphate of soda required to neutralise a bath was so small in the latter case that his firm had never recommended its use. Also, it was no better than silicate of soda in the case of wool. With straw bleaching a very large amount of pyrophosphate of soda was used in the bath, and silicate of soda could not be used there, because it would destroy the straw fibre. In some straw bleaching processes much more ammonia was used than in any process of wool bleaching; as much as 2 pints of ammonia to 10 gallons, say, of hydrogen peroxide would be used, and the whole of the oxygen liberated in 6 hours. Whereas in straw bleaching the object was to use a strong bath and liberate the oxygen quickly, in the case of wool bleaching the object was to use a weak bath and liberate the oxygen slowly.

Advantages of Hydrogen Peroxide Over Sodium Peroxide.

Mr. Evan W. Walker asked what metal Mr. Weber recommended as the lining for the hydro-extractor used for extracting bleached goods, as he understood they were "hydroed" and the drainings passed back into the bleaching bath. Also, what did Mr. Weber say as to the comparative merits of hydrogen peroxide and sodium peroxide in connection with the bleaching of tussore.

Mr. Weber said that as a rule the goods were put into linen bags and hydroed, so that they did not come into contact with the sides of the hydro. Otherwise, the sides of the hydro were lined with some material, such as filter cloth. Another good method was to tin the inside of the hydro, to prevent damage to the hydro itself. As to the pipes for carrying hydrogen peroxide from one vat to another, lead was the best metal to use. As to the bleaching of tussore with sodium peroxide and hydrogen peroxide, the problem one would consider was that of cost. Hydrogen peroxide was being sold at a price which enabled it to compete quite readily with sodium peroxide for bleaching. In addition, with hydrogen peroxide there was not the risk of fire that there was with sodium peroxide. Further, there was risk of sodium peroxide getting on to goods and burning them, and the sodium peroxide had to be neutralised with an acid; sulphuric acid was used as a rule, and this meant an accumulation of sodium sulphate in the bath. There was not so much labour involved in making up the hydrogen peroxide bath as the sodium peroxide bath. Comparative trials had been made, and these showed that with sodium peroxide it cost 1.23d. per lb. to bleach, sulphuric acid and ammonia being used to neutralise. With hydrogen peroxide, using silicate of soda, the cost per lb. was 0.9d., so that in this particular instance, where there was something like 6,000lb. per week to bleach, it meant a saving of something like £4,000. per annum.

Mr. Walker asked the effect of these bleaches on aluminium. Alkalies affected aluminium very seriously, but it was remarkable that the sodium-carbonate solution, when it contained a proportion of silicate of soda, appeared to exercise no action.

Mr. Weber replied that peroxide without silicate of soda did attack aluminium, alumina being precipitated. He had not tried it with silicate of soda, but did not think it would stand up. He had tried chrome steel, which was a rustless steel, and which should be ideal for bleaching, but where there were flaws in the polished steel, ferric oxide occurred. Tungsten acted well when polished, but the weaknesses were shown up immediately.

Comparative Merits of 100-Volume Peroxide.

Asked whether the manufacture of 100-volume hydrogen peroxide, which was carried out in America and elsewhere, could be made a commercial success in this country, Mr. Weber pointed out that the difficulty here was that we had not the facilities for cheap power, but we were very fortunate in having a source of barytes, from which to make very high grade hydrogen peroxide. The only thing in favour of the 100-volume hydrogen peroxide was the advantage in handling, due to the smaller quantity needed for the same work as compared with the 12-volume peroxide. As to its bleaching properties, Messrs. Laporte had carried out exhaustive trials, using the foreign 100-volume peroxide against their own 12-volume, and had shown on each occasion that, where silicate of soda was used, and where the bleaching was carried on as they recommended, they could get better whites with their own 12-volume peroxide.

As to the delivery of hydrogen peroxide to the users, a tank lorry had been adopted. The peroxide was pumped direct from storage tanks into the lorries, and pumped out again into storage tanks at the users' works, from which it could be run direct into the vats. The 100-volume peroxide could not be handled in that way so conveniently, because it was much more corrosive. His firm had been making small quantities of 100-volume peroxide in this country, and hoped in time to be able to supply it to those who wanted the higher strengths, but he did not think the 100-volume peroxide would be demanded for wool bleaching.

In reply to another question, Mr. Weber said that, for bleaching purposes, no other preservative than acid was used. Referring to comments made in the Press as to damage caused by hydrogen peroxide, used for toilet purposes, being splashed on to cotton goods, Mr. Weber said it was the acid in the peroxide which caused the damage, but whether the damage was as frequent as the writer in the Press made out he doubted. This would hardly apply in the case of woollen goods anyhow, because the amount of acid required to make the peroxide stable in storage would not be sufficient to damage wool.

With regard to the silicate of soda, Mr. Weber said that 140 Tw. was used; 2lb. of 140 Tw. was used for 40 gallons of hydrogen peroxide, and this was diluted with water. There was a silicate of soda in powdered form being put on the market, in which the SiO_2 ratio was higher than in the ordinary 140 Tw., but whether the increased silica had an increased stabilising effect it was too early to say. It being suggested that alpha-naphthol-phthalein was a useful indicator for bleaching, Mr. Weber said he had tried it for the bleaching of wool, but had found that the phenol-red was the best.

BRITISH ASSOCIATION OF CHEMISTS.

"Take my advice. Unite! Hold high the standard of chemistry and chemical industry."—Lord Moulton.

Hon. General Secretary: Mr. I. Boodson, Bedford House, 108, Baker Street, London, W. 1.

Hon. Registrar: Dr. David Bain, The Woodlands, Crescent Road, Crumpsall, Manchester.

Hon. Treasurer: Mr. H. E. J. Cory, Bedford House, 108, Baker Street, London, W. 1.

Hon. Editor: Mr. A. Merrick, 4a Rossett Road, Great Crosby, Liverpool.

NOTICES.

Full information regarding the Association may be had on application to the Hon. General Secretary, to whom all applications for membership should be sent.

It is particularly requested that all changes of address be notified promptly to the Hon. General Secretary.

A register of members seeking appointments is kept at the registered offices of the Association. All inquiries should be addressed to the Hon. General Secretary.

Short articles, letters, etc., on matters of general interest are invited from members of the Association. These, together with all reports of meetings, should be sent to the Hon. Editor.

THE ANNUAL GENERAL MEETING.

THE sixth annual general meeting was held on Saturday, October 27, at the University of Birmingham, under the chairmanship of the President (Dr. H. Levinstein). There was a representative attendance.

The Treasurer's Statement.

The Hon. Treasurer (Mr. H. E. J. Cory), who moved the adoption of the statement of accounts, said that for the first time in four years their income on the general account had exceeded their expenditure. The present income, however, was quite insufficient to meet the needs of the Association, having regard both to the cost of covering adequately and completely the whole field of the B.A.C. activities, and to the attendant costs of administration, which, at present, absorbed approximately 60 per cent. of available income. An improvement in their financial position could come only through an extension in membership. The financial state of the Unemployment Benefit Fund was extremely satisfactory, and in spite of large calls, at the end of the year a substantial balance still remained. He recommended that the actual creation of the Special Reserve Fund be undertaken at an early date, and estimated that at least £100. per annum would be available for this purpose at the present rate of working. The administration of the Fund had entailed heavy additional work on the part of their staff. In that connection a special word of commendation was due to Mr. Mills, whose wholehearted efforts had made possible the success of this Fund.

The President said a very fair and excellent statement had been put before them, and reflected the greatest possible credit upon those responsible for supervising the finances of the Association.

Mr. E. F. Morris (Manchester) seconded the resolution, which was carried.

Report of Council.

Mr. W. E. Kay moved the adoption of the report of the Council. He said he would like to pay their congratulations to the Council and to Mr. R. Brightman, the Hon. Editor, for his informative and instructive articles which had done much to mould opinion among the members and to promote progress. His (Mr. Kay's) hope was that the Association would become absolutely representative in bulk membership of the chemists of the country, but frankly they had to admit they were, as yet, a long way off that ideal. There was no matter upon which the members could more usefully devote themselves than that of making known the objects of the Association. One of those main objects had relation to the Unemployment Benefit Fund. In this, the economic aspect of the Association had been brought to the forefront; the working of the Fund had represented, as it were, a leap into the unknown. The experience, so far, had been satisfactory; the Fund showed financial soundness; and it would appear that it would grow and prosper. They had experience to gain yet; they were not out of the wood; and a longer period of working was necessary to demonstrate definitely how far their scales of payment were adequate to meet possible demands upon the Fund.

With regard to "external relations" during the year, the negotiations with the National Union of Scientific Workers originated from the Scientific Workers; the desire on their own part being to work in accord with all bodies having similar ends to their own. Mr. Kay added that he had always felt that their natural line of association was with the Institute of Chemistry, and he clearly indicated this in the early days of the Association in letters he wrote to the *Chemical Trade Journal and Chemical Engineer.*

The President: We gave a stimulus to the Institute.

Tribute to the "Chemical Trade Journal and Chemical Engineer."

Mr. Kay replied that he quite agreed. In conclusion he expressed on behalf of the Council warm appreciation of the excellent services long rendered by their late Secretary, Mr. Price, and also by Mr. Brightman, the Editor of their journal; he was personally sorry he was not able to continue that work. In association with that, he would also like to refer to the most happy relations which existed between themselves and the *Chemical Trade Journal and Chemical Engineer*, and he recalled the voluminous correspondence that arose out of the attempt to found the B.A.C. From that time to the present the Editor had placed open the columns of that paper to any subject of real concern to the interests of chemistry, and as a member of the Council he would like to express their appreciation of that generous consideration.

Mr. E. R. Redgrove seconded, and stated that he there wished to support Mr. Kay's remarks regarding their relation with the Institute of Chemistry. He concluded with a tribute to the sterling service rendered by Mr. Kay; he had been largely instrumental for the success that had been achieved.

Discussion on the Report.

Dr. J. L. Hankey said they were sometimes asked what the Council was doing, but it was not always easy to give an answer because much of the work was of necessity to some extent confidential and it was frequently in the direction of consolidating the position of the Association. Their one great ideal was to raise the status of the professional chemist, and their efforts were to that end; they desired he should occupy that place in public opinion to which he was entitled.

Working of the Unemployment Benefit Fund.

Mr. A. S. Mills (Assistant Secretary), in reply to a question by Mr. Gibson, said that at the present time the Unemployment Benefit Fund took up nearly half of the actual office work. One quarter of the total rent was charged to the Fund, and one half of the typists' salary, general postages, and stationery. A larger disbursement would be really better for the Fund because it would indicate development. Mr. Cory (Hon. Treasurer) pointed out, on the same subject, that the administrative cost of the Fund showed a lower percentage than the general run of insurance companies having similar schemes.

Mr. Rowell said they had a right to more members because the Association was offering by their unemployment scheme to do what no other organisation of chemists could do. The Institute of Chemistry could not do it; nevertheless the Association had been of the greatest help to it; it had doubled the membership and they in turn were deserving of some return. In Birmingham there were a number of members who later were admitted into the Institute of Chemistry, and they had left the B.A.C. and his hope was that these men would return.

What the B.A.C. Really Means to the Chemist.

The President said the Association was something different from the other organisations, for its outlook and its functions were different. It was not a high-brow movement; it was not got up by professors and recognised people who had hitherto spoken for the chemical profession; and its work was not done behind closed doors and sealed windows. It was a movement started with open doors and windows, "from below." Their object was to get together all men who were engaged in factories and in chemistry generally, in the Association which was run by persons similar to themselves. In a corporate way it could help them in all kinds of difficulties that might arise; neither the Institute of Chemistry nor the Society of Chemical Industry could do this.

Alteration of Rules.

The President, speaking with regard to the suggested alterations of rules, pointed out that in the one case the

proposal was to give authority for the appointment of two vice-presidents instead of one, and the object was to enable them to appoint Mr. Kay. The other alteration in relation to the Unemployment Benefit Fund would remove an ambiguity.

The resolution, which was proposed by Mr. Johnson and seconded by Mr. Hills, was approved.

Election of Officers.

The President pointed out that the following nominations had been received:—President, Dr. Herbert Levinstein; vice-presidents, Mr. W. E. Kay and Mr. Fred Scholefield; hon. treasurer, Mr. Harold E. J. Cory; hon. general secretary, Mr. I. Boodson; hon. registrar, Dr. David Bain; and hon. editor, Mr. A. Merrick. Personally, he much regretted the loss of Mr. Kay from the office he had held for so many years; and he also regretted to say that Mr. Brightman was no longer able to carry on his duties as Editor; and he desired also to make a similar expression of regret with regard to Mr. Price. Dr. Hankey moved the resolution, which was seconded by Mr. Kay and carried. On the motion of Mr. Bath seconded by Mr. Rowell, Messrs. Hughes and Allen, were re-elected auditors.

The meeting concluded with a vote of thanks to the President; and the members then took tea, at the invitation of the Chemical Department at the University. Later, they inspected in that Department an exhibition of specimens and apparatus from the Research Section.

THE ANNUAL DINNER.

In the evening the annual dinner was held at the Queen's Hotel, Birmingham. The President (Dr. H. Levinstein) occupied the chair; and the guests of the evening included Professor G. T. Morgan (Chemical Department, University of Birmingham), Dr. E. B. Maxted (chairman, Birmingham and Midland Section of the Society of Chemical Industry), Dr. Sumpner (head of the Birmingham Municipal Technical School), Dr. Newton Friend (head of the Chemical Department, Birmingham Technical School), Major A. G. Church (National Union of Scientific Workers), and Dr. Stephen Miall (Federal Council of Pure and Applied Chemistry).

The toast "The B.A.C.," was proposed by the President, who said he was recently criticised for an observation, in relation to unemployment, which suggested what a wonderful thing it was to go into chemistry, and that fathers and mothers need not then worry about their boys and girls who entered into it. He pleaded "not guilty" to anything of that sort. What he said was that if new industries were developed and a bid made to secure the world's markets, there would be an opening for chemists which hitherto did not exist. The B.A.C. had a great opportunity, and definite functions not possessed by the Institute, and his sincere wish was that the Association would flourish, and continue to grow in strength and influence.

The toast, with which the name of Mr. W. E. Kay was coupled, was warmly received.

Mr. Kay, in reply, said his message to his fellow members was: "Try and increase the numerical strength of our Association and so enable us to serve the general body of chemists in this country."

Functions of the Various Societies.

The toast "Kindred Societies" was proposed by Mr. E. R. Redgrove. Dr. Maxted, who replied, said that chemical societies might be divided into two groups: those whose object was to further chemistry, and those whose aim was to further the chemist. Each group had its own importance and special work. They, of other societies, were conscious of the good work that was being done by the "B.A.C.," and to them their message could only be: "May they flourish and increase." They should not lose sight of the fact however that the real place of chemistry and of chemists was determined not by societies or organisations but by the standard of chemistry.

The toast "The Universities and Seats of Learning" was submitted by Dr. F. W. Kay, who coupled with the toast the names of Professor Morgan and Dr. Friend. The toast was honoured with enthusiasm. Professor Morgan replied, and expressed the hope that year by year the B.A.C. would meet in one of the Universities, and would thus come into closer communion with the young chemists who were receiving their training there. Dr. Newton Friend also expressed his appreciation of the honour done him, and a wish for the Association's success.

Mr. N. P. Booth (Birmingham) proposed the toast of "The Guests."

The Chemist and the Lawyer.

Dr. Stephen Miall, whose name was coupled with the toast, mentioned that he was probably the only one present who was not a chemist. He had been trained in the profession of the law, and it was of great interest to notice the extraordinary difference between the organisation of lawyers and the organisation of chemists. All the lawyers were members of one or two societies. That gave them the power of making their voices heard far greater than the power which chemists could exercise at the moment. To become a chemist was at least as difficult and involved as much prolonged study, probably more, as was necessary to become a lawyer. Yet the chemists seemed to make less impression upon the great body of the public, including the manufacturers of the country, than did their not more highly educated brothers in the law. The great factor which gave barristers their importance, power, and influence was the very strong and united public spirit that existed among them; there was a public feeling amongst themselves which was very dominant and hardly any barrister dare transgress the traditions which prevailed at the Bar. That public spirit was fostered and encouraged by the fact that barristers were accustomed when students, and after they had become practising barristers on circuit, to dine together, to get to know each other and to discuss not only points of law but of etiquette.

Mr. E. F. Morris submitted the toast of "The President."

The toast was warmly honoured and the President briefly replied.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE REMUNERATION OF THE SCIENTIST IN GOVERNMENT RESEARCH.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Lord Salisbury has noticed with great pleasure your appreciative article on the co-operation of the different parts of the Empire in scientific research, dealt with in his recent speech to the Imperial Economic Conference. He would like, however, to assure you and your readers that when he spoke of the willingness of scientific men to place their services at the disposal of the Government and the community for "far less than the true remuneration of their great talents," he was referring not to the scientific staff of the Department, but to the distinguished men who serve on the Advisory Council and other committees and boards of the Department, most of them entirely gratuitously. The members of the Advisory Council are offered a modest honorarium, but it is not always accepted.—Yours, etc.,

Philip Farrer, Private Secretary.

Privy Council Office, London, S.W. 1,
October 29, 1923.

THE EMPIRE MARKET FOR BRITISH DYESTUFFS.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—There must be many who, while convinced Free Traders in a general sense, wish to see a vigorous reservation in favour of the British dyestuffs industry. Greater Britain's annual dyestuffs requirements are, roughly, these: South Africa, 50 tons; New Zealand 200 tons; Australia, 400 tons; Canada, 1,200 tons; India, 7,000 tons.

Now, in Australia it is forbidden for any manufacturer of foreign dyestuffs to send goods into the Commonwealth unless he has a license. Australia, however, is the only region of the British Empire which has set up this absolute prohibition against the outsider. In South Africa, German dyes are freely used. In Canada we hold at the moment only about one-tenth of the market. In India the German, paying the same rate of duty as we do, has just as much advantage, although it is not at all improbable that here terms could be arranged as between India and ourselves. Indeed, it seems to me that, before the Empire Premiers go home, some very definite understanding should be come to regarding the attitude of the Dominions to the Mother Country, at least as far as dyestuffs are concerned.—Yours, etc.,

Potters Bar, October 19, 1923. N. Grattan Doyle.

THE FUTURE OF THE ANALYTICAL CHEMIST.

STREATFEILD MEMORIAL LECTURE.

THE Streatfeild Memorial Lecture at the Finsbury Technical College, London, was delivered on Thursday, October 25. Mr. Julian L. Baker, who presided, explained the circumstances of the Lecture, which is in memory of F. W. Streatfeild, who was lecturer and demonstrator in chemistry at the Finsbury Technical College from 1883 to 1917 and died in March, 1918, when actually on the college staff. The Memorial Lecture has been made possible as the result of subscriptions amounting to £230., the income from which is allotted to the purpose in question and the award of a gold medal and portrait to the lecturer each year, together with a prize of £5 to the most proficient third-year chemical student.

The lecturer this year was Mr. E. M. Hawkins, public analyst at Canterbury, and he departed from the usual custom of dealing with a technical subject, devoting the lecture to a talk to students concerning the qualifications and openings for analytical chemists. The lecturer, who was one of Streatfeild's students—it is a condition of the arrangements that the lecturer shall be an old student of Streatfeild's,—first recalled many of the incidents that arose during the time he was under Streatfeild and acknowledged gratefully the help that was given him by his old teacher.

The Three Categories of Analytical Work.

Passing on to the main subject of his lecture, he said that analytical work can be divided roughly into three categories —viz., the public analyst, the works analyst, and the consulting chemist,—and he put forward the suggestion that these three branches will tend to become more and more distinct. Discussing the technical training of those who aim at entering the profession of analytical chemistry, it was urged that the old idea of treating the analyst in a different way from the chemist should be abandoned, and that it is necessary for an analyst to be a good chemist and for a chemist to be a good analyst. One reason for making this assertion was the lecturer's knowledge of men who had drifted into positions as analysts, but who, he said, could not, by any stretch of the imagination, be regarded as chemists. Thus there was a need for the broadest possible training for all those who aimed at becoming analytical chemists. He also uttered a warning against the tendency by some chemists to regard physics and mathematics as things they should not bother themselves with, because there was little chance in analytical chemistry generally for the man who disregarded physics and mathematics, or who did not have some knowledge of electrical science. One of the greatest needs of the analytical chemist was the ability to make accurate calculations.

After a word in praise of the examinations of the Institute of Chemistry and the manner in which they are framed to ascertain the students' practical knowledge, Mr. Hawkins recommended all those desiring to take up analytical chemistry to spend some period, after leaving college, in a food-producing or similar factory, in order to learn the details of the processes, and he ventured the opinion that such an experience would be of the greatest possible value later when the student might have a public appointment, in preventing him making impossible suggestions as regards manufacture. He himself had found the benefit of such an experience, and had never regretted the year he had so spent.

The Qualifications for the Analytical Chemist.

Passing to the most important qualifications for the analytical chemist, first place was given to accuracy, it being added that one of the most undesirable things was for a student not to know he was inaccurate in his work. Mr. Hawkins stated he had met those who had employed young men from college, and the complaint always was of inaccuracy. Another important essential was rapidity of work. A warning was also given concerning the very great amount of detail work which has to be done in the analytical laboratory, but the importance of such work was emphasised. On this aspect, too, reference was made to Streatfeild's contempt for what he often termed a kid-glove chemist, the man who did not like to get his hands dirty or his clothes spoiled. Emphasis was next laid upon the absolute necessity for clear expression in preparing reports, as so many valuable pieces of work have, said Mr. Hawkins, failed to attract the attention they deserve on account of inability of the investigator to express himself in simple and clear language. Further, the analytical chemist was impressed with the great necessity for being able to have confidence in his results and to justify them when occasion demands it.

New Openings in the Future.

Comparing the possibilities under the three headings into which the lecturer originally divided his subject, it was stated that although there might be a tendency for the number of analytical chemists employed by the Government and the municipalities to increase, experience did not suggest that that would be so, and therefore the number of openings would always be limited. To counterbalance this, however, the employment of analysts by manufacturing firms was becoming more and more common, and the openings here would increase very largely in the future. As to remuneration, an able man would be able to command equally high remuneration either as a public analyst or as a works analyst, although the works chemist in control might be better off. There was also the uncertainty of private employment, due to the state of trade, to be taken into account. As to the nature of the work, the works analyst might be more restricted in the scope of his operations, and the work of the public analyst or the consulting chemist, being the more varied, was the more interesting on that account.

Finally, Mr. Hawkins suggested that as time goes on the consulting chemist would become more and more separated from the public analyst and the works analyst. There would be an increasing number of the latter employed, and therefore only special problems which the works man was incapable of dealing with would be handed on to the consulting chemist. This implied a very high standard of ability on the part of the latter, which should be liberally paid for.

OUR BOOKSHELF.

Nitric Acid and Nitrates. A. Cottrell, M.Sc., F.I.C. London: Gurney and Jackson; 36s. net.

This volume forms a part of the new and enlarged edition of the late Professor Lunge's Sulphuric Acid and Alkali—a work which won unprecedented fame amongst technological books, whatever the subject. It is quite natural that the very able authorities who have been selected to write the special parts into which Lunge's work has now been divided should take full advantage of the wealth of information the late author provided; but so much has transpired in the way of development during the stress of recent years that a very large amount of new material demanded incorporation. In many ways efforts have been made to secure improved arrangement of various detail, and, on the whole, success has been achieved in this direction. Probably no type of chemical plant requires a more precise study of material used in its construction and its form and arrangement than a modern nitric-acid installation. The variety of types—or, at any rate, sections—of units employed are therefore easily accounted for. The false-bottom retort, with a view to economy in replacing cracked retorts, is described and illustrated. Retort setting and flue arrangements are indicative of progress made through careful study during the war. The many well-known and ingenious forms of condensers are discussed—Hart, S Pipe, Hough, Guttmann, etc., etc., and materials like Ironac, fused silica ware, and glass used in their construction. Absorption, pumping, and other details receive fair treatment, and incidental matter concerning the handling and disposal of nitre cake is presented. Regarding the latter, the paragraph "where conditions allow . . . . may be run into a good stream of water," etc., might very wisely have been left out. A very interesting batch of matter is contained in the reports of various large manufacturers containing accounts of their nitric-acid plant and processes, these being followed by reports from various H.M. factories. Fuel consumption, general process detail, patents akin to the subject are large features. There can be no doubt about the expert character of the book, its exactitude and thorough grasp of all essential detail being very apparent.

COMBINED GRINDING AND MIXING.*

USE OF PEBBLE OR BALL MILLS.

THE ball or pebble mill, as a medium for pulverising and grinding either dry or wet materials, is quite well known and is coming more and more into use in the various industries because of its simplicity, low maintenance cost, low power consumption, the elimination of expert attendance and the fact that it requires very little attention during its operation. Its application to mixing problems, although not quite as general, is also commanding very favourable attention, because it produces a very uniform mix. There is, however, one application that has not been developed to the same extent, and that is the combining of grinding and mixing in one operation. Before considering the latter subject, it might be well to go into the principles governing grinding and mixing in ball or pebble mills.

Essentially, the ball or pebble mill consists of a revolving cylinder usually lined with a material that will withstand impact and abrasion. The cylinder is partly filled with a charge of flint pebbles, porcelain balls, metal balls or other freely movable reducing bodies. The revolving of the cylinder causes the balls or pebbles to rise on one side of the cylinder until the force of gravity overcomes the centrifugal force. The pebbles then begin to roll and tumble to the bottom of the cylinder, and in this way a combined impact and attrition effect is produced. The speed at which the best grinding efficiency is produced will vary with the diameter of the mill, the coefficient of friction of the material that is to be ground or mixed, the size of feed and fineness of finished product desired.

The ideal condition for fine grinding is where the peripheral speed is such that the pebbles or balls will be carried up to a sufficient height, so they will roll and tumble over one another. It might be stated at this point that the foregoing does not apply to ball mills which are used for the preliminary crushing of large pieces of hard material. In a case of this kind, it is desirable to depend to a great extent on impact and consequently larger balls are used and the speed increased to the point where the balls actually drop through space.

Size of Balls or Pebbles.

Too little attention is given to the proper size of pebbles for the grinding of a certain kind of material to a given fineness. If the grinding consists in the reduction of a fairly coarse material, say about ¼in. to ½in., and it is not necessary to grind the finished product very fine, a large pebble or ball should be employed. If the feed consists of a mixture of coarse and fine material, it is advisable to take a mixture of small and large pebbles or balls. If the material is fed in a fairly fine condition, say from 8 to 20 mesh, and the resulting product is to be extremely fine, it is advisable to use small pebbles or balls. In other words, the idea in fine grinding is to have as many points of contact as possible with a pebble or ball of sufficient weight, so that the impact is sufficient to reduce the material to be ground. It can be readily seen from this that the ideal condition is obtained with maximum points of contact and with pebbles or balls of sufficient weight to grind or pulverise the material. This is true in either wet or dry grinding.

In the case of dry grinding, the moisture content of the material to be ground is very important and it has been definitely established that greater efficiency is obtained when the material is as free from moisture as possible. If the moisture content is increased, the time of grinding is invariably increased, and if there is an excessive amount of moisture present, the material will have a tendency to "ball" or pack.

The Most Suitable Grinding Charge.

There is a considerable difference of opinion as to what constitutes a proper grinding charge and the relation that the volume of the pebbles should bear to the total volume of the mill. In the case of dry materials, however, it has been the writer's experience in testing out a great many different materials that there is a certain definite relation among the total volume of the mill, volume of material and the volume of the pebbles as follows: The cylinder should be approximately half full of pebbles or balls and then a sufficient amount of material put in to slightly more than fill the voids or interstices in the mass of pebbles.

In the case of wet grinding—that is, the grinding of a solid in a liquid—the general practice is to charge the mill approximately half full of pebbles with sufficient material to bring the level slightly above the centre. Some users of mills, in wet grinding, charge the cylinder with material about three-quarters full, which usually results in an increase in grinding time, but a somewhat greater production per batch from the same size machine.

For wet grinding, the material should be of about the consistency of a heavy cream, or perhaps to illustrate this a little better, in the case of an ordinary house paint, slightly heavier than is best for regular brush work.

Advantages of Combined Mixing and Grinding.

The general advantages to be gained in combining grinding and mixing are as follows: 1. The labour charge is materially reduced. 2. A greater uniformity in the mix is secured. 3. In cases where a colour is to be mixed either with other materials or other colours, the increased grinding which the material will receive, during the time it is in the mill, will produce a greater tinting power and consequently a smaller amount of colour can be used to produce the same effect. 4. In the case of pharmaceutical and food products, the pebble or ball mill, therefore, is the ideal machine to use, as it is practically hermetically sealed during the operation. 5. In the case of wet grinding and mixing, the foregoing holds good and in many cases a greater saving can be made, as for instance in the case of the paint, varnish and lacquer industries.

Some Typical Uses.

In the grinding and mixing of paint, the usual method has been to pre-mix the pigment with the vehicle, then grind it through a paint mill and then thin down in a final mixer. These three operations can be combined in one in the pebble mill, as the pigment and vehicle can be introduced simultaneously, and if necessary, after grinding, a thinner can be added directly in the mill. Another advantage is the fact that with such a large number of pebbles and the many points of contact which are effected during the grinding of a charge, a thorough incorporation of the pigment in oils will naturally follow.

A few of the uses in which pebble or ball mills serve for combined grinding and mixing are flooring compounds, drugs and chemicals, face powders, coloured cements, and also in the blending and standardising of dyes, dry colours, etc. It might also be remembered that these mills can be used on either alkali or acid materials, as the linings can be made to resist almost any condition that may arise.

There are some industries which might find a greater use for this type of machine if they would realise that the mills can be built so that either a heating or cooling effect of the material can be accomplished, the material either ground under a vacuum or pressure or in the presence of a gas. In this way very often chemical reactions may be obtained at the same time that grinding and mixing are accomplished.

* From an article by H. F. Kleinfeldt, of the Abbé Engineering Co., New York, in *Chemical and Metallurgical Engineering*, Sept. 10, 1923.

THE ESTIMATION OF SELENIUM IN GLASS.

COLOURIMETRIC METHOD FOR MINUTE QUANTITIES.

AT the meeting of the Society of Glass Technology at Sheffield on October 17, to which reference was made last week, a paper on the above subject was read by Mr. A. Cousen, B.Sc., A.R.C.S., who, illustrating his remarks with experiments, said that the amount of selenium actually added to a glass batch as a decolourising agent was, in general, of an order sufficient to give only 1 part of the element per 42,000 parts of glass, or 0.0024 per cent., if no loss occurred. Since, however, selenium was volatile at the temperature of the furnace, values considerably less than the above were likely to be found. The only chemical method for estimating selenium in glass so far published was that of Fränkel, and this was not quite comparable, since it dealt with proportions of selenium at least ten times as great as those it was desired to estimate.

Practical Details of the Test.

The following modification of the Fränkel process was found to give results of fair accuracy. Twenty grammes of finely powdered glass were dissolved slowly in hydrofluoric acid, and after standing in the cold the products of decomposition, with the exception of selenium, were dissolved by pouring into excess of boiling water. The selenium itself

was filtered off on a filter pulp pad in a Gooch crucible. From the pad the selenium was removed by treating with a dilute chlorine solution (about one three-hundredth normal). To the filtered solution was added 1 c.c. of 5 per cent. gum arabic and 5 c.c. of half per cent. phenyl hydrazine hydrochloride—the whole being made up to 50 c.c. Colloidal selenium was obtained, a yellow colour slowly developing, which was after half an hour matched against a standard solution of sodium selenite similarly treated. The method on testing with synthetic mixtures gave results well within 0.0002 per cent. of the actual values, and a commercial glass, for which selenium had been used sufficient to give theoretically 0.0025 per cent., was found to contain actually only 0.0006 per cent. of the element.

BRITISH EMPIRE EXHIBITION.

THE PURE CHEMISTRY EXHIBIT.

DR. H. LEVINSTEIN, who is getting through an incredibly large amount of work in the organisation of the Pure Chemistry Exhibit at the British Empire Exhibition, in response to a unanimous invitation from the British Technical Press, gave a short address in London on Monday dealing with the conception, aspirations, organisation, and direct objects of this extremely important section of the chemical exhibit. He promised that the national life of the country and of our newer nations overseas will reveal itself in every branch of its activities. Clearly, therefore, chemical science must occupy a prominent position in any national demonstration of this kind, especially when we consider that whilst it is imperceptible to most, it is nevertheless clearly intertwined with our progress and position in industry, preservation of health, and enjoyment of all the cultured amenities of civilisation.

Organisation of the Exhibit.

The Pure Chemistry Exhibit is being organised by a committee composed of representatives of the Association of British Chemical Manufacturers, of the Chemical Society, of the Society of Chemical Industry, of the Institute of Chemistry, of the Society of Dyers and Colourists, of the Federal Council of Pure and Applied Chemistry—in fact, of all relevant scientific societies, supported and greatly assisted by the advice and co-operation of the Royal Society. It will, without a doubt, for ever destroy the illusion, which had some justification in the past, that our University training and research in chemistry is below the highest standard of other countries. This would not have been true in the same sense thirty years ago.

Nothing could be of greater importance than to give the general public, through the eye and in an interesting, fascinating way, greater appreciation of the value of chemical science in the affairs of life, and of the steps that precede great industrial or medicinal discoveries.

Details of the Exhibit.

The following details will serve to illustrate the very wide scope of this exhibit, showing also in each case the carefully chosen high authority who will handle the subject on the capacity of the convenor.

	Convenor.
Physics and Physical Chemistry.	
Structure of the Atom	Sir Ernest Rutherford, LL.D., F.R.S.
Spectroscopy.....	Professor J. C. McLennan, F.R.S.
Crystallography and Crystal Structure.	Sir Henry Miers, LL.D., F.R.S.
Valency Theories and Theories of Chemical Combination.	Dr. Arthur Lapworth, D.Sc. F.R.S.
Photography	Dr. T. Slater Price, F.I.C.
General Physical Chemistry	Professor F. G. Donnan, F.R.S.
Inorganic Chemistry.	
Atomic Weight Determination....	Dr. Alexander Scott, F.R.S.
Analysis: Hydrogen Ion Concentration.	A. Chaston Chapman, Esq., F.R.S.
General Inorganic	Professor E. C. C. Baly, M.Sc., F.R.S.
Flame, Fuel, and Explosion Waves	Professor A. Smithells, B.Sc., F.R.S.
Organic Chemistry.	Dr. Henry and Professor F. L. Pyman, D.Sc., F.R.S.
Bio-chemistry (Fermentation, Enzymes, etc.).	H. L. Baker, Esq., F.I.C.
Agricultural Chemistry	Sir John Russell, F.R.S.
Sugars (dealing largely with the work of Emil Fischer and its continuation as developed at St. Andrew's).	Principal J. C. Irvine, C.B.E., F.R.S.
Terpenes	Professor G. G. Henderson, LL.D., F.R.S.
Plant Colouring Matters	Professor I. M. Heilbron, D.S.O., F.I.C.
Coal Tar Colouring Matters	Dr. J. T. Hewitt, F.R.S.
General Organic Chemistry	Professor J. F. Thorpe, F.R.S.
Cellulose (Viscose, etc.)	C. F. Cross, Esq., B.Sc., F.R.S.
Catalysis (Production of Ammonia, Fat Hardening, etc.).	Dr. E. F. Armstrong, D.Sc., F.R.S.
Plastics (Synthetic Resins, etc.) ..	Dr. W. R. Ormandy
Apparatus	Commander R. E. Stokes-Rees.
Chemical Engineering	Professor J. W. Hinchley, A.R.S.M., F.I.C.
Historical (Old Manuscript, Apparatus, Prints, etc.).	R. B. Pilcher, Esq.

FATALITY AT A CHEMICAL WORKS.

DEATH FROM AMMONIA FUMES.

THE Birmingham City Coroner, on Friday of last week, held an inquiry into the circumstances of the death of Albert Victor Wooffinden (54), an ammonia plant attendant, of 10, Eliot Street, who died as the result of an accident at the chemical works of Messrs. Brotherton and Company, Nechells. Wooffinden had been in the employ of the firm for 17 years, and for the past eight or nine years had been working on the ammonia plant. Edward Fisher, a plumber, stated that on the previous Wednesday morning he was at work on a tower by the side of the ammonia plant There was a smell of gas, and, turning round, he saw Wooffinden standing on the platform near the boiler. Two minutes later witness noticed the man staggering to the handrail. He saw him fall from the platform, a distance of 11 feet. Witness rushed to the man's assistance, and found him unconscious on the floor.

John Daniels, another employee of the firm, said he saw Wooffinden at 10.30 on Wednesday morning, when he remarked, "I think we have a leakage here." About five minutes later the accident occurred. On examining the plant, witness found that the tap had been dismantled and the gas was blowing out. It was stated by Frederick Collett, plant superintendent, that it was not Wooffinden's job to dismantle the tap. If there was anything wrong it was his duty to report the matter so that it could be put right by a fitter. The actual cause of death was a fracture of the base of the skull.

A verdict of "Accidental death" was returned.

SULPHUR AS A FUNGICIDE.—Mr. Harry Curtis Young has recently published (*Annals of Missouri Botanical Garden*, 9, pp. 403-435, 1922) a valuable contribution to the much-investigated problem as to the reason for the toxicity of sulphur when used as a fungicide for the control of disease upon plants. He finds that sulphur owes its toxic properties to pentathionic acid, an oxidation compound formed from sulphur and water. On this account the sulphur needs to be applied in a very finely divided and therefore easily oxidised form, and he recommends colloidal sulphur liberated in a medium containing buffers so that it is easily maintained at a reaction between PH 4.0-5.5; above or below this hydrion concentration pentathionic acid is not stable. In the light of this general conclusion there is a brief discussion of the practical problem of producing a suitable sulphur spray or vapour, but the author's investigations on this side of the problem are still in progress.—*Nature.*

ITEMS OF INTEREST.

Australian Chemical Imports.—Imports of chemicals and drugs in July, 1923, were valued at £283,999., compared with £332,484. for July, 1922.

Nobel Medicine Awards.—The Nobel medicine prizes for 1923 have been awarded half each to Dr. F. G. Banting and Professor J. R. Macleod of Toronto, Canada, in connection with the discovery of insulin.

Obituary.—We regret to announce the death of Dr. J. E. Stead, the metallurgical chemist and senior partner in the firm of Messrs. Pattinson and Stead, Middlesbrough, which occurred on Wednesday, at Redcar, after prolonged illness, at the age of 72.

Business Notice.—It is announced that J. Brown and Co., Ltd., of Savile Town, Dewsbury, have taken over the business of Mr. Wm. C. Wakefield, Savile Town, Dewsbury, which is chiefly a production of hydrochloric acid, saltcake, and Glauber's salt.

Tariff Notes.—In the Board of Trade *Journal* dated October 25, particulars are given of the Colombian import duties on salt; and the Italian import duties on certain essential oils.—Details are also given of amended regulations on the importation of pharmaceutical specialities into Paraguay and into Spain.

Chemical Engineering Group.—A meeting of the Chemical Engineering Group of the Society of Chemical Industry will be held at the Chemical Industry Club, 2, Whitehall Court, London, S.W. 1, on Friday, November 16, when Professor J. W. Hinchley will read a paper entitled "A New Source of Potash, and its Industrial Exploitation."

Humber Portland Cement Merger.—The business of the Humber Portland Cement Company, Limited, whose works are situate at Melton, East Yorkshire, has been acquired by G. and T. Earle, Limited, Hull. Payment was made to shareholders in accordance with the terms of the circular issued earlier in the month—namely, at the rate of 30s. 3d. per £1. ordinary share

Tinplate Wage Dispute in South Wales.—Locomotive men and shunters in the Welsh tinplate industry have decided to tender next Monday 28 days' notice to terminate their contracts. They are demanding day rates of 13s. for locomotive drivers and 12s. for firemen, which represent an increase of two to three shillings on present rates. If the notices become effective over 3,000 workmen will be affected.

Steaming in Vertical Gas Retorts.—The Fuel Research Board of the Department of Scientific and Industrial Research has issued a report on the work carried out in continuation of the experiments described in the Report of the Fuel Research Board for 1920-21, First Section: Steaming in Vertical Gas Retorts. The new report gives the results of tests carried out at H.M. Fuel Research Station on the carbonisation of Wigan Arley coal in vertical retorts when various amounts of steam are introduced into the retorts.

Birmingham Technical School Laboratory.—Sir Robert Hadfield formally opened on Wednesday the new corrosion research laboratory and lecture-room in the chemistry Department of the Birmingham Municipal Technical School. The pharmaceutical laboratory also has been completely refitted. In addition to actual gifts, the school benefits by two grants made personally to the head of the department, Dr. Newton Friend—one of £150. from the Royal Society, and another of £100. from the Carnegie Research Fund for work on corrosion.

Importing German Chemicals.—Mr. A. Humphreys, president of the York Chamber of Trades, and chairman and managing director of Bleasdales, Ltd., manufacturing chemists, in a recent interview, said that he thought it most unfair that when British manufacturers had put down expensive plant to develop their industries, German manufacturers should be allowed to dump their products in this country at prices at which the home producer could not compete. His own branch of the trade dealt more particularly with synthetic chemicals, and he saw no practical difficulty in the way of imposing an adequate tariff. He knew there was the Reparations duty, but he thought that was more often evaded than not. He did not know that protection would be any special advantage to his own business, but he took a broader view, and in any event if the trade of the big industrial centres of the North continued to be hopelessly depressed through foreign dumping the trade of the wholesale distributing houses would be done.

British Coal Output.—The coal output for the week ended October 20 was 5,678,600 tons, compared with 5,626,000 tons in the preceding week. A year ago the output was 5,355,400 tons.

Salt Tender Result.—The Borough of Salford have been recommended to accept the tender of Murgtroyds Salt Works, Ltd., Manchester, for 100 tons of common salt at 39s. 11d. per ton for the Lighting and Cleansing Committee.

Manchester University Lectures.—A course of six lectures on "Recent Advances in Chemistry" is to be given at Manchester University by Professor Arthur Lapworth on Fridays (fortnightly) at 7.30 p.m., commencing Friday, November 2; course ticket, 5 shillings.

British Copper Sulphate in France. — For agricultural purposes, chiefly for spraying vines, France uses annually some 66,000 tons of copper sulphate, the British product enjoying a very high reputation. During the past year France imported 20,426 tons, of which 18,000 tons came from Great Britain.—*Chemist and Druggist.*

Benzol Works Fatality.—While an oil tank at the works of the National Benzol Company, Cardiff, was being cleared out, on Wednesday, two men and a lad were rendered unconscious. One, a depôt foreman named Mann, succumbed; and a second man—a labourer named Victor Breese—lies in the infirmary. The lad recovered.

Committee on Food Preservatives. — Sir William Joynson-Hicks, M.P., Minister of Health, has appointed Mr. P. A. Ellis-Richards, President of the Society of Public Analysts, to be a member of the Departmental Committee on Preservatives and Colouring Matters in Food in the place of Mr. Otto Hehner, who has resigned from the Committee.

Paper from Coconut Husks.—Still another material suggested for use in the manufacture of paper is the coconut husk, states the *Anglo-Norwegian Trade Journal*, but it is doubtful whether the cost of preparing and transporting the husks would be low enough to permit of their commercial use. A Philippine company which has large quantities of husks as a waste product in manufacturing desiccated coconut states the cost of drying husks, flattening them into rolls, and wrapping and baling them into bales of about 100 kilos at 19.80 dollars per metric ton.

Helium Storage Plant for U.S. Navy.—The American Navy Department has made plans for a large helium storage plant at its air station at Lakehurst, N.J. Ten helium containers which are steel cylinders 40 feet long and four feet in diameter, with a shell four inches thick, have been purchased. They will hold gas at a pressure of 2,000 pounds per square inch. These cylinders will be placed side by side underground, and concrete galleries at the ends of the series will carry the necessary piping and valves for control of admission and discharge of the helium, and facilitate inspection.

Position of Public Analyst at Manchester.—In asking for the appointment of an assistant public analyst, the Manchester Public Health Committee say that the work is more than can be covered by the public analyst himself. The public analyst has had to enlist unskilled and voluntary help from members of the staff of the laboratory who are not paid by the Corporation; he has been unable to take any time off since 1920, when he was appointed; in the event of illness there is no one to take his place; in addition to working a long day in the laboratory he has to carry work home every night and to work on Sundays as well, and he analyses about 3,000 samples per annum.—*Manchester Guardian.*

Personal.—The many friends in the gas and tar industries, of Mr. J. E. Barlow, director of Messrs. Hardman and Holden Limited, chemical manufacturers, Miles Platting, Manchester, will be interested to know that he completes fifty years service with the firm to-day, November 2. Mr. Barlow joined the firs as office boy on November 3, 1873, and in 1898, became secretary to the company. After holding this position until March 17, 1916, he was elected a director of the company, and now occupies the position of Sales Director.—Dr. Andrew Balfour, until recently Director of the Wellcome Bureau of Scientific Research, London, has been appointed Director the School of Hygiene, to be established as the result of the gift of the Rockefeller Foundation.—Mr. John Allan, F.C.S., has been proposed by the Council of the Manchester Literary and Philosophical Society for election as honorary secretary in succession to Dr. H. F. Coward.

American Platinum Imports.—Platinum imports into America during July dropped to 1,394oz. troy. Imports from Colombia were 827oz., which compares with a monthly average of 1,951oz., or a total of 11,705oz. for the first six months of 1923.

Platinum in the Transvaal.—Transvaal Platinum, Ltd., have acquired further mineral rights in the Waterberg district of the Transvaal, where platinum in payable quantities has been discovered by the Transvaal Consolidated Land and Exploration Company, Ltd. Prospecting has disclosed encouraging values, and sinking is now in progress with a view to testing values at depth.

Research in the Textile Industries.—Dr. A. E. Oxley, giving the fifth of a series of lectures on Monday week on the relation of science to industry, arranged by the Institute of Physics, emphasised the necessity of the application of scientific research to the textile industries. He pleaded for a close co-operation between the research worker and the highly skilled millhand, and said that an enormous unexplored field awaited investigation. At present only about twenty physicists were engaged on this work, but several hundred were needed if an industry that constituted a great national asset was to go forward to assured prosperity.

Institution of Chemical Engineers.—A meeting of the Institution of Chemical Engineers will be held at the Engineers' Club, Coventry Street, London, W. 1, on Wednesday, November 14, at 7.30 p.m., when the following two papers will be read and discussed:—(1) "A Study of the Conditions of Constant Rate of Flow in Filter Presses," by M. B. Donald and R. D. Hunneman. (2) "A Study of the Absorption Tower," by M. B. Donald and C. W. Tyson. The meeting will be preceded by a dinner, at 6.30 p.m., tickets for which can be obtained from the Hon. Secretary at the offices of the Institution, 307, Abbey House, Victoria Street, Westminster, S.W. 1.

British Colour Index.—At the annual smoking concert of the West Riding Section of the Society of Dyers and Colourists, held at Bradford on Friday last, Mr. H. Jennings (Chairman of the Section) announced that with the December issue the Society's Colour Index will be completed, and in January bound volumes will be available. The completion of the Index after three years' work, at a cost of £6,000., compared with the original estimate of £2,000., marks a distinct step forward by the British dyeing industry. Schultz's Farbstofftabellen was the standard index before the war, and contained particulars of 1,001 German and Swiss dyes in 432 pages. The new Colour Index contains details of 1,700 colours in 728 pages, and deals with the dyes of the whole world. It is anticipated that it will be recognised as the standard work of reference.

Stability of Sodium-Thiosulphate Solutions.—Since standard solutions of sodium thiosulphate are extensively used in volumetric analysis, the stability of these solutions is a matter of great importance. M. Kilpatrick and M. L. Kilpatrick (*Jour. Am. Chem. Soc.*, 1923, 45, 2132) have studied the stability of several one-hundredth normal solutions of this salt over a period of eight months. Freshly boiled redistilled water yielded a solution which was more permanent than those prepared with laboratory distilled water, ordinary redistilled water, and redistilled water through which air free from carbon dioxide had been bubbled. The stability of the solution was influenced but little by carbon dioxide, oxygen, and dilute sodium hydroxide. Decomposition of the solution was caused by the action of bacteria.—*Jrnl. Franklin Inst.*

Injuries Received While Trespassing.—At the Glasgow Court of Session, last week, Lord Constable gave judgment in an action by George Bitters, 34, Keyden Street, Kinning Park, Glasgow, against the Scottish Farmers' Dairy Company (Glasgow), Ltd., 2, Anderson Street, Kinning Park, Glasgow, for £300. as damages for injuries sustained by him on March 13, 1922. The plaintiff, who is 14 years of age, was playing with a number of other children about the defendants' yard when a barrel, which had contained benzol burst, and the plaintiff was projected about 30 yards and injured. The plaintiff maintained that the accident was due to the fault of the defendants in failing to take proper precautions. The defendants denied fault and pleaded contributory negligence The plaintiff was well aware that he was trespassing, and the barrel was maliciously interfered with. His Lordship dismissed the action on the ground that it was irrelevant.

COMING EVENTS.

Society of Chemical Industry (Manchester Section).—Joint meeting, **Friday, November 2,** at **7 p.m.,** at the Textile Institute, St. Mary's Parsonage. Address: "Electrometric Methods in Analytical Chemistry," by Professor W. D. Treadwell, of Zurich.—**(London Section):** Meeting, **Monday, November 5,** at **8 p.m.,** at Burlington House, Piccadilly, W. 1. Paper: "The Use of Hydrogen Cyanide for the Fumigation of Ships," by G. W. Monier-Williams.

Society of Engineers.—Meeting, **Monday, November 5,** at **5.30 p.m.,** at Burlington House, W. Paper: "Lubrication," by W. Lee.

Society of Chemical Industry (Birmingham Section).—Meeting, **Tuesday, November 6,** at **7.15 p.m.,** at the University, Edmund Street, in co-operation with the Chemical Society. Papers: "The Amino Acetophenones as Colour Intermediates," by Professor G. T. Morgan and J. E. Moss; "Current Research at the Birmingham University," by Professor Morgan.

Institution of Civil Engineers. — Meeting; **Tuesday, November 6,** at **6 p.m.,** at Great George Street, Westminster, London, S.W. 1. Presidential address by Sir C. L. Morgan.

Society of Public Analysts. — Meeting, **Wednesday, November 7,** at **8 p.m.,** at Burlington House, Piccadilly, London, W. 1.

Society of Chemical Industry (South Wales Section).—Meeting, **Thursday, November 8,** at **7.30 p.m.,** at the Engineers' Institute, Park Place, Cardiff. Address by the President, Dr. E. F. Armstrong, on "The New Chemistry."

Chemical Society.—The Van der Waals Memorial Lecture. **Thursday, November 8,** at **8 p.m.,** at the Institution of Mechanical Engineers, Storey's Gate, Westminster, S.W. 1; to be delivered by Dr. J. H. Jeans.

Institute of Metals (London Section).—Meeting, **Thursday, November 8,** at **8 p.m.,** at the Royal School of Mines, South Kensington, London, S.W. 7. Paper: "Some Impressions of American Non-ferrous Metallurgy," by Dr. W. Rosenhain. —**(Sheffield Section):** Meeting, **Friday, November 9,** at **7.30 p.m.,** at the University, St. George's Square. Paper: "Substitutes for Platinum," by E. A. Smith.

Society of Dyers and Colourists (Manchester Junior Section).—Meeting, **Friday, November 9.** Paper: "Ice Colours" (with demonstration), by K. Saunders.

Institute of Metals (Scottish Section).—Meeting, **Monday, November 12,** at **7.30 p.m.,** at 39, Elmbank Crescent, Glasgow. Paper: "Nickel Alloys," by D. Turner.—**(Birmingham Section):** Meeting, **Tuesday, November 13,** at **7 p.m.,** at the Chamber of Commerce, New Street. Paper: "X-Rays and Crystal Structure," by Dr. H. B. Keene.—**(N.-E. Coast Section):** Meeting, **Tuesday, November 13,** at **7.30 p.m.,** at the Armstrong College, Newcastle-on-Tyne. Paper: "General Scientific Brass Foundry Work," by Dr. P. Longmuir. — **(Swansea Section):** Meeting, **Friday, November 16,** at **7.15 p.m.,** at University College, Singleton Park. Paper: "The Density of Alloys," by Professor Thomas Turner.

Hull Chemical and Engineering Society. — Meeting, **Tuesday, November 13,** at **7.45 p.m.,** at the Photographic Society's Rooms, Grey Street. Paper: "Heating Mediums, Past and Present," by E. G. T. Hill.

Institution of Chemical Engineers.—Meeting, **Wednesday, November 14,** at **7.30 p.m.,** at the Engineers' Club, Coventry Street, London, W. 1. Papers: "A Study of the Conditions of Constant Rate of Flow in Filter Presses," by M. B. Donald and R. D. Hunneman; "A Study of the Absorption Tower," by M. B. Donald and C. W. Tyson.

Society of Dyers and Colourists (West Riding Section).—Meeting, **Thursday, November 15.** Paper: "The Romance of Science," by Professor E. C. C. Baly.—**(Manchester Section):** Meeting, **Friday, November 16.** Paper: "Investigations into the Changes which Occur in Cotton Fabrics During Calendering and Beetling," by J. Huebner and V. Malwin.

Institute of Chemistry (Glasgow Section).—Discussion, **Friday, November 16,** at the Royal Technical College. Subject to be announced later.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN SEPTEMBER.

(Concluded from page 495.)

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during Sept., 1923, compared with 1921 and 1922. As from April 1, 1923, export trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended September 30.			Value. Month ended September 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
Oils, Fats and Greases:				£	£	£
Animal (except Marine Animal), not refined ..... tons	2,971	1,176	1,312	102,308	35,599	41,878
Vegetable, other than essential:						
Castor Oil ..... ,,	500	333	302	25,889	18,474	19,200
Coconut Oil, unrefined ..... ,,	120	—	11	5,816	—	616
Cotton-seed Oil, unrefined ..... ,,	398	34	237	19,872	1,234	9,513
Linseed Oil ..... ,,	6,347	3,471	4,877	263,756	162,621	219,198
Olive Oil, unrefined ,,	2	6	1	125	476	148
Palm Oil, unrefined ,,	271	36	20	14,053	1,244	712
Palm Kernel Oil, unrefined ..... ,,	2,975	139	1,817	154,684	5,236	73,199
Rape Seed Oil ... ,,	252	314	1,143	13,231	14,123	47,432
Soya Bean Oil .. ,,	810	464	307	43,405	21,868	13,230
Other Seed Oils . ,,	164	8	53	8,023	390	2,313
Other Vegetable Oils, not elsewhere specified.. ,,	111	94	340	3,802	2,769	9,930
Tar, Coal Tar .... tons	126	1,274	452	1,348	4,695	3,338
Pitch, Coal Tar Pitch ,,	9,274	9,603	8,695	41,503	36,112	55,448
Cement, Calcareous, for Building and Engineering purposes:						
To Netherlands .. tons	10	5,059	3,742	69	8,320	4,857
,, France..... ,,	—	5	1	15	38	32
,, Brazil ..... ,,	1,607	2,941	2,763	8,444	8,196	6,789
,, Argentine Rep. ,,	134	889	—	754	2,102	—
,, Brit. S. Africa . ,,	18	1,784	1,809	68	4,864	4,729
,, Brit. East Indies ,,	11,304	12,954	15,380	58,745	42,209	41,956
,, Australia..... ,,	—	6,263	2,733	6	17,806	6,926
,, New Zealand .. ,,	8	108	36	221	709	98
,, Other C'tries .. ,,	9,268	9,575	21,990	46,735	30,569	69,022
Total ..... ,,	22,349	39,578	48,454	115,057	114,813	134,409
Fertilisers not elsewhere specified:						
Basic Slag..... tons	227	12	260	1,063	68	591
Superphosphates ,,	539	448	421	2,594	2,001	2,572
Guano, Manufactured, and Compound Manures (including Bone Meal, and other Manufactured Fertilisers) ..... tons	815	3,515	4,557	9,655	33,186	35,442
Gelatine ..... cwts.	521	680	539	7,976	7,061	6,455
Glue and Size ... ,,	4,802	14,137	11,534	12,366	32,269	24,919
Lead:						
To Russia ..... tons	—	—	—	—	—	—
,, Sweden ..... ,,	22	74	129	654	2,039	3,560
,, Germany..... ,,	75	100	20	1,476	2,450	390
,, France..... ,,	428	380	504	10,446	9,955	11,091
,, China (including Hong Kong) ,,	18	4	18	588	151	671
,, Japan ..... ,,	2	—	—	173	11	—
,, U.S.A. ..... ,,	—	—	—	46	—	8
,, British S. Africa ,,	36	42	46	1,259	1,549	1,784
,, British E. Indies ,,	175	172	204	6,774	6,010	7,601
,, Canada ..... ,,	8	12	1	429	562	30
,, Other C'tries ,,	568	391	520	16,204	13,147	18,800
Total: Pig ..... ,,	1,016	722	712	24,846	18,168	16,694
Total: Sheet ... ,,	224	287	560	8,487	10,188	19,755
Total: Pipes ... ,,	64	78	116	2,494	2,882	4,432
Total: Foil ..... ,,	5	28	3	269	1,336	165
Total: Manufactures not elsewhere specified ,,	23	60	51	1,953	3,300	2,889
Total ..... ,,	1,332	1,175	1,442	38,049	35,874	43,935
Tin: Blocks, Ingots, Bars and Slabs:						
To Russia ..... tons	—	28	9	—	4,387	1,833
,, Sweden ..... ,,	92	47	110	16,684	7,554	20,820
,, Germany..... ,,	71	14	23	11,081	2,296	4,228
,, France..... ,,	289	296	196	45,097	46,414	37,590
,, Turkey ..... ,,	11	10	22	1,767	1,550	4,085
,, U.S.A. ..... ,,	50	95	660	7,560	15,098	127,565
,, Canada ..... ,,	19	53	93	3,276	8,467	17,485
,, Other C'tries . ,,	366	373	488	58,852	60,884	91,833
Total ..... ,,	898	916	1,601	144,317	146,650	305,439
Zinc, Crude, and Manufactures thereof tons	738	405	535	20,873	13,214	20,585

CHEMICAL TRADE OF THE NETHERLANDS.

SEPTEMBER IMPORTS AND EXPORTS.

THE following statistics, which have been furnished by the Bureau voor Buitenlandsche Bedrijfsberichten, of The Hague, show the amount and value of the Dutch trade in chemicals during the month of September, 1923.

Imports of Chemical Products.

		Kilogrammes.	Florins.
Calcium acetate	Total	50,000	10,000
	Belgium	50,000	10,000
Lead acetate	Total	3,000	1,000
Copper acetate	Total	—	1,000
Acetone	Total	29,000	29,000
Methyl alcohol	Total	18,000	7,000
Ethyl ether	Total	1,000	1,000
Soda ash	Total	2,478,000	179,000
	Germany.....	246,000	19,000
	Belgium	15,000	1,000
	Gt. Britain....	101,000	7,000
	France.....	1,722,000	126,000
	B.E. Africa ...	394,000	26,000
Soda crystals	Total	71,000	3,000
Caustic soda	Total	122,000	23,000
	Germany.....	18,000	3,000
	Gt. Britain....	68,000	13,000
	France.....	21,000	3,000
	U.S.A.	3,000	1,000
Bleaching powder ...	Total	381,000	35,000
	Germany.....	25,000	5,000
	Belgium	301,000	26,000
	Gt. Britain....	55,000	6,000
Calcium carbide	Total	1,781,000	85,000
	Germany.....	379,000	39,000
	Sweden	108,000	14,000
	Serbia	106,000	12,000
	Switzerland ...	186,000	20,000
Magnesia.....	Total	1,318,000	76,000
	Greece	1,301,000	75,000
Alum	Total	27,000	3,000
Boric acid	Total	72,000	22,000
	Gt. Britain....	50,000	15,000
Sulphate of iron	Total	20,000	1,000
Copper sulphate	Total	3,000	1,000
Sodium sulphate	Total	349,000	16,000
	Germany.....	116,000	4,000
	Belgium	206,000	11,000
Sulphuric acid	Total	8,901,000	149,000
	Germany.....	22,000	2,000
	Belgium	8,832,000	143,000
Nitric acid	Total	159,000	21,000
Hydrochloric acid....	Total	568,000	12,000
Liquid carbonic acid..	Total	47,000	16,000
Salammoniac	Total	15,000	3,000

Exports of Chemical Products.

Lead acetate	Total	31,000	13,000
Acetone.....	Total	1,000	1,000
Ethyl ether	Total	3,000	2,000
Soda ash	Total	1,000	—
Soda crystals	Total	15,000	1,000
Caustic soda.....	Total	21,000	4,000
Bleaching powder ...	Total	1,000	1,000
Calcium carbide	Total	32,000	40,000
Magnesia.....	Total	1,341,000	104,000
	Germany.....	20,000	2,000
	Belgium	24,000	2,000
	Gt. Britain....	388,000	30,000
	France.....	190,000	15,000
	U.S.A.	376,000	28,000
	Norway	36,000	3,000
	Sweden	63,000	5,000
	Ireland	40,000	3,000
	Spain	35,000	3,000
	Switzerland ...	57,000	4,000
	Finland	23,000	2,000
	Czecho-Slovakia	25,000	2,000
	Australia.....	20,000	2,000
Boric acid	Total	1,000	1,000
Copper sulphate	Total	1,000	—
Sodium sulphate	Total	360,000	20,000
Sulphuric acid	Total	583,000	23,000
	Germany.....	145,000	5,000
	Egypt	70,000	2,000
	Argentina	117,000	5,000
	Mexico	9,000	—
Nitric acid	Total	3,000	1,000
Hydrochloric acid....	Total	8,000	1,000
Liquid carbonic acid..	Total	19,000	6,000

Textile Technology as a Profession.—The Textile Institute, which held its annual conference at Leicester recently, is at present engaged in an effort to secure a royal charter of incorporation, and thus to set up a recognised qualification in textile technology.

LEGAL INTELLIGENCE.

ARBITRATION IN THE CHEMICAL TRADE.

Scrimaglio *v.* Thornett and Fehr.

In the King's Bench Commercial Court, on Thursday, October 25, Mr. Justice Greer continued the hearing of an action brought by Messrs. Scrimaglio, merchants, of Genoa, against Messrs. Thornett and Fehr, of Leadenhall Street, London, E.C., which arose out of a tallow contract and a soda ash deal.

Further evidence was given that the custom with regard to arbitrations was to appoint two arbitrators with power to appoint an umpire.

Counsel for the plaintiffs then contended that the arbitration was not held "in the usual way," and there was not sufficient evidence called to show that the arbitrator was entitled to act.

His Lordship, giving judgment, said the case was not without difficulty, arising out of business people preferring vague phrases to a clearer form. Under the contract the words were: "Any dispute arising out of this contract shall be settled by arbitration in London in the usual way." It was a clear, definite contract, which he would describe as an English and even a London one. He had to ask himself whether there was a "usual way" within the meaning of the contract. A great deal of evidence had been called which showed that, unless the contract contained stipulations to the contrary as to what was to be done, the custom in the chemical trade was to appoint two arbitrators and an umpire; and it was the rarest possible thing to happen to find a contract which provided for a single arbitrator. He was satisfied that the words, "in the usual way," referred to the chemical trade, and were in accordance with the practice of the trade. This resulted in it being necessary to appoint two arbitrators who, if they differed, appointed an umpire. The result was that on the preliminary point his decision was in favour of the defendants, and after deducting that item of the plaintiffs' claim which was admitted, he should give judgment for the defendants for £4,414. 12s. 7d., with costs.

Leave to appeal was granted on the usual terms.

IMPORTED "SALVAGE" FERTILISER.

A. J. R. Anderson, Ltd., v. G. Daniel.

In the Court of Appeal, on October 25, Lords Justices Bankes, Scrutton, and Atkin gave judgment allowing the appeal of George Daniel, a farmer, against whom judgment was given in the Malton County Court at the suit of A. J. R. Anderson, Ltd., of Pickering, for £77. 10s., the price of 10 tons of imported "salvage" fertiliser.

It appeared that the plaintiffs had bought some 60 tons of salvage mixture on Hull Docks, the stuff being brought by ships from the Continent with cargoes of nitrate of soda, ammonia compounds, potash, superphosphates, and basic slag. In unloading many bags and casks burst, and the contents fell into the hold and were mixed up. Some of the mixed-up stuff stopped as ballast in the holds, which at certain periods were cleared out by arrangement between the shipowner and the manure manufacturers, who were in the habit of selling it as "salvage," which meant this stuff out of the holds. It is the custom of the trade to sell this "salvage" without any analysis, as in the circumstances analyses would be impossible.

The County Court Judge found that, in view of the evidence of the plaintiffs with reference to the Hull trade in salvage, the plaintiffs had "a reasonable excuse" for not delivering an invoice, and therefore that the plaintiffs were entitled to judgment for the £77. claimed, with costs. But on appeal to the Divisional Court there was a difference of opinion, Mr. Justice Lush agreeing with the County Court Judge, and Mr. Justice Salter taking the contrary view. Hence the present appeal.

Lord Justice Bankes, giving judgment, said he agreed with the finding of fact that the substance in question was an imported fertiliser within Section 1 (1) of the Act of 1906, and it was clear, therefore, that the giving of an invoice was imperative, unless there was a reasonable excuse. On the facts, the County Court Judge could not in law come to the conclusion that there was a reasonable excuse within the meaning of the statute. The appeal would be allowed, with costs and judgment entered for defendant, also with costs.

The other Lords Justices concurred.

SULPHATE OF AMMONIA SALES DISPUTE.

British Sulphate of Ammonia Federation, Ltd. *v.* The South Metropolitan Gas Company.

In the King's Bench Commercial Court on Wednesday, Mr. Justice Greer commenced the hearing of an action brought by the British Sulphate of Ammonia Federation, Ltd. against the South Metropolitan Gas Company for a declaration that certain proceeds of sales of sulphate of ammonia were due to plaintiffs. Defendants denied liability.

Mr. Wright, K.C., for plaintiffs, said the action was to ascertain on what principles accounts were to be adjusted between the parties. The disputes which had arisen between the parties had reference to a scheme called the Equalisation Scheme, in operation during the years 1920-21, for the equalisation of prices of sulphate of ammonia. The members of the scheme were the makers of the commodity in this country. There had been an organisation in the trade previously, but in 1920 the Federation was formed as a limited liability company, and carried out a scheme of equalisation. They had about 90 per cent. of the makers in it, and the defendant gas company represented about five per cent. of the total output. The position of the maker was affected by his topographical position, and the Federation arranged for the distribution of the orders amongst the makers both for home and export trade, and the surpluses arising from the profits were distributed to the members. Towards the end of 1920, however, difficulties arose. By that time the foreign competition in the export market which was small when the war began had become operative again, as the productive capacity of foreign countries had largely increased. Under those circumstances the question had to be considered how the equalisation was to be dealt with in a falling export market with the home trade. It was in respect of this that the difference of opinion arose with the defendants. The agreement was worked by the Federation, according to the obligations imposed upon them, and the defendants now said because there was a special provision as to what was to be done in regard to export rules they were excluded from the other obligations, which plaintiffs said rested on them.

The hearing was adjourned.

APPLICATION FOR DEBTOR'S DISCHARGE.

Hugo Edward Mayer.

An application was made on October 26, for the discharge of Hugo Edward Mayer, merchant, 44, Chatsworth Road, Brondesbury, N.W., who was adjudicated bankrupt on June 14, 1921.

The Official Receiver in his report estimated the unsecured indebtedness at £6,960., and the sum of £2. 4s. 6d. had been realised from a bank balance. In May, 1918, debtor formed The Ink Manufacturing Supply Co., Ltd., the name of which was afterwards changed to the Blackamoor Chemicals and Colours, Ltd., and he acted as director until its liquidation in January, 1921. Regarding applicant's liability as surety to L. Jacobson and Co., Ltd., which he had helped to form, he said that the company had sold in 1919, caustic soda to one F. Nattero. A dispute arose regarding the strength of the soda and an action was brought against the company and settled in December, 1919 (after the company had gone into liquidation), on terms, *inter alia*, that he and his co-director guaranteed the payment to F. Nattero of £3,900. His co-director paid £300. and he £1,740., leaving a balance due and owing by the bankrupt of £1,860. He had received no consideration from the company in giving the guarantee.

The discharge was granted subject to a suspension of two years.

Colouring Paper with Insoluble Azo Colours.—The preparation of azo colours by treating with sodium nitrite a solution of a primary amine and the substance with which it is to be coupled in an oil, such as a liquid fatty acid, a glyceride, or a hydrocarbon containing a free fatty acid is claimed in a recent American patent specification (*U.S. Pat.* 1,462,613, of 1923). The fatty acid or acidified oil liberates nitrous acid and brings about diazotisation without the use of water or mineral acids, the presence of which is often disadvantageous. The method may be applied to printing on sized paper, which is impregnated with sodium nitrite and then treated with a solution in a fatty acid of the amine and coupling component. The use of the oily vehicle causes complete penetration of the paper, which cannot be achieved with aqueous solutions.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

United Kingdom.

The Commissioners of His Majesty's Works, etc., invite tenders, before 11 a.m. on November 13, for supply of soda crystals and soda ash. Forms of tender, etc., may be obtained on application to the Controller of Supplies, H.M. Office of Works, etc., King Charles Street, Westminster, London, S.W. 1.

Australia.

An Australian manufacturers' agent, at present in London, wishes to be put into touch with manufacturers of raw materials, heavy chemicals, etc. Letters should be addressed in the first instance to the Official Secretary, Commercial Branch, Australia House, Strand, London, W.C. 2, quoting reference No. 412/7/1/1/167.

Cyprus.

An agent resident in Larnaca desires to secure the representation of British manufacturers of varnishes, paints, colours, etc., on a commission basis. (Ref. No. 444.)

New Zealand.

A firm of agents resident in Auckland desires to obtain the representation of a British exporter of olive oil soap, shaving soap, and olive oil. (Ref. No. 445.)

Norway.

A commission agent in Christiania desires to secure the representation for Norway of British exporters of lubricating oils and greases. (Ref. No. 453.)

Spain.

A commission agent of Barcelona is desirous of securing the representation of British manufacturers of sulphate of ammonia, sulphate of copper, and superphosphates. (Ref. No. 454.)

Algeria.

A firm of commission agents established in Algiers desire to be placed in touch with British exporters of household and laundry soap. Correspondence in French. (Ref. No. 459.)

Guatemala.

A commission agent of Guatemala City is desirous of securing the representation of British firms manufacturing drugs and chemicals, patent medicines, perfumery, etc. (Ref. No. 468.)

REPORTS OF COMPANIES.

American Smelting and Refining Company.

The report states that the company has completed the financing for the construction of an arsenic plant and a new copper smelter at San Luis Potosi and a zinc smelter at Rosita. After deducting interest, depreciation, taxes, and miscellaneous adjustments, there was a net income of 5,096,045 dollars, an increase of 3,270,122 dollars over the same period for last year. As the preferred stock dividends for each six months amount to 1,750,000 dollars, there was left available for dividends upon the common stock 3,346,046 dollars. The board, in June, decided to resume dividends upon the common stock at the rate of 5 per cent. per annum, the first quarterly dividend of 1¼ per cent. being payable on August 1.

Lighting Trades, Ltd.

The directors' report for the year ending March 31, 1923, states that the trading of the year resulted in a loss of £14,872., to which has been added £56,689. for depreciation of stocks, £11,829. for depreciation of buildings, plant and machinery, £6,605. for investments depreciation, and £12,000. reserve for taxation, making a total debit balance for the year of £101,995.; to this must be added the £198,016. brought forward, plus £8,997. for preference dividend for half-year to March 31, 1922 (not paid out of profits), making a debit balance of £309,008. to be carried forward.

DIVIDENDS.

Brunner, Mond and Co., Ltd.—Interim dividend on the ordinary shares for six months ended September 30 at the rate of 7 per cent. per annum, payable on December 12. Last year the corresponding dividend was 7½ per cent.

Sadler and Co., Ltd. — Final dividend of 4 per cent., making 7 per cent. for the past year.

Ship Canal Portland Cement Manufacturers, Ltd.—The accounts for the year ended March 31 show a loss of £13,655., after providing for debenture, but £8,615. has been transferred from the employers' liability fund, and the surplus brought forward was reduced to £6,214., which it is proposed to carry to the new account.

Nitrate Producers' Steamship Company, Ltd.—Dividend at the rate of 7½ per cent. per annum (3s. 9d. per share net), payable on November 1.

Alfred Bird and Sons, Ltd.—Net profit for year ending March last is £80,000. Dividend of 21½ per cent., free of tax, again proposed, and £21,000. carried forward.

Wall Paper Manufacturers, Ltd.—Profit for the year ended August 31 last was £635,681. Final dividend of 6 per cent. on the ordinary shares, making with the 4 per cent. interim dividend already paid 10 per cent. for the year, a dividend of 10 per cent. on the deferred shares, and a transfer to reserve of £100,000., carrying forward a balance of £223,088.

Aguas Blancas Nitrate Company, Ltd. — Interim dividend on account of the year 1923 of 25 per cent., less tax, at 4s. 7½d. in the £., payable on November 30.

Ayrton Saunders and Co., Ltd.—Interim dividend on 7½ per cent. preference, payable, less tax, at 4s. 5d., on November 1.

REVISED RAILWAY CHARGES.

THE PROBLEM OF EXCEPTIONAL RATES.

BEFORE any real progress can be made by the Railway Rates Tribunal with the task of reviewing the new scales of charges it is essential that the problem associated with the retention of exceptional rates should be solved, states a correspondent to the *Times*. At one period it was expected that the bulk of the many millions of exceptional rates below the class rates, at which traffic is carried for various reasons, might be merged, under the new classification, in some of the additional classes into which traffic is to be grouped in the new system.

It is now realised that there are good reasons for the retention of a large number of the exceptional rates at present in operation. Under section 36 of the Railways Act, however, the bulk of the exceptional rates would disappear on and after the "appointed day," which will be that on which the new schedules of charges by order of the Railway Rates Tribunal come into operation. Power is granted to the managements of the railway groups to grant new exceptional rates after the appointed day in respect of the carriage of any merchandise, but it is obvious that this would be a long and tedious task. Faced with this difficulty, traders' organisations, in association with railway officials, have been endeavouring to frame a scheme by which those exceptional rates which it is desirable to retain may be grafted on to the new schedules. The subject has been again under review at a meeting of the Traders' Co-ordinating Committee—a body representing the leading business organisations—this week, and arrangements have been made for a conference with railway officials to-day (Friday), when, it is hoped, a scheme may be evolved which will obviate the labour and delays associated with a strict compliance with the letter of the Railways Act.

There is an additional reason why a solution of the exceptional rates problem should be found. It would appear to be impossible to fix standard charges at a level which would produce the standard revenue to which under the Railways Act the companies are entitled, until it is known what proportion of the total traffic, when the new schedules come into operation, will be carried at rates which in many instances are much below the class rates. At the present time more than half the total tonnage is charged at exceptional rates. On the percentage which may pass at such rates in the new era which will dawn on the appointed day estimates of railway revenue must to some extent be based. It will be seen, therefore, that the coming conference will have before it a fundamental issue.

FERTILISER NEWS.

Nitrate of Soda.—The efforts of the Chilean Government to assist the nitrate producers by temporarily suspending, or rather postponing the payment of the export tax on nitrate, have, in conjunction with difficulties in other directions, been responsible for a serious Budget deficit for the current year. The present Finance Minister, Señor Subercasseaux, had hoped to receive approximately 30,000,000 pesos revenue under the new income-tax act, which has, however, been held up in the Upper House. In view of the urgent necessity, therefore, the Minister conceived the idea of selling certain of the nitrate properties in the provinces of Tarapaca and Antofagasta, the proceeds of the sales to be applied to the reduction, or extinction, of the budget deficit. Introduced on July 28 into the Senate, its importance as a revenue measure assured the preference given to the proposal over all other pending business. A cable from Valparaiso under date of October 25 now states that the law has been passed by Congress, and the yield from the sales, which it is hoped will amount to about 30,000,000 pesos, will be at the disposal of the Minister of Finance. Particulars as to the conditions of sale, and information relative to the possible occupation on lease of the properties, is not yet available, but the condition of affairs disclosed does not encourage the hope of a definite reduction in the export tax on nitrate in the future. Stocks of nitrate in Chile, which have been steadily diminishing during the past twelve months or more, have been assisted on their downward course by the recent discovery in certain oficinas that stocks had been overestimated by some 26,000 tons. The amended figure at September 30 last, therefore, is 927,000 tons, the production during September amounting to 153,000 tons. As mentioned last week, shipments during the first half of October totalled 75,000 tons—approximately equivalent to the present rate of output. The general unsatisfactory position, combined with the lack of further sales, resulted in the Chilean exchange falling to the low level of 39 pesos to the £ sterling, during the earlier part of October, though there was a subsequent recovery to about 38.

Sulphate of Ammonia.—A further small advance in the price of this fertiliser brings the quotation for November to £14. 15s. per ton for the neutral quality, basis 25¾ per cent. ammonia. This is the Federation's official price for sulphate for home consumption, delivered to consumer's nearest station in 4 ton lots. On the basis of unit cost of nitrogen therefore, ammonium sulphate is still much cheaper than nitrate of soda, the values being about 14s. per unit in the case of the former, corresponding to a price of about £10. 18s. per ton for the latter, which is, at the present time, being sold at £13. 10s. per ton. The home-produced material is the cheapest form of nitrogen fertiliser in this country, though it must be admitted that the manufacturers are making very little profit at current prices. The present price for sulphate of ammonia, taking into account the improvement in the quality and higher guarantee of nitrogen content given, is considerably below the price for 1913, whereas costs of production are still very much higher than in that year. The main reason for the increased cost of production is, of course, the high price of sulphuric acid, and there is a general feeling among sulphate makers, who are the largest consumers of the acid produced in this country, that the price of acid is higher than it need be. In this connection, however, it is interesting to hear that a large new production may shortly be available, with the possibility of easier prices. The export market continues active, though values are only on about the same levels as for home consumption. For later delivery, higher prices are being asked, with indications of fair business. The loss of the pre-war American and German markets, and in part, the Japanese market, as a result of strenuous American competition during and since the war has restricted the market abroad for British material. At the present time, however, American production is only sufficing to fill domestic requirements, and any excess which does come on to the open market is priced too high for effective competition with the sulphate made in Great Britain. British manufacturers have taken full advantage of these conditions, as a glance at the statistics for 1923 will show, but it is to be feared that the re-entry of the United States as a serious competitive force will result in the closing to us of the markets in the Far East.

Other Fertilisers.—Potash fertilisers are reported to be in good demand, with kainit showing 12½ per cent. of potash at £1. 17s. per ton at London. The 14 per cent. grade is quoted at £2. 5s. per ton, and £2. 10s. at Liverpool. Sylvinite, 20 per cent., is not in so much request as kainit, although a cheaper fertiliser on the unit price. Chloride of potash remains at about £7. per ton, and sulphate at £10. 15s. Basic slag and superphosphate are in fair request at recent rates, prices for the former being for the 20-22 per cent. grade, £2. 5s.; 30 per cent., £2. 17s.; and 35 per cent., £3. 10s. per ton delivered. Superphosphate 30 per cent. is quoted at £3., and 35 per cent. at £3. 5s. per ton at London. Bone meal and steamed bone flour are in demand, and slightly dearer; bone meal containing 45 per cent. total phosphate being quoted at £8. 10s. at London, £9. at Liverpool, and £9. 10s. per ton at Bristol. Steamed bone flour showing 60 per cent. total phosphates is on offer at £6. 5s. per ton, and 10s. dearer at Liverpool, where fish guano is scarce and firm at £12. 10s. per ton for material giving 9-10 per cent. ammonia and 16-20 per cent. total phosphates.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(Specially Contributed.)

The pressure being exerted on the coking industry by the hematite pig-iron smelters at the present time is not of the heaviest, but it is, at all events, sufficient to compel the ovens to be worked fully, and a very considerable output is being obtained. That the pressure will be greater in the course of a month or two seems undoubted. It is quite certain now that in January a much larger proportion of the make of ordinary pig iron will be going into local consumption, and as soon as that is the case the lighting of additional furnaces will become necessary. Whether the increase in the demand for pig iron will come from the Continent is uncertain. The indications are that it will be home users, and not overseas consumers, who will absorb whatever expansion of output takes place. At the present time the Midlands is the only important consuming district. It is seldom that the coal and coking industries have been so busy at a time when only fourteen furnaces were in draught between Workington and Carnforth. The collieries are all working full time, but, in spite of that, the supplies of smalls are practically all reserved for the coking plants. Of best round coal for shipment there is an ample supply, and industrial fuel is in very small request. In addition to the local coke, the smelters in Cumberland and North Lancashire are taking nearly 9,000 tons weekly from the East Coast. Most of it, however, is going to the furnaces in the Furness area. Little of it is used in West Cumberland. Prices are steady, the local coke commanding from 29s. to 32s. per ton, according to carbon content. Continental users who are not at present taking other than inconsiderable parcels are paying from 32s. to 36s. Residuals are rather a low market. Sulphate of ammonia is on the easy side.

SOUTH WALES NOTES.

[Specially Contributed.]

The state of the tinplate trade continues good, and there is now sufficient work at all the factories to last over the remainder of the year. At some works, indeed, orders are in hand that will carry operations over the next quarter. The engine drivers and stokers intend on Monday to give notice to cease work in 28 days, unless their wage demands are satisfied. It is not thought that a strike will take place, but should this be the case, over 25,000 persons will be affected. Business in the galvanising industries is increasing, the Far Eastern markets having strengthened considerably. The spelter trade does not seem to improve, although there is a steady demand by the galvanised sheet manufacturers. Basic slag of local make is moving somewhat better. The copper industry remains stagnant, and there are no signs of re-starting the works which have now been idle for some two or three years. Cokes have a fair inquiry, with residuals in strong demand.

Among the imports were 46 tons copper ore from Arica, 20 tons zinc ores, 300 tons silica, 2 tons ferro chrome from Antwerp, 124 tons zinc ashes from Montreal, 58 tons ferro silicon from Christiania, 50 tons ditto from Riscoer to Swansea; 4 tons fish oil from Oporto, 48 tons zinc dross from Baltimore, 24 tons ditto from New York to Cardiff. Exports included 71 tons painters' colours to Capetown, 1,455 gallons wood naphtha to Sydney, and 9 tons zinc chloride to Antwerp from Newport.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Borax Consolidated, Ltd., London, E.C.—Registered October 12, Trust Deed dated October 9, 1923 (supplemental to Trust Deed dated October 10, 1912), securing £100,000. further 2nd debenture stock.

Catalytic Chemical Company, Ltd., Southall.—Registered October 9, £1,000. debentures.

Coleby, Ltd., London, E., chemists.—Registered October 12, £10,500. debentures.

Express Dyeing and Cleaning Company, Ltd., London, W. —Registered October 11, £500. (not ex.) charge, to Lloyds Bank, Ltd.

Synthetic Products Company, Ltd., London, E.C.—Registered October 13, £5,000. (not ex.) debenture, to King's Lynn Milling Company, Ltd., Alexandra Dock, King's Lynn.

SATISFACTION.

Wyke Dyeing Company, Ltd., Bradford.—Satisfaction registered October 11, £1,500., registered December 23, 1922.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Devon Hide, Skin and Manure Company, Ltd.—Resolved October 16: That the company be voluntarily wound up. C. E. B. M. Smith, 10 and 12, Victoria Street, Paignton, liquidator.

Henson and Son, Ltd., Peterborough, chemical manure manufacturers.—J. Stephenson ceased to act as receiver. October 8.

BANKRUPTCY INFORMATION.

Stansfield, Jno. Lord, Boothfold, Waterfoot, Bacup, chemical manufacturer. 1st meeting, O.R.'s, Manchester, November 1. Exam., County Police Court, Rochdale, November 30.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Humber Chemical Company, 23, North Walls, Hull; chemical manufacturers; £18. 16s. 6d. September 21.

Klero and Co., 80, Borough High Street, London, S.E.; ink manufacturers; £20. 11s. 8d. September 25.

Stansfield, J. L., Boothfold, Waterfoot; chemical manufacturer; £10. 13s. 3d. September 21.

Trefriw Mining Company, Ltd., and Crafnant Valley Lead and Zinc Mining Syndicate, Ltd.; registered offices, 86, Cross Street, Manchester; £62. 6s. 9d. September 14.

Turner Drug and Galenical Company, Ltd., Roden Street, Ilford; £86. 19s. 4d. July 3. (Remitted action.)

NEW COMPANIES.

Abbey Works, Ltd.—Private company. Capital £100. Manufacturers of earthenware, clays, chemicals, etc. Office: Abbey Works, High Street, Hanley, Staffs.

Aluminium Products, Ltd.—Private company. Capital £3,000, £1. shares (2,000 A. and 1,000 B.). Manufacturers of and dealers in aluminium and other metallic alloys, etc. Office: Stanhope Works, Park Street, Camden Town, N.W.

Northern Smokeless Fuels, Ltd. — Private company. Capital £2,000. Manufacturers of and dealers in briquettes and patent fuels in the U.K., Europe, or elsewhere. Solicitors: Cooper and Co., 54, Gresham Street, London, E.C.

Stuart, Roy and Co., Ltd.—Private company. Capital £100., 1s. shares. Manufacturers, producers, quarriers, refiners, storers, suppliers of and dealers in chemicals, etc. Office: The Hill, Darlaston, Staffs.

Warrington Products Company, Ltd.—Private company. Capital £2,000. Manufacturers of and dealers in animal products, etc. Address: Chorley Street, Warrington.

Irish B.P. Company, Ltd.—Private company. Capital £100,000. To purchase, import, and manufacture oil, etc. Registered by Miley and Miley, solicitors, 12, South Frederick Street, Dublin.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 15 to 20 (inclusive).

Dyeing Acetyl Cellulose. Baddiley, J.; British Dyestuffs Corporation, Ltd.; Hill, J.; Lawrie, L.; Shepherdson, A.; and Swann, H. 26,158.

Black Shades on Cellulose Acetate Materials. Blackshaw, H.; British Dyestuffs Corporation, Ltd.; and Lawrie, L. G. 26,029.

Substituted Products of an Aliphatic Arsinic Acid. Etablissements Poulenc Frères; and Oechslin, C. 26,163.

Commercial Products from Blood. Fitzgerald, F. W. V. 25,659.

Artificial Wood. Forster, A. 25,935.

Elevating and Controlling Supply of Acids. Guillaume, F. J. 25,961.

Valves for Gas Purifiers. Horsfall, J. E.; and Lumb, H. 25,769.

Distillation of Coal. Jones, F. W. Salisbury-; and Parker, C. H. 26,100.

Alcohol. Klein, E. 26,014.

Artificial Silk. Mandleberg and Co., Ltd., J.; and Rothband, H. L. 25,934.

Manufacture of Fertilisers. Messerschmitt, A.; and Schmidt, F. L. 26,053.

Anti-freezing Device for Gas-storage Cylinders. Pennington, A. M. 26,060.

Perylene Vat Dye. Pereira, H. 25,665.

3.10. Perylene Quinone. Pereira, H. 25,666.

Resinous Materials. Potts, H. E. (*Canadian Electro Products Co., Ltd.*). 25,990.

Atomising and Oxidising Oils. Schofield, H. 25,732.

Naphthaquinone Derivatives. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis.; Lantz, R.; and Wahl, A. 26,037.

Dyestuffs. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis; Lantz, R.; and Wahl, A. 26,154.

Rendering Porous Electrodes Impermeable to Liquids. Soc. Anon. Le Carbone. 26,140.

Urea and Its Compounds. Soc. des Produits Azotes. 26,164.

Hydrogen. Soc. L'Oxyhydrique Française. 25,936.

Burning of Sulphur. Texas Gulf Sulphur Co. 25,698.

Separation of Insoluble Substances from Each Other. Traube, I. 25,641.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.

1922.

Treating Tin Ores and Concentrates. Lockwood, A. A. 10,554. **205,122**

Ferrous Alloys and Weatherproof Articles Therefrom. Skelley, J. M.; and Continuous Reaction Co., Ltd. 12,878. **205,125**

Recovery and Refining of Sulphur. Robinson, C. S. 16,289. **205,141**

Reducing Iron Ores. Dony, O.; and Spirlet, X. de. 17,849. **205,150**

Dye-solutions for Fast Colours. Geigy Soc. Anon., J. R.; and Luttin, K. 18,696. **205,166**

Phenol Formaldehyde Condensation Products. Petroff, G. 18,712. **205,167**

Moisture-absorbing Compositions. Moyer, P. S. 18,898. **205,173**

Electrolytic Extraction of Zinc. Hansgirg, Dr. F. 18,928. **205,176**

Protecting Inflammable Liquids Stored in Bulk from Fire. Sevian, V. 19,019. **205,181**

Cellulose Derivatives. Dreyfus, H. 19,256. **205,195**

Sulphur Dioxide. Houseman, C. R.; and British Oxygen Co., Ltd. 19,820. **205,224**

Sweating of Paraffin and Like Waxes. Esling, F.; and Johnson and Co., Ltd., S. H. 20,465. **205,245**

Dichlor Fluorane. British Dyestuffs Corporation, Ltd.; and Hodgson, H. H. 20,831. **205,254**

Rain and Waterproof Distempers and Water Paints. Weller, H. O. 21,832. **205,262**

Chloridising Roasting of Ores. Mond, A. L. (*International Process and Engineering Corporation*). 22,243. **205,269**

Oxides of Nitrogen and Nitric Acid. Goodwin, C. J. 24,008. **205,288**

Drying of Ammonium Sulphate. Weymann, G. 24,941. **205,301**

Vat Dyestuffs. Johnson, J. Y. (*Badische Anilin and Soda Fabrik*). 25,209. **205,304**

Obtaining Metals from Their Chloride Vapours. Vermaes, S. J.; and Lijnden, L. L. J. van. 30,301. **188,657**

Compression, Storage, and Treatment of Gases. Naamlooze Vennootschap Algemeene Norit Maatschappij. 30,724. **188,665**

Albumose Solutions. Weidner, Dr. E. 33,877. **205,395**

1923.

Control Valves for Gases or Liquids. Hall, I.; and Howlett, J. H. 1,527. **205,413**

Continuous Production of Absolute Alcohol. Barbet et Fils et Cie, E. 2,461. **192,410**

Washing Material which has been Separated by Centrifugal Action. Chemische Fabrik Griesheim-Elektron; and Sander, Dr. F. 7,110. **205,430**

Agitating or Stirring Devices. Jackson, W. J. Mellersh- (*American Abrasive Metals Co.*). 7,266. **205,432**

Ethyl Alcohol from Sulphovinic Acid. Compagnie de Béthune Soc. Anon. 10,469. **197,315**

Glues Insoluble in Water. Svensson, O. 11,533. **205,446**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Synthetic Ammonia. Norsk Hydro-Electrisk Kvœlstofaktieselskab. 23,950. **205,477**

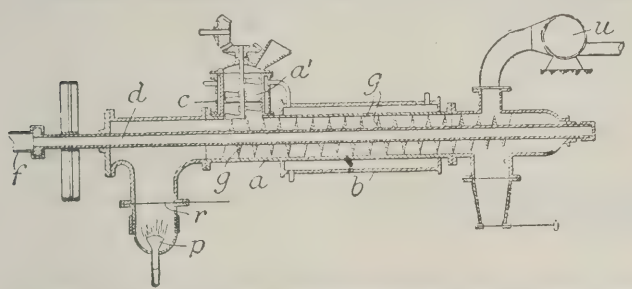
Condensation Products of the Anthraquinone Series. Farbwerke vorm. Meister, Lucius, and Brüning. 25,482. **205,502**

Mono-azo Dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning. 25,483. **205,503**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Ammonium Sulphate. A. H. Thwaite and Pease and Partners, Ltd., Darlington. British Patent, **203,013,** of 1922.

In apparatus for simultaneously neutralising, drying, and grinding crude ammonium sulphate, the salt is fed from the inlet hopper a^1 through a cylinder a provided with a hollow perforated rotary shaft d through which ammonia, or gas containing ammonia, is introduced from a stationary pipe f. A screw g mounted on the shaft d feeds the salt through



the cylinder and at the same time grinds it. The cylinder and the inlet hopper are heated by steam-jackets b, c, respectively. The drying may be assisted by passing hot air and combustion products from a burner p through the cylinder in the same direction as the salt, the flow of these gases being controlled by a damper r. The surplus gases are withdrawn by a fan u and treated for the recovery of ammonia.

Insoluble Black Azo Dye Produced on Fibre. A. G. Bloxam, London. (Chemische Fabrik Griesheim-Elektron, Frankfort-on-Main, Germany.) British Patent, **203,032,** of 1922.

Azo dyes are obtained by coupling diazotised arylazo-1-naphthylamines not containing sulphonic groups, with arylides of 2:3-oxynaphthoic acid; for the production of black shades on the fibre, the latter is impregnated with the arylide and dyed or printed with the diazo-azo compound. An example is given in which *o*-ethoxy-*m*-tolueneazo-1-naphthylamine is diazotised and coupled with the *p*-anisidide of 2:3-oxynaphthoic acid in the presence of Turkey-red oil. Examples are also given of baths for the production of the dyestuffs on yarn and piece-goods. A table is given of the shades yielded by numerous pairs of components. Specification 100,804, is referred to.

Nitroso Compounds. N. E. Siderfin, S. B. Tallantyre, and W. V. Shannon, Gas Light and Coke Company, Beckton, London; and W. L. Galbraith, Westminster British Patent, **203,060,** of 1922.

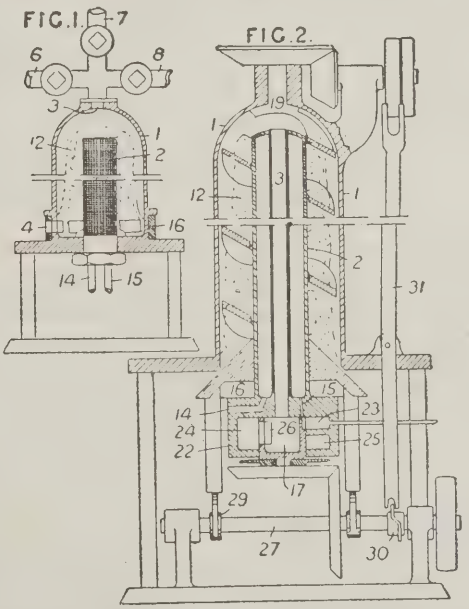
Nitroso compounds of organic substances are prepared by interaction of the organic compound and nitrosyl sulphuric acid, water or ice being added in regulated amount so that nitrous acid is liberated at such a rate as to permit efficient reaction with the organic compound. The nitrosyl acid may be previously diluted to the point at which dissociation sets in, further water or ice being then added as required; this mode of procedure is especially beneficial when the compound is readily sulphonated; the dilution may also be effected by addition of a dilute mineral acid. The process may also be carried out by dropping nitrosyl acid into a mixture of the compound with water or dilute mineral acid. The nitrosyl acid used should be almost freed from nitric acid; this can be done by heating to 150-200° C. or by treatment with sulphur dioxide. The process is particularly applicable as a step in the production of indophenols such as carbazole-indophenols.

Reactivating Nickel Catalysts. Technical Research Works, Ltd., and E. J. Lush, London. British Patent, **203,218,** of 1922.

Catalytic metallic surfaces, particularly those of the nickel employed in hydrogenating oils, etc., are activated or re-activated by subjecting them to electrolytic anodic oxidation, followed by reduction with hydrogen. Nickel or other metal, in the form of wool, turnings, plates, ribbons, rods or balls, is made the anode in a bath in which a salt which does not allow the metal to pass into solution, for example, sodium carbonate, is used as electrolyte. After its surface has been blackened uniformly, the anode is removed, washed, dried, and reduced with hydrogen at 250° C. for a short time. Spent catalysts can be treated in a similar way, after adhering oil has been removed.

Pressure Filters. G. C. Hurrell, London. British Patent, **203,162,** of 1922.

In pressure filters of the type in which the liquid to be filtered is forced into a vessel provided with surfaces for arresting solids and ducts for removing the filtered liquid, the liquid being forced into the filter until the desired thickness of cake is formed, and the cake then being washed and dried before removal, the filter comprises a cylindrical shell, Figs. 1 and 2, and an inner pervious tube 2. A plug or valve for opening or closing one end of the cylinder is provided and valves are fitted for the admission of liquid, wash-water, and compressed air. In the form shown in Fig. 1, the liquid is admitted through the pipe 6 and inlet 3 until the cake 12 is of the desired thickness, the filtrate being removed by the pipe 14. Compressed air is first admitted by the pipe 7, then wash-water through the pipe 8, and the cake is finally dried by a further supply of compressed air. The sleeve 16 is now



rotated to open ports 4, compressed air is admitted to the interior of the tube 2 by the pipe 15, and the cake is blown off and removed. In the form shown in Fig. 2, the filter is adapted to function automatically, the cake being removed at intervals by a worm 19. In this construction, an enlargement 22 of the tube 2 is provided with a number of valve chests, of which two, 24, 25, are shown. A sleeve 17 is rotatably mounted in the port 22, and is provided with a port 26 adapted to establish communication between the valve chests and the ingress tube 3, for the admission in turn of liquid, wash-water, and compressed air. The sleeve 17 is driven from a shaft 27, a pair of cams 29 on which close the plug 16 at the commencement of each operation, whilst a cam 30 actuates the belt shift-bar 31 to set in motion the worm 19. When the worm 19 is operated, an opening 15 registers with a port in the valve chest 23, which admits compressed air to dislodge the cake. The filtrate is removed by a pipe 14. The worm 19 may be dispensed with. Specification 174,116 is referred to.

PUBLICATIONS RECEIVED.

Vicona Separator or Vibrating Screen.—Mr. C. E. V. Hall, of Sheffield, sends us circulars of this patented plant used for separating various products in connection with grinding machinery. Novelty and efficiency are the outstanding features.

Wellconstruct Slotted Steel.—Constructors, Ltd., make a feature of patent slotted steel suitable for the formation of racks, bins, benches, shelving, etc. (Booklet available.)

The Business World.—A very bright booklet containing attractive views and commercial detail of the largest cities in the British Empire. The book also makes a special feature of the history, constitution, and activities of that very enterprising firm of chemical manufacturers, Messrs. F. W. Berk and Co., Ltd., who, apart from their large acid business, are turning out and selling many other chemical products used in various industries of importance.

Drying Machinery.—(Sheet No. 5,571) "Bloomsgrove" Cubing Machine (5,572). Messrs. Manlove, Alliott and Co., Ltd., send us illustrations of the above class of machinery, in the manufacture of which they are specialists. Accompanying the catalogue sheets are tabulated forms showing the exact information which should be sent with inquiries.

Rok Roofing.—Booklet giving, through photographs, some idea of the vast popularity of this well-known roofing amongst industrial concerns. D. Anderson and Sons, Ltd., Belfast.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," November 3, 1888.)

The New Salt Union.—There have been certain financial papers that have preached the sinfulness of the action of the present Salt Union, and they have prophesied an increase in the price of salt. Nothing could have been easier than this. It has been urged all along that the very *raison d'être* of the Salt Union was the paucity of profits in former years; the public had been getting the advantage at the manufacturer's expense; now the tables are turned, and it is certain that, financially, the undertaking will be a success, for a time at least, as there is no doubt such a price will be charged as will leave the Union a profit on their business. And who shall dare to say that this is not legitimate? Is the "natural course of trade" an operation by which a manufacturer shall be plundered by a not overscrupulous public?—a public which will gather round the threshing-floor to carry away all that may come to them for nothing, but who will clear away upon the first demand being made upon them. Do "the laws of supply and demand" require a surplus to be produced in order that it may be wasted. We would have it distinctly understood that we are not arguing for the imposition of fancy prices upon any article of industry, but we are certainly of opinion that unless a capitalist is able to secure a fair remuneration for his outlay, it is folly to expect any extension of the trade of the country.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Business continues to be very quiet indeed. Prices in a few items have been rather easier, owing to weak spot holders. The state of affairs in Germany has not affected this market so far as is the case in the pharmaceutical section, where prices on spot have advanced all round. **Acetic Acid,** 80% technical, £46.; 80% pure, £48.; 98% glacial, £60. in casks, and £72. in glass demijohns, ex wharf London: spot values are about the same, with demand still rather poor. **Acetone,** British Government specification, about £124. per ton, in drums; the spot position keeps very steady at this level, with business quiet. **Alum,** lump, in casks, £10. to £10. 5s. per ton; dealers are offering imported material at about these figures. **Arsenic,** Cornish, white powdered, about £65. per ton, ex wharf; supplies are short, while there is a very good inquiry; the market is firm, and likely to advance. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; there has been little inquiry on the market; prices unchanged. **Bleaching Powder,** 35—37%, £10. to £10. 5s. per ton; dealers are quoting at these slightly easier rates on Continental material. **Barium Chloride,** 98—100%, about £14. 15s. to £15. per ton; offers of Continental material are now being made at these rather easier rates; business is quiet. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £31., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are maintained at these rates; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at—commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers' prices, for home trade only, packages free, carriage paid, are unchanged. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain. British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P., crystals, about 1s. 4d. per lb., less 5%, for spot goods; business remains very hard to find, and the market is exceedingly weak. **Cream of Tartar,** 99—100%, about 85s. per cwt., in one-ton lots; dealers are quoting steadily at about this figure, with occasional business about. **Epsom Salts,** commercial, crystals, £4. 10s. to £4. 15s. per ton, in bags; the spot position is a shade firmer, although business is still small. **Formaldehyde,** 40%, about £62. to £63. per ton; the demand is still unsatisfactory, and prices are rather unsteady. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; dealers' prices are about the same, but the market is still flat. **Lead Acetate,** brown, about £41. 10s. to £42.; white, £42. to £43. per ton; spot supplies appear to be restricted, and prices quoted are fully maintained. **Litharge,** imported, about £35. 10s. per ton; dealers are offering at about this figure, with little doing. **Lithopone,** 30% Continental red seal, about £22. 10s. to £23. per ton; the position is unchanged; business limited; market steady. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; spot offers by importers are at these rates, with the demand poor. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers' prices show no change. **Oxalic Acid,** 5¾d. to 6d. per lb.; the demand here is still very small, and the market quotation has weakened. **Carbonate of Potash,** 90—92%, about £26.; 96—98%, about £27. 10s. per ton; spot values have weakened here, owing to lack of demand; some dealers seem willing to clear at a loss. **Chlorate of Potash,** crystals and granular, 2¾d. to 3d. per lb.; dealers are offering at about these rates, but are not finding much business. **Caustic Potash,** 88—92%, about £31. to £32. per ton; spot stocks are reported as limited, and some opinions favour advances in prices; on the other hand, some remarkably cheap offers are reported from the Continent. **Permanganate of Potash,** commercial quality, about 9d. per lb.; the market is very steady at this figure, and may advance a shade. **Prussiate of Potash,** yellow, about 10½d.; this figure is usually quoted, but most sales would be at a slightly easier figure; the demand remains poor. **Sulphate of Potash,** 90%, about £11. per ton, ex ship; the position shows no change on the week. **Mercury,** £9. 10s. to £9. 15s. per bottle; with business rather limited, the spot position remains unsteady. **Red Lead,** imported, about £35. 10s. per ton; importers are offering at about this level, with not much business about. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £43.; fine white crystals, £25.

to £26. per ton; supplies are available on spot, but there is not much demand at present; prices are well maintained. **Saltcake,** home trade, about £4. 10s. per ton; export prices are slightly higher; supplies available are restricted. **Acetate of Soda,** about £24. 15s. per ton; spot offers of small lots are being made at about this figure. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers continue to quote at these levels, with inquiry still small. British makers' prices to home consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers' prices to home trade only are unchanged, packages free, carriage paid; dealers are offering at competitive figures. **Bichromate of Soda,** home trade, 4½d. per lb.; all British makers are reported to be quoting at this level; export prices are rather dearer. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers quote at this price. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in free bags, carriage paid to destination; British makers quote at this unchanged figure, for home trade only. **Hyposulphite of Soda,** pea crystals, £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £10. to £10. 10s. per ton, in casks; spot offers are being made at these figures; opinions favour an advance in price. **Nitrate of Soda,** 96%, £13. 5s. per ton; quoted rates are unchanged on a steady market. **Nitrite of Soda,** 100%, about £26. 10s. per ton; the market is fully maintained at this rate. **Prussiate of Soda,** about 5½d. per lb.; last week's lower price is maintained, but business is still very slow and small. **Sodium Sulphide,** 60—62%, solid, about £14.; ditto, broken, about £15. per ton, in drums; dealers are offering at about these figures, with not much business doing. **Tin Crystals,** about 1s. 4d. per lb.; the market is unchanged. **Tartaric Acid,** B.P., crystals, about 1s. 1½d. per lb., less 5%; spot stocks are quoted nominally at this figure; any business would be at much lower rates. **White Lead,** imported, about £42. per ton; dealers continue to quote at about this figure, with inquiry limited. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers' prices show no change.

Pharmaceutical Chemicals.—This market has experienced further advances in spot prices for many items. This movement, which we have commented upon for some weeks, is, of course, due to the firmer conditions on the Continent, especially in Germany. The spot prices of those articles usually obtained from Germany seem likely to move up to very high rates, and a shortage would not be unexpected. **Acetanilid,** crystals and powder, 2s. per lb.; a further advance in spot quotations is recorded, with the market firm. **Acetyl-Salicylic Acid,** B.P. 3s. 4d. to 3s. 6d. per lb.; this market has been moving up each day, and the lower price quoted here may be withdrawn by the time this report is published; supplies on spot are short. **Benzoic Acid,** 2s. 5d. to 2s. 6d. per lb., nominal; this market remains idle; it is considered that the price for B.P. material would be much higher than the figure quoted here. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. per lb.; at this figure the spot position is quite firm; business is small. **Salicylic Acid,** B.P., 2s. 4d. to 2s. 5d. per lb.; this article continues to advance on spot, with the market very firm. **Tannic Acid,** leviss, 3s. 6d. per lb.; prices are firmer this week, with some little business doing. **Amidopyrin,** about 14s. 6d. per lb.; holders of spot supplies are quoting at this rate; demand small. **Ammonium Bromide,** about 7½d. per lb., according to quantity; the better tone reported last week is well sustained, and further advances in spot prices are expected. **Benzonaphthol,** about 5s. per lb., nominal; no business recorded here. **Betanaphthol,** resublimed, about 2s. per lb.; spot holders are quoting at this firmer figure, with not much business about. **Benzaldehyde 03,** about 3s. per lb.; this market keeps very steady, and some moderate business has been done. **Calcium Lactate,** 1s. 10d. to 1s. 11d. per lb.; spot supplies are quoted at these dearer rates, with the position steady. **Chloral Hydrate,** duty paid, about 4s. 3d. per lb.; the advance in spot prices continues, with the position very firm. **Creosote,** B.P., about 2s. 6d. per lb.; this market is fully maintained, with a slight advance expected in spot values. **Creosote Carbonate,** about 8s 6d per lb this market has been dull; quoted rates unchanged. **Guaiacol Carbonate,** 12s 6d. per lb.; after the recent big jumps in spot prices a further sharp advance is recorded, and this movement is likely to continue. **Hexamine,** 4s. to 4s. 2d. per lb.; the firmer tone reported here in last week's report is fully maintained. **Hydroquinone,** 3s. 7d. to 3s. 9d. per lb.; the market is fairly steady, but there is little business about. **Methyl Salicylate,** about 2s. 10d. per lb.; the limited spot supplies available are offered firm at this further advanced figure, and still higher rates are expected. **Methyl Sulphonal,** about 15s. per lb.; the position on spot is unchanged, with business dull. **Paraformaldehyde,** about 3s. 9d. per lb.; dealers are quoting in the region of this figure, with the demand small. **Paraldehyde,** about 1s. 6d. per lb.; some offers may be a shade under this rate, but the position seems firmer. **Phenacetin,** 7s. 6d. per lb.; another big jump in spot values is recorded, and it is uncertain what figure this article may move up to should supplies run short, which is quite possible. **Phenazone,** 8s. 6d. per lb.; this article continues to appreciate in value on spot, and some opinions favour still higher rates to come. **Phenolphthalein,** 7s. 9d. to 8s. per lb.; supplies on spot seem very scarce, and the figures quoted are more or less nominal. **Potassium Bromide,** B.P., crystals and granular, about 7d. per lb., according to quantity; the spot position continues to improve, and it seems likely that a full recovery in values will take place. **Potassium Permanganate,** B.P., 9½d. per lb.; at this unchanged figure the spot position is very steady, and may harden. **Potassium Sulphoguaiacolate,** about 6s. per lb.; owing to lack of demand, the figure quoted is given as the nominal value. **Resorcin,** about 5s. 9d. per lb.; spot holders are inclined to move their quotations up to this figure. **Salol,** 4s. per lb.; spot values have advanced very sharply, and may go still higher. **Sodium Benzoate,** 2s. 6d. per lb.; nominal on a neglected market. **Sodium Bromide,** B.P., crystals and granular, about 8d. per lb., according to quantity; with the other bromides, this article is improving on spot. **Sodium Diethylbarbiturate,** 18s. 6d. per lb.; spot holders are quoting at this figure, with little inquiry on the market. **Sodium Salicylate,** B.P., crystals, about 3s.; powder, about 2s. 10d. per lb.; values on spot have advanced again, and the movement continues; supplies here appear short, and any further imports must be at very dear rates. **Sulphonal,** about 15s. per lb.; business is lacking here; dealers' quotations are unchanged. **Terpin Hydrate,** about 1s. 9d. per lb.; spot prices are steady at this unchanged rate. **Thymol,** about 15s. per lb.; there is little inquiry for spot offers at about this figure.

Coal-tar Products, Intermediates, Etc. — Matters remain decidedly dull in this market, with prices quoted about the same, but some items are rather unsteady. **Aniline Salt,** about 9½d. per lb., casks free; quoted prices show no change, with the demand small. **Aniline Oil,** about 9d. per lb., drums free; dealers' quotations are level on the week, with little doing. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; the market quotations are steady, with business quiet. **Benzol,** about 1s. 3½d. to 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; the demand is still slow, and prices as quoted are unsteady. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers packages; inquiry remains poor, with prices none too steady. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; dealers continue to quote at these figures on a dull market. **Naphtha,** about 1s. 2d. per gallon; the big drop in quoted rates recorded last week has not brought any improvement in demand. **Solvent Naphtha,** 90/160, 1s. 3d. per gallon, drums extra; the quoted price is unchanged so far, but the market is weak at this level. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; this market is likely to weaken in price; business remains dull. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; quoted rates are maintained at these levels. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; dealers' quotations are maintained at this rate, with business dull. **Creosote Oil,** about 9¼d. per gallon, f.o.b.; this market seems a little steadier after the recent declines in value, but business is still slow. **Carbolic Acid,** crystals, about 1s. 1½d. per lb. f.o.b.; the position is none too steady at last week's cheaper rate. **Naphthalene,** about £19. per ton; the lower offers mentioned last week have not improved business; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; tablets and candles, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; dealers' offers are steady at this level, with not much doing. **Pyridine,** 22s per gallon; the spot position keeps very firm at this higher level. **Hexamethylene,** 3s. 9d. to 4s. per gallon; these recently advanced rates are fully main-

tained on spot. **Pure Methyl Alcohol,** about £90. per ton, in drums, ex wharf London; importers' quotations are very steady in the region of this figure. **Pitch,** about 140s. per ton, f.o.b. East Coast; the better position reported last week has been steadily maintained, and prices are returned unchanged.

LONDON METAL MARKET

Wednesday.

Copper: Standard brands, £59. 15s. to £59. 17s. 6d., cash; £60. 5s. to £60. 7s. 6d., three months; electrolytic, £63. to £63. 10s. **Tin**: Standard, £207. 10s. to £207. 15s., cash; £204. 5s. to £204. 10s., three months; Straits, £208. 10s.; English, £208. 10s. **Lead,** soft foreign, £31. 10s., prompt; English, £32. 10s.; chemical sheet, 37s. 6d. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £32. 17s. 6d.; hard, £27. 15s. **Antimony,** English regulus, 99%, £32. 5s. to £33. 10s.; special brands, £38. 10s. to £39. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. 15s. **Bismuth,** 10s. **Platinum,** £26. 10s. per oz.; scrap £24. 10s. **Wolfram,** spot, 12s. to 12s. 3d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** quotations are as follows: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET.

Wednesday.

There has been rather a better demand for heavy chemicals during the past week, but trade as a whole is still on the quiet side, both on home and export account. There are no alterations to report in quotations for alkali products, and works generally are fairly well engaged with orders. **Bleaching Powder** continues dull at £11. to £11. 5s., soft-wood casks, on rails makers' works. **Bichromates** and **Chlorates** are steadily maintained at recent rates, though business is only on the small side. The demand for **Copper Sulphate** is only slow, and quotations are easier at £25. to £25. 5s., f.o.b. Roasted **Saltcake** unchanged at £4. 10s., carriage paid. Imported cruue **Sulphur** is firm at £5. 5s. on rails. **Phosphate** and **Commercial Hyposulphite of Soda** continue in small request, and quotations are easy at £14. and £9. 10s. respectively. **Nitrite of Soda,** lower at £26., ex store. Concentrated **Sodium Sulphide,** weak at £14., carriage paid. There has been rather a sharp advance in the price of white powdered **Arsenic** during the past week owing to renewal of American demand, and quotations are firmly maintained at £65. to £66., on rails Cornish works. Yellow **Prussiate of Potash,** weaker at 11d. per lb.; **Soda,** steady at 5¾d. **Carbonate of Potash,** 90—92%, quiet at £23. 10s., c.i.f.; solid **Caustic,** 88—90%, firm at £29. per ton. **Acetic Acid** and **Acetate of Soda** have an easier tendency. Brown **Acetate of Lime,** scarce and dear at £12. per ton; grey, £22. **Acetone,** dull at £124. per ton. Miscible **Wood Naphtha,** slow of sale at 6s. per gallon. **Barium Chloride,** firm at £14. 10s. per ton. **Lead Salts** are dearer; white **Acetate** £42., brown £45., and **Lead Nitrate** £43., carriage paid. English **Litharge,** £40. per ton. Green **Copperas** moved off steadily, but prices show no improvement. **Oxalic Acid** unchanged at 5¾d. per lb., ex store. **Permanganate of Potash,** commercial quality, at 8½d. per lb., carriage paid.

SWANSEA MARKET REPORT.

Wednesday.

The **Tinplate** market had a steady demand, with a fair turnover on the basis of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets** also in good demand at £19. 2s. 6d. per ton, f.o.b. **Copper** rather depressed, with prompt at £60. 2s. 6d. per ton, and three months £60. 12s. 6d. **Tin** fairly active, with an advancing tendency at £205. 2s. 6d. cash, and £202. 7s. 6d. three months. **Lead** dearer at £30. 7s. 6d. per ton prompt, and £27. 12s. 6d. forward. **Spelter** steady at £33. 7s. 6d. per ton prompt, and £32. 12s. 6d. three months. **Zinc Sheets** in good demand at £39. 12s. 6d. per ton, on rail makers' works, for prompt, and £38. 12s. 6d. three months. **Sulphate of Copper** dull at £25. 17s. 6d. per ton, less 5%, in casks, f.o.b. **Sulphate of Ammonia** quietly steady, with neutral quality at £14. 15s. per ton over delivery November. **Nitrate of Soda** steady at £13. 7s. 6d. per ton prompt. **Bone Meal** in poor demand, with Indian prompt at £9. 2s. 6d. per ton. **Rape Oil** quiet; best refined £2. 6s. 3d. per cwt., net, in barrels. **Cod Oil** very steady; Newfoundland, at docks, £2. 5s. 3d. per cwt.; English, £1. 15s. 6d., f.o.b. **Coconut Oil** steady, with Ceylon at £2. 4s. 3d. per cwt. **Linseed Oil,** raw £2. 5s. 3d., and boiled £2. 7s. 3d., per cwt. **Cottonseed Oil** in good demand; common edible £2. 3s. 3d., and deodorised £2. 6s. 3d. per cwt. **Castor Oil,** very firm at £2. 18s. 6d. for best prompt, and £2. 12s. 6d. per cwt. in barrels, ex ship. **Olive Oil** quiet, with Spanish offered at £66. 17s. 6d. per ton, ex ship. **Oxalic Acid,** slow trade at 6¼d. per lb., f.o.r. **Arsenic** in better demand, with scarcity of offers; white powdered at £60. 17s. 6d. per ton. **Copperas,** poor demand at £2. 2s. 6d. per ton for 4-ton lots, f.o.r. **Sulphuric Acid** in good demand at unchanged rates. **Pitch** remains firm at £6. 17s 6d. per ton for high-grade quality, ex ship. **Benzol** in good demand at 1s. 4½d. per gallon, f.o.r. **Creosote** firm at 8¾d. per gallon, f.o.r. **Palm Oil** quietly steady; Lagos £36. 15s., softs £36., mediums £36. 10s., and hards £36. 15s. per ton. **Turpentine** quiet, with American prompt at £3. 14s. 9d per cwt. In the **Coal** trade buyers received some concessions: Best Admiralty smokeless £1. 7s. 6d., seconds £1. 6s.; ordinaries, £1. 5s. 6d.; Monmouthshire black vein, £1. 6s. 6d., all f.o.b. **Anthracite** in good demand; best large, £2. 6s.; Paris and French nuts, £2. 17s. 6d. per ton, f.o.b. **Patent Fuel,** dearer from £1. 9s. to £1. 12s. per ton, f.o.b. **Cokes** very steady; export, £2. 2s. 6d., f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, in trucks at ovens.

LIVERPOOL CHEMICAL MARKET.

Wednesday.

The demand for chemicals of the heavier class, for use in the United Kingdom, has been very fair, a slight improvement on the recent condition being noticeable. In the export branch of the trade business has been moderately active, shipments being on a fairly large scale. **Bleaching Powder** continues in quietly steady demand for the home trade, and has moved more freely in the export branch; spot is £11. 5s. per ton; for contracts, rates are quoted according to requirements. **Chloride of Calcium** has been quiet, and is £5. 12s. 6d. per ton. **Caustic Soda** has been in fair request for home-trade use, and has again had an active shipment; spot is £19. 7s. 6d. per ton for 76%, with special prices for contracts, according to requirements. **Bicarbonate of Soda** has been steadily called for on U.K. account, and has been freely shipped for foreign ports; the price is £10. 10s. per ton, carriage paid, for the home trade. **Soda Crystals** have again sold somewhat freely for use in the U.K.; the price is £5. 5s. per ton, carriage paid, to home-trade buyers. **Nitrate of Soda** has been in quietly steady demand, and is £13. 5s. to £13. 10s. per ton. **Borax** has been in rather good request; commercial grades are—crystals £25. per ton, powdered £26.; higher grades—crystals £29. per ton, powdered £30. per ton, and superfine £31. per ton, in 2cwt. bags, carriage paid in the U.K. **Saltcake** has been quieter, and is £4. 10s. to £5. per ton for home-trade use, and £5. to £6. per ton for export. **Bichromate of Soda** has had a moderate inquiry, and is 4¾d. per lb. to stated ports. **Ammonia Alkali** has been in very fair demand on home-trade account, and has had an active shipment; it is £7. 10s. per ton, f.o.r. at works, for spot; special prices being quoted in contracts; for export, £8. per ton, varying somewhat according to destination, is quoted. **Hyposulphite of Soda** has been in fair request; it is £10. per ton, in 2cwt. bags, for commercial, and £15. to £15. 10s. per ton for photographic, in 1cwt. kegs. **Sulphide of Soda** has moved but slowly; it is £14. 10s. to £15. per ton for solid, and £8. 15s to £9. per ton for crystals. **Chlorate of Soda** has been very quiet, and is 3d. per lb. **Phosphate of Soda** has been but little in demand, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has been quiet, and is 6d. per lb. **Yellow Prussiate of Potash** has had a moderate sale, and the price has again eased; it may be given as 11½d. to 1s. per lb. **Red Prussiate** has been quiet, and is 3s. per lb. **Carbonate of Potash** has been more in request, and is £25. to £30. per ton **Nitrate of Potash** has sold with some freedom, and is £29. to £30. per ton. **Chlorate of Potash** has had a limited inquiry, and is 3½d. to 4d. per lb. **Caustic Potash** has been in very fair demand, and is £29. to £30. per ton. **Permanganate of Potash** has been rather more in request, and is 9d. to 9½d. per lb. **Bichromate of Potash** has again been in fair request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has sold more readily; first quality is £60., and second quality £57. per ton. **Sulphate of Ammonia** has been very quiet on home-trade account, but has had a

fairly free shipment on export account; neutral of 25¾% is £14. 15s. per ton, and ordinary of 25¼% £13. 12s. per ton, for November, for home-trade uses. **Carbonate of Ammonia** has been in rather good demand, and is 4d. per lb. **Muriate of Ammonia** has been quieter, and is £32. per ton. **Magnesia** continues to sell somewhat freely; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been in very limited demand; it is £11. per ton for use in the U.K., and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been quieter, and is £8. to £11. per ton, according to quality. **Sulphur** has been in good request; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s. per ton, and American £5. 10s. per ton. **Tartaric Acid** has been but little in request, and the price has again eased; it may be given as 1s. 1d. to 1s. 1½d. per lb. **Cream of Tartar** has had a steady and very fair sale, and is £4. 10s. per cwt. **Boric Acid** has had a rather free inquiry; commercial is £48. per ton, and powdered £51. per ton; B.P. grades are £54. to £60. per ton. **Citric Acid** has had a slow sale, and the price has been weak; it may be given as 1s. 5½d. per lb. **Oxalic Acid** has been but little in demand, and is 6d. per lb. **White Acetate of Lead** has moved but slowly, and is £42. to £42. 10s. per ton. **Sulphate of Copper** has been rather more in request on home-trade account, and has had a fair shipment for overseas ports; it is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been quiet; white powdered is £60. to £61. per ton.

WEST OF SCOTLAND CHEMICALS.

Wednesday.

There has been a slight improvement in the demand for chemicals over the past week on home-trade account, though inquiries for export have fallen off a little. Prices generally continue at about previous figures, but arsenic and brown acetate of lead are both dearer. Quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, dearer at £67. per ton on spot; a steady market. **Barium Chloride,** £14. 10s. per ton; at this price the market remains steady. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, makers' prices; demand rather poor. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted at slightly below this figure. **Citric Acid,** 1s. 6d. per lb., less 5%; little business about at last week's quotation. **Copper Sulphate,** £27. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar,** £4. 3s. per cwt. for 99% at Glasgow; quotation steady, but inquiry small. **Lead Acetate,** white, £41. 10s. per ton on spot; brown, more inquiry at £44. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. 1½d. per lb.; at this price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £60. and £57. per ton respectively; crystals £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 12s. per cwt., net; a better market, with quotation unaltered. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate,** £9. 10s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; rather easier in tone, and inclined to be dull. **Tartaric Acid,** 1s. 2d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending October 27,

ALUMINIUM SULPHATE—
Marseilles, 1,250 bgs.

ARSENIC—
Oporto, 69 cks.

BARYTES—
Antwerp, 250 bgs.

BAUXITE—
Marseilles, 250 t.

CARBON BLACK—
Gothenburg, 10 cks.

CASEIN—
Hamburg, 10 bgs.

CAUSTIC POTASH—
Hamburg, 20 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 1,811 pkgs.

CREAM OF TARTAR—
Barcelona, 17 cs.
Oporto, 20 cks.

DEXTRINE—
Hamburg, 50 pkgs.

GLUCOSE—
Ghent, 10 cks.
Hamburg, 10 brls.

GLUE—
Antwerp, 50 bgs., 58 bls.

KIESELGUHR—
Cartagena, 40 cs.

LEAD ACETATE—
Hamburg, 14 brls.

MAGNESITE—
Madras, 72 bgs.
Terokino, 1,000 t.

MAGNESIUM CHLORIDE—
Hamburg, 364 drms.

PARAFFIN WAX—
New York, 200 brls.

PLUMBAGO—
Hamburg, 35 bgs.

POTASH ALUM—
Hamburg, 33 cks.

SALT—
Hamburg, 1,600 bgs.

SOAP—
Genoa, 39 cs.
Hamburg, 10 cs.
New York, 1,000 cs.
Philadelphia, 605 bxs.
Seville, 109 cs.

SODIUM ACETATE—
Antwerp, 36 cks.

SODIUM PHOSPHATE—
Antwerp, 8 cks.
Hamburg, 5 cks.

SODIUM SULPHATE—
Hamburg, 792 brls.

STEARINE—
Buenos Aires, 226 trcs.

SUPERPHOSPHATE—
Antwerp, 1,500 bgs.

TALLOW—
Monte Video, 11 crbys., 16 trcs., 1 ppe.

TANNING MATERIALS—
Chestnut
Leghorn, 100 brls.
Quebracho
Buenos Aires, 2,018 bgs.

WHITE LEAD—
Genoa, 41 cks.
New York, 54 cks.

ZINC OXIDE—
Antwerp, 40 brls.

GOOLE.

Week ending October 27.

COLOURS (*otherwise undescribed*)—
Antwerp, 233 pkgs.

FORMIC ACID—
Hamburg, 79 cbys.

GLUE—
Antwerp, 1 ck. 81 bgs.; Boulogne, 30 bgs.; Hamburg, 6 cks.

MAGNESITE—
Amsterdam, 50 bgs.

MAGNESIUM SULPHATE—
Hamburg, 110 bgs.

GRANGEMOUTH.

Week ending October 27.

ACETIC ACID—
Rotterdam, 15 cks.

CHEMICALS (*otherwise undescribed*)
Antwerp and Ghent, 250 bgs., 15 drms.

GLUE—
Antwerp and Ghent, 10 bgs.

LEAD ACETATE—
Rotterdam, 3 cks.

MANGANESE—
Antwerp and Ghent, 100 cs.

GRIMSBY.

Week ending October 27.

CALCIUM CARBIDE—
Halmstad, 400 drms.

COLOURS (*otherwise undescribed*)—
Dieppe, 1 ck.

DYESTUFFS (NATURAL)—
Madder
Dieppe, 2 bls.

KAINIT—
Antwerp, 152 t.
Hamburg, 170 t.

POTASH (*otherwise undescribed*)—
Hamburg, 2 crts.

HULL.

Week ending October 27.

CHEMICALS (*otherwise undescribed*)
Bremen, 4 t. 18 c.
Copenhagen, 66 galls.
Hamburg, 26 t. 9 c.
Melbourne, 5 1
Rotterdam, 3

DEXTRINE—
Amsterdam, 2 t.

DYESTUFFS (ARTIFICIAL)—
Alizarine—
Amsterdam, 260 lb.
Unspecified
Amsterdam, 2,160 lb.
Rotterdam, 3,907 lb.

FERRO CHROME—
Gothenburg, 5 t.

FERRO MANGANESE—
Gothenburg, 5 t.

FERRO SILICON—
Gothenburg, 15 t.

KAINIT—
Antwerp, 100 t.

ROSIN—
Antwerp, 115 t. 11 c.; Bordeaux, 5 t. 6 c.; Gefle, 11 t. 16 c.; Gothenburg, 6 t.

SALT—
Hamburg, 148 t.

SALTPETRE—
Rotterdam, 5 t. 7 c.

SILICO MANGANESE—
Gothenburg, 10 t.

STEARINE—
Antwerp, 3 t.

SULPHUR—
Porto Empedocle, 3,700 t.

TANNING MATERIALS—
Wattle Extract
Durban, 452 t. 8 c.
Natal, 80 t.

TAR (WOOD)—
Danzig, 7 t. 10 c.
Gefle, 13 t.

TURPENTINE—
Bremen, 16 c.
Gefle, 6 c.

LEITH.

Week ending October 27.

BARYTES—
Bremen, 150 bgs.

BASIC SLAG—
Antwerp, 1,000 bgs.

BLEACHING POWDER—
Hamburg, 76 cks.

CASEIN—
Dunkirk, 78 bgs.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 7 drms.

FERRO SILICON—
Gothenburg, 44 cks.

GLUE—
Antwerp, 50 bgs.
Dunkirk, 40 bgs.

LACTIC ACID—
Rotterdam, 25 cks.

MAGNESITE—
Amsterdam, 20 bgs.

OLEINE—
Antwerp, 4 brls.

PLUMBAGO—
Bremen, 89 cks.

POTASH (*otherwise undescribed*)—
Antwerp, 1,000 bgs.

ROSIN—
Bremen, 100 brls.

SALT—
Bremen, 50 bgs.
Hamburg, 250 bgs.

SOAP—
Copenhagen, 12 cs.
Hamburg, 1 cs.
Rotterdam, 10 cs.

SUPERPHOSPHATE—
Antwerp, 7,444 bgs.

LIVERPOOL.

Week ending October 27.

ACETATE OF LIME—
Germany, 572 bgs.

ALBUMEN—
France, 11 cs.

AMMONIA (ANHYDROUS)
U.S., 120 cylds.

ARGOLS—
Argentine, 300 bgs.
France, 383 sks., 577 bgs.
Spain, 93 cks.

BARYTES—
Germany, 150 bgs.

BEESWAX—
Chile, 88 sks.

BONE ASH
Argentine, 590 t.

BORATE OF LIME—
Chile, 13,509 bgs.

BORIC ACID—
Italy, 160 brls.

CALCIUM CARBIDE—
Jugo-Slavia, 660 drms.

CARBON (DECOLOURISING)
Holland, 20 bls.

CARBONATE OF LIME—
Jersey, 29 bgs.

CARNAUBA WAX—
Brazil, 57 bgs.

CASEIN—
Argentine, 84 bgs.

CAUSTIC POTASH—
Germany, 17 drms.

CHROMIUM ORE—
Cyprus, 12 t.

COAL TAR PRODUCTS—
Carbolic Acid
Belgium, 25 drms.
Unspecified
France, 2 djns.

CREAM OF TARTAR
Spain, 4 cks., 20 kgs.

DISINFECTANTS (*otherwise undes.*)
Canada, 1 kg.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Canada, 9 brls., 2 kgs.

DYESTUFFS (NATURAL)—
Fustic
France, 26 cks.
U.S., 20 cks.
Hematine
U.S., 20 cks.
Logwood
France, 21 cks.
Jamaica, 32 cks.
Unspecified
France, 5 cks.

FERTILISER (DRIED BLOOD)—
Argentine, 670 bgs.

FORMALDEHYDE—
U.S., 133 brls.

GELATINE—
Belgium, 20 bls.
Czecho-Slovakia, 20 bls.

GLUE—
France, 120 bgs.
Holland, 500 bgs.
U.S., 20 brls.

GLYCERINE—
Holland, 193 drms.
Switzerland, 89 drms.

IRON OXIDE—
Spain, 200 bgs., 38 cks., 15 brls.

LITHOPONE—
Germany, 60 cks.

MAGNESITE (CALCINED)—
Holland, 50 bgs.

MAGNESIUM SULPHATE—
Germany, 104 bgs.
Holland, 500 bgs.

MANGANESE ORE—
Holland, 59 t.
India, 5,000 t.

OCHRE—
France, 6 cks.

PARAFFIN SCALE—
U.S., 2,599 brls.

PARAFFIN WAX—
U.S., 204 bgs., 100 brls.

PHOSPHATE ROCK—
U.S., 1,900 t.

PITCH (MINERAL)
U.S., 615 brls., 100 drms.

PITCH (VEGETABLE)
Italy, 29 brls.

PLUMBAGO—
France, 10 t.

POTASSIUM CHLORIDE
Germany, 100 bgs.

ROSIN—
Portugal, 222 cks.
U.S., 100 brls.

SOAP—
Denmark, £12.; France, £162.
U.S., £1,467.

SODIUM ACETATE
Belgium, 40 cks.

SODIUM CHLORATE—
Spain, 150 brls.

SULPHUR—
Spain, 12 brls.

TALLOW—
Argentine, 291 pkgs., 2,192 cks., 858 tcs., 424 pps.

TANNING MATERIALS—
Chestnut
France, 100 cks., 1,153 bgs.
Italy, 100 cs., 65 cks.
U.S., 304 bgs.
Myrabolans
E. Indies, 2,804 pkts.
India, 1,866 bgs., 2,200 pkts.
Quebracho
Argentine, 4,275 bgs., 11,613 brls.
Italy, 400 brls.
Valonia
Cyprus, 408 bgs.
Wattle
South Africa, 2,833 bgs.

TIN ORE—
Bolivia, 911 t.
Portugal, 23 t.

TURPENTINE—
U.S., 290 brls.

ULTRAMARINE BLUE
Germany, 5 cks.

VANADIUM ORE—
Peru, 17 t.

VERDIGRIS—
France, 2 cks.

WAX (*otherwise undescribed*)—
U.S., £5.

WAX (MINERAL)—
Germany, 10 bgs.

ZINC ASHES—
Chile, 100 t. 10 c.
U.S., 13 t. 19 c.

ZINC OXIDE—
Belgium, 80 cks.

LONDON.

Week ending October 27.

ACETIC ACID—
Belgium, 5 cks. Reifmayer, Calburn & Kindersley

ACETONE—
Germany, 10 t. Chance & Hunt
,, 2 t. 10 c. Stern

ACETYL SALICYLIC ACID—*
——— £205.

ALBUMEN—
China, £11,540. Baxter, Hoare
,, £3,514. McDougall & Bonthron
,, £1,925. W. M. Smith
,, £161,046.
,, £12,893. Morris
,, £2,917. C. Goldrie, Foucard
France, £850. Slann Davies
U.S.A., £25.

ALUMINIUM SULPHATE—
France, 200 pkgs. J. Bailey

ARGOLS—
France, 1,384 pkgs.
Italy, 333
,, 18 Morison, Pollexfen & Blair
Portugal, 389
Spain, 119

ARSENIC—
Japan, 10 c.
Queensland, 22 t. 2
N.S.W. 52 18 c. T. Swan

ARSENIOUS ACID—
Japan, 9 pkgs. W. & J. Bowdith
Portugal, 74 Coverley, Wall & Westray

BARBITONE—*
——— £633.

BARIUM CHLORIDE—
Czecho-Slovakia £115. T. Potter Priestley

BARIUM CHLORIDE—
Germany, £248. Petri

BARYTES—
Belgium, 450 bgs. Felton & Crepin
Germany, 114 cks. Burton, Smart & Orford
,, 300 bgs. H. Smart
,, 31 cks. W. Harrison
,, 90 Felton & Crepin
,, 2
,, 400 bgs. W.
,, 106 cks. Harrison

BEESWAX—
Anglo-Egypt-Sudan 36 pkgs. Baxter, Hoare
B.W.I., 2 Weber, Smith & Hoare
Pt. W. Africa, 5 bgs.

BENZYL ALCOHOL—*
——— £239.

BENZYL BENZOATE—*
——— £144.

BONE BLACK—
Belgium, 20 cks. O. Murray

CALCIUM CARBIDE—
Norway, 29 t. 10 c.
,, 50 C. J. Quirk
Switzerland, 140

CAMPHOR—
China, 33 drms. R. Warner
France, 15 cs. W. M. Smith
Japan, 200 R. Warner

CARBON BLACK—
U.S.A., 40 cs. H. W. Peabody

CASEIN—
Brit. India, £400. J. Latham
France, £450.
Germany, £534. Cox

CAUSTIC SODA—
Czecho-Slovakia, 2 t. 1 c. Brotherton & Ratcliffe
U.S.A., 7 General Electric

CERESINE WAX—
Czecho-Slovakia, 65 bgs.

CHEMICALS (*otherwise undescribed*)
Canada, £956. Chance & Hunt
,, £336. E. A. Kimpton
,, £55.
Denmark, £74.
Germany, £109. Petri
,, £90. Beck & Pollitzer
,, £49. C. Tennant
,, £32.
,, £14. E. Friedlander
,, £77. O. Harris
,, £16. J. B. Ballantyne
,, £15. K. J. Braendle
,, £219. Rudolf Wolff
Sweden, £52.
U.S.A., £15. Gerhard & Hey
,, £482. Burton, Baker
,, £55.
,, £37. Allison

CHEMICALS (*otherwise undes.*)—*
——— £2,829.

COAL TAR PRODUCTS—
Unspecified
Switz'land £137.

COCAINE HYDROCHLORIDE—*
——— £259.

COUMARINE—*
—— £22.

CREAM OF TARTAR—
France, 100 pkgs. F. W. Taylor
,, 20 Bessler, Waechter

DEXTRINE—
Holland, 11. 17 c. Gough, Kidstone
,, 3 Strilbeck
,, 1 18

* Entered under the Safeguarding of Industries Act.

DEXTRINE—
Germany, 5 t. H. Keller

DISINFECTANTS (*otherwise undes.*)
U.S.A., £1,081. H. C. Hackney

DYESTUFFS (ARTIFICIAL)—
Unspecified
Austria, £948. Roberts, Brining
France, £142. Mory
Germany, £827.
,, £21. A. Potter

DYESTUFFS (NATURAL)—
Annatto
B.W.I., 8 pkgs. Weber, Smith & Hoare
Brit. India, 27 D. H. Gaskain
Denmark, 2 tanks.
Cochineal
France, 2 pkgs.
Logwood
U.S.A., 10 pkgs. Pronk, Davis & Rushby

FERTILISERS (*otherwise undes.*)—
Argentine, 5 t. Beresford
Belgium, 1 Beresford
Brit. India, 10 Ralli
Denmark, 8 T. Elliott
Egypt, 50

FORMALDEHYDE—
Germany, 4 pkgs. Reitmayer, Calburn & Kindersley
U.S.A., 64 H. Green
,, 50 V. Blagden

GELATINE—
Belgium, £1,183. Duche
,, £121. Soc. des Prod. Chim.
,, £16.
France, £33. Butcher, Wetherly
Germany, £56. Crowe
,, £67. G. Elliott

GLUE—
Belgium, £3,410. Cazaly, Mills
,, £106. P. Ingenlath
,, £567. A. J. Malicet
,, £591. Symons
,, £25. Van Oppen
Holland, £283. P. Ingenlath
,, £27.
Hungary, £660. G. E. King
,, £74. Van Oppen
Roumania, £250. Union Glue & Gel.
U.S.A., £6. Gerhard & Hey

GLYCERINE—
Holland, £112.

HEXAMINE—*
—— £119.

HYDRASTINE—*
—— £735.

HYDROGEN PEROXIDE—
U.S.A., 2 t. 6 c. Allen & Hanbury

HYDROQUINONE—*
—— £128.

ISINGLASS—
B.W.I., 7 bgs.
Brit. Guiana, 19 pkgs.
,, 9 cks.
China, 22 vdls. R. Warner
Japan, 20 W. M. Smith
,, 30 Thornett & Fehr

KAINIT—
Germany, 370 t. F. W. Berk

LITHOPONE—
Germany, 1 ck. Stromwall
Holland, 268 F. T. H. Nye
,, 60 M. Ashby

MAGNESITE—
Holland, £98. Ray
,, £70.

MINERAL COLOURS (*otherwise un.*)
Germany, 100 bgs. H. Smart
Italy, 8 cks. Pinchin, Johnson

OCHRE—
Brit. India, 200 bgs. J. W. Cook
France, 34 cks. W. Harrison
,, 4 Taylor & Cox

OXALIC ACID—*
—— £177.

PARAFFIN WAX—
U.S.A., 60 t.
,, 37 14 c. Simplon Spence & Young
,, 44 Anglo-Amer.
,, 11 16 S. Bramwell
,, 189 5 Mawson, Clark

PHOSPHATE (*otherwise undescribed*)
Holland, 10 t. W. H. Muller

PHOSPHORIC ACID—*
—— £119.

PITCH (*otherwise undescribed*)—
Belgium, 183 brls. Pure Russian Liq. Paraffin

PLUMBAGO—
Ceylon, 61 brls. Morgan Crucible
Madag'car, 1,000 –

POTASSIUM BROMIDE—*
—— £331.

POTASSIUM CARBONATE—
Germany, 11 pkgs. Beck & Pollitzer
Japan, 14 Beck & Pollitzer

POTASSIUM CHLORATE—
France, 560 pkgs. C. Tennant

PRUSSIAN BLUE—
France, 10 cks. H. H. Poole

PYRAZOLONE—*
—— £280.

ROSIN—
Portugal, 95 cks.
,, 84 M. H. Winkley
U.S.A., 1,257 brls.
,, 500 Fox, Stockell
,, 200 Lowden, Connell
,, 1,050 Litchfield & Saundy
,, 2,346 Rosin & Turp. Imp.

SALT—
Germany, 45 t. Morris

SHELLAC—
Brit. India, 28 t. 9 c. J. W. Cook
,, 3 H. Smart
,, 7
,, 37 7 Litchfield & Saundy
,, 73 10 Dunlop

SOAP—
Austria, £279.
,, £14. Gerhard & Hey
Denmark, £224.
,, £16. Beck & Pollitzer
France, £128.
,, £944. P. Le Brun
,, £19. Hill
,, £17. W. G. Frith
,, £190. J. D. Hewett Symons
,, £32.
Germany, £52.
,, £4. S. Kalisky
Holland, £60.
U.S.A., £3,713. Knight & Morris
,, £850. L. F. Smith
,, £67. H. C. Hackney
Victoria, £3,600. L. F. Smith

SODIUM CHLORIDE—*
—— £270.

SODIUM PHOSPHATE—
Belgium, 5 t 4 c.

SODIUM SALICYLATE—*
—— £336.

SULPHUR—
Czecho-Slovakia, £17. J. Schnurmann
France, £55. G. W. Wheatley
Italy, £165.

TALLOW—
N.Z., 75 t. 4 c.
W. Australia, 137

TANNING MATERIALS—
Myrabolans
Brit. India, 1 pkg. Brit. Drug Houses
,, 1,000 Wills
Sumac
Italy, 650 pkgs. Fisher, King
,, 250 J. Kitchin
,, 100 H. G. Harper
Unspecified
Switzerland, 4 pkgs.
Belgium, 50 t. Gough, Kirkston
,, 52 W. A. J. Tilleray

TAR (*otherwise undescribed*)—
Latvia, 24 brls. Russian Prod.

TARTARIC ACID—
Holland, 20 pkgs.

THORIUM NITRATE—*
—— £1,910.

TURPENTINE—
France, 50 brls. Lowden, Connell
Germany, 9 drms.
U.S.A., 900 brls. Rosin & Turp. Imp.
,, 100 Goodlake & Nutter
,, 100 P. A. Watt
,, 100 Bowring, Jones & Tidy
,, 25 White Sea & Baltic

ULTRAMARINE—
Germany, 1 ck. Stancourt & Muir

WHITE LEAD—
Belgium, 53 cks. G. Farmiloe
France, 4
Germany, 1 Stancourt & Muir
Italy, 30 A. W. Page
Holland, 16 Chance & Hunt

ZINC OXIDE—
Germany, 50 cks. M. Ashby
Holland, 85 F. T. H. Nye

MANCHESTER.

Week ending October 27.

ACETIC ACID—
Hamburg, 87 crbys.
Rotterdam, 6 cks.

ALBUMEN—
Antwerp, 41 cs.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 34 cks.

BITUMEN—
Beaumont, 797 brls.

CALCIUM CARBIDE—
Skien, 40 drms.

CARBORUNDUM—
Montreal, 726 bgs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 34 brls.

CHLOROPHYLL—
Antwerp, 3 cs.

COAL TAR PRODUCTS—
Naphthalene
Antwerp, 20 cks.

CREAM OF TARTAR—
Hamburg, 6 cks.

DEXTRINE—
Hamburg, 100 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 23 brls.
Unspecified
Rotterdam, 11 cks., 1 brl.

FERRO SILICON—
Skien, 79 brls., 272 cs.

GLUCOSE—
Hamburg, 100 brls., 200 bgs.

GLUE—
Antwerp, 50 pkgs.
Hamburg, 100 bgs.

IRON OXIDE—
Malaga, 45 brls.

LACTIC ACID—
Rotterdam, 50 cks.

LEAD ACETATE—
Hamburg, 11 brls.

LITHARGE—
Ghent, 2 cks.

LITHOPONE—
Antwerp, 10 cks.
Rotterdam, 124 cks.

MAGNESITE—
Amsterdam, 50 bgs.
Drammen, 102 bgs.
Rotterdam, 103 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 65 drms.

MAGNESIUM SULPHATE—
Danzig, 455 bgs.

MINERAL COLOURS (*otherwise un.*)
Malaga, 76 brls., 700 sks.

OXALIC ACID—
Hamburg, 5 cks., 13 crts.
Rotterdam, 19 cks.

PARAFFIN WAX—
Beaumont, 1,016 bgs.

PHOSPHORUS—
Montreal, 94 drms.

PITCH (STEARINE)—
Rotterdam, 53 brls.

POTASSIUM CARBONATE—
Hamburg, 11 brls.

RED LEAD—
Ghent, 2 cks.

ROSIN—
Savannah, 250 brls.

SOAP—
Rotterdam, 6 cks.

SODA—
Antwerp, 26 cks.

SODIUM ACETATE—
Amsterdam, 24 cks.
Antwerp, 32 kgs.

SODIUM NITRITE—
Skien, 113 cks.

SODIUM PHOSPHATE—
Hamburg, 7 cks.

STEARINE—
Antwerp, 128 bgs.

TALLOW—
Sarpsborg, 720 brls.

TARTARIC ACID—
Amsterdam, 4 cks., 100 kgs.

TIN OXIDE—
Hamburg, 10 cks.

TURPENTINE—
Savannah, 200 brls.

WAX (*otherwise undescribed*)—
Baltimore, 200 brls.
Norfolk, 250 brls.

WHITE LEAD—
Ghent, 38 cks.

ZINC DUST—
Antwerp, 50 cks.

ZINC OXIDE—
Antwerp, 51 cs.
Rotterdam, 10 cks.

NEWCASTLE-ON-TYNE

Week ending October 27.

ANTIMONY—
Hamburg, 1,000 cs.

CALCIUM CARBIDE—
Christiania, 1,085 drms.

FERRO TITANIUM—
Stavanger, 150 cs.

GLUE—
Antwerp, 20 bls.

LITHOPONE—
Antwerp, 8 cks.

SALT—
Hamburg, 420 bgs.

SALTPETRE—
Stavanger, 1 kg.

STEARINE—
Antwerp, 13 bgs.

TAR (WOOD)—
Hamburg, 10 brls.

N. & S. SHIELDS.

Week ending October 27.

NIL.

* Entered under the Safeguarding of Industries Act.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending October 27.

BOILER COMPOSITION—
Gothenburg, 1 t.

CHEMICALS (*otherwise undescribed*)
Cape Town, 41 pkgs.; Coquimbo, 60 drms.; East London, 13 pkgs. Hamburg, 17 pkgs.; New York, 228 pkgs.

COAL TAR PRODUCTS—
Creosote
San Antonio, 182 t. 13 c.
Tar
Cape Town, 4 t. 12 c.
Unspecified
Hamburg, 1 t. 14 c.

DISINFECTANTS (*otherwise undes.*)
Algoa Bay, 9 c.
Cape Town, 650 galls.

PITCH (*otherwise undescribed*)—
Antwerp, 100 t.

POTASSIUM BICHROMATE—
Hamburg, 7 c.

SPERMACETTI WAX—
Hamburg, 1 t. 1 c. 2 qrs.
New York, 1 t. 7 c.

TALLOW—
Hamburg, 10 t.

GRANGEMOUTH.

Week ending October 27.

CHEMICALS (*otherwise undescribed*)
Christiania, 2 drms.
Rouen, 45 pkgs.

NAPHTHA (*otherwise undescribed*)
Rouen, 68 drms.

PARAFFIN WAX—
Bordeaux, 312 bgs.
Nantes, 88 bgs.
Rouen, 528 bgs.

HULL.

OFFICIAL AMENDMENT.

From return for week ending September 14, deduct—

SULPHUR—
Amsterdam, 50 bgs.

Week ending October 23.

ALUM—
Montreal, 3 cks., 5 kgs., 137 bgs., 50 brls.

AMMONIUM SULPHATE—
Rotterdam, 2,542 bgs.

CHEMICALS (*otherwise undescribed*)
Antwerp, 596 drms.; Aalesund, 6 kgs.; Amsterdam, 30 cs., 34 drms.; Christiania, 5 cks., 19 pkgs., 10 cs., 4 drms.; Copenhagen, 6 cs., 120 drms.; Gruz, 1 cs.; Gothenburg, 4 pkgs., 3 cs., 59 drms.; Halmstad, 4 cks.; Helsingfors, 25 cks., 1 cs.; Hamburg, 3 drms.; Malmo, 4 cks.; Montreal, 209 drms.; New York, 1 cs.; Raumo, 100 bgs.; Rotterdam, 7 cks., 3 drms.; Stavanger, 1 kg.; Wasa, 300 drms.

COAL TAR PRODUCTS—
Pitch
Christiania, 1 cs.; Leghorn, 50 cks.; Montreal, 15 brls.; New York, 266 brls.
Tar
Bombay, 120 drms.

DISINFECTANTS (*otherwise undes.*)
Bombay, 50 cs.; Callao, 25 drms.; Karachi, 360 drms.; Mazathan, 20 drms.; Montreal, 10 cks., 30 cs., 105 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Wasa, 5 bxs.

DYESTUFFS (NATURAL)—
Logwood
Genoa, 2 cks., 46 bxs.

GELATINE—
Montreal, 52 bgs.

GLUE—
Copenhagen, 1 bg.; Gothenburg, 40 bgs.; Helsingfors, 112 bgs.; Montreal, 100 bgs.; New York, 140 bgs.; Stockholm, 1 cs.

GLYCERINE—
Montreal, 200 drms.

MINERAL WHITE—
Montreal, 100 bgs.
Stavanger, 5 bgs.

SALT—
Amsterdam, 124 cs.; Copenhagen, 215 cs.; Gothenburg, 50 cs.; Helsingfors, 10 cs.; Norrkoping, 20 cs.; Stockholm, 20 cs.

SOAP—
Constantinople, 5 brls.

STEARINE—
Raumo, 28 brls.

TURPENTINE—
Arica, 50 cs.
Christiania, 2 cks.

WOOD PRESERVATIVE—
Bombay, 4 cs., 200 drms.

LEITH.

Week ending October 27.

AMMONIUM SULPHATE—
Java, 20,560 bgs.

COAL TAR PRODUCTS—
Phthalic Anhydride
Rouen, 2 cks.

DISINFECTANTS (*otherwise undes.*)
Rouen, 25 cks.

POTASSIUM BICHROMATE—
Antwerp, 4 cks.

SODIUM BICHROMATE—
Antwerp, 16 cks.
Dunkirk, 29 cks.

TALLOW OIL—
Copenhagen, 50 tcs.

TAR (*otherwise undescribed*)—
Antwerp, 15 brls.

LIVERPOOL.

Week ending October 25.

ACETIC ACID—
Auckland, 3 c., £18.

ALUM—
Hamburg, 10 t. 3 c., £181.
Pt. Said, 5 c., £16.
Trieste, 5 t. 1 c., £91.

ALUMINIUM SULPHATE—
Bombay, 10 t., £99.
Cartagena, Col., 1 t., £16.
Wiborg, 50 t., £275.

ALUMINOFERRIC—
Vera Cruz, 24 t. 13 c., £141.

AMMONIA—
Calcutta, 11 c., £38.
Durban, 2 c. 3 qrs., £12.

AMMONIUM CARBONATE—
Barcelona, 1 t., £29.; Bari, 19 c., £24.; Constantinople, 19 c., £26.; Galatz, 3 t. 10 c., £84.; Hamburg, 4 t. 18 c., £115.; Melbourne, 1 t. 10 c., £50.; Marseilles, 2 t. 2 c., £56.; New York, 1 t., £28.; Piraeus, 2 t. 18 c., £99.; Rotterdam, 1 t., £30.; Rockhampton, 10 c., £17.; Sydney, 4 t. 6 c., £153.; Stockholm, 1 t. 9 c., £39.

AMMONIUM CHLORIDE—
Melbourne, 5 c., £13.; New York, 22 t. 18 c., £458.; Sydney, 1 t. 3 c., £36.; Salonika, 1 t., £41.

AMMONIUM SULPHATE—
Barcelona, 203 t. 10 c., £2,953.; Cape Town, 1 t., £66.; Hong Kong, 50 t., £812.; Las Palmas, 302 t., £4,287.; Naples, 35 t., £516.; Orotava, 5 t., £72.

AMMONIUM SULPHATE—
Oporto, 24 t. 4 c., £345.; Palermo, 10 t., £145.; Samarang, 349 t. 17 c., £5,511.; Sourabaya, 350 t. 7 c., £5,420.; Tarragona, 148 t. 4 c., £2,041.; Teneriffe, 23 t., £328.

AMYL ACETATE AND ALCOHOL—
Wellington, 20 gals., £25.

ANTIFOULING PAINT—
Brisbane, 5 c., £23.; Cape Town, 2 t., £136.; Calabar, 10 c., £36.; Kobe, 3 t., £300.; Rio de Janeiro, 4 t., £342.

ARSENIC—
Valencia, 1 t. 11 c. 2 qrs., £159.

ARSENIOUS ACID—
Rouen, 15 c., £65.

BARIUM CHLORIDE—
Rouen, 8 t., £124.

BLEACHING POWDER—
Algoa Bay, 1 t., £12.; Aarhus, 15 t. 4 c., £132.; Arica, 3 t. 1 c., £37.; Antofagasta, 2 t. 5 c., £29.; Bombay, 45 t., £540.; Buenos Aires, 24 t. 8 c., £244.; Calcutta, 30 t. 2 c., £296.; Corunna, 3 t. 14 c., £38.; Chicago, 12 t. 6 c., £340.; Delagoa Bay, 14 t. 19 c., £180.; Melbourne, 1 t. 1 c., £11.; Madras, 3 t., £36.; Odense, 60 t. 16 c., £547.; Oporto, 6 t. 12 c., £73.; Rio de Janeiro, 9 t. 17 c., £106.; Sydney, 1 t. 1 c., £11.; Santos, 10 t., £107.

BORAX—
Helsing' org, 2 t. 9c., £60.
Piraeus, 14 c., £23.
Vera Cruz, 5 t., £130.

BORIC ACID—
Bombay, 2 qrs., £2.; Cartagena (Col.), 10 c., £32.; East London, 1 c., £4.; Madras, 5 c., £23.; Seychelles, 1 c., £3.; Valparaiso, 2 c., £15.

CALCIUM CARBIDE—
Calabar, 14 c. 2 qrs., £15.; Iddo, 1 t. 2 c., £24.; Pt. Harcourt, 10 c., £10.; Sierra Leone, 19 c., £20.

CALCIUM CHLORIDE—
Adelaide, 9 t. 18 c., £56.; Algoa Bay, 2 t. 13 c., £15.; Buenos Aires, 40 t. 4 c., £161.; Brisbane, 11 t. 3 c., £66.; Fremantle, 2 t. 19 c., £17.; Guayaquil, 5 t. 4 c., £31.; Melbourne, 10 t. 4 c., £61.; Punta Arenas, 1 t. 12 c., £15.; Sydney, 15 t. 10 c., £267.

CARBONATE OF LIME—
Barcelona, 5t., £90.

CHEMICALS (*otherwise undescribed*)
Adelaide, 1 t., £25.; Auckland, 5 t., £130.; Bombay, 10 t., £250.; Brisbane, 2 t., £52.; Bahia Blanca, 26 t. 7 c., £1,375.; Bergen, 1 t., £26.; Copenhagen, 3 t., £30.; Cape Town, 16 c., £21.; Calcutta, 48 t. 16 c., £348.; Fremantle, 2 t., £54.; Hobart, 2 t. 13 c., £88.; Karachi, 2 qrs., £11.; Lisbon, 4 t., £100.; Monte Video, 50 t., £350.; Melbourne, 9 t. 1 c., £732.; New York, 14 t. 5 c., £36.; Patras, 1 t., £25.; Quebec, 10 t., £50.; Rosario, 50 t. 2 c., £35.; Sydney, 3 t., £79.; Singapore, 1 t. 1 c., £12.; Sourabaya, 32 t. 9 c., £81.; Sydney, 3 t., £79.; Shanghai, 14 t. 3 c., £376.; Valencia, 1 t., £25.; Wellington, 1 t. 2 c., £480.

CITRIC ACID—
Buenos Aires, 1 t. 18 c., £655.
Wellington, 5 c., £36.

COAL TAR PRODUCTS—
Benzyl Chloride
Amsterdam, 6 c., £39.
Carbolic Acid
Dunedin, 1 t., £54.; Genoa, 4 t. 9 c., £632.; Hamburg, 1 t. 5 c., £175.; Kobe, 10 t. 1 c., £1,219.; Sydney, 2 c., £15.; Switzerland, 13 c., £88.; Wellington, 2 c. 2 qrs., £19.

COAL TAR PRODUCTS—
Creosote
Alexandria, 1 t. 6 c., £26.
Montreal, 9 t. 6 c., £254.
Naphthalene
Mombasa, 5 t., £74.
Sydney, 2 t., £15.
Pitch
Antwerp, 10 t. 12 c., £191.
Rotterdam, 1 t. 13 c., £16.
Pyridine
Hamburg, 2 t. 19 c., £580.
New York, 2 t., £414.
Tar
Accra, 2 t. 14 c., £43.; Punta Arenas, 1 t. 4 c., £12.; Pt. Swettenham, 112 t. 10 c., £412.; Sekondi, 2 t. 3 c., £23.
Unspecified
Buenos Aires, 2 t. 10 c., £130.; Hamburg, 37 t. 19 c., £4,674.; Kobe, 5 t. 2 c., £1,263.; Rotterdam, 50 t., £1,520.

COPPER OXIDE—
Melbourne, 1 t., £69.

COPPER SULPHATE—
Christchurch, 1 t., £27.; Mollendo, 10 c., £14.; Monte Video, 7 t. 7 c., £189.; Oporto, 14 t., £342.; Sydney, 3 c., £5.; Tampico, 1 t., £24.; Wellington, 2 t. 10 c., £66.

CREAM OF TARTAR—
Auckland, 1 t., £116.; Dunedin, 2 t., £172.; Fremantle, 2 t., £172.; Invercargill, 1 t. 10 c., £129.; Launceston, 1 t., £86.; Melbourne, 5 t., £430.; Sydney, 3 t., £258.

DISINFECTANTS (*otherwise undes.*)
Auckland, 5 c., £37.; Bombay, 2 c., £21.; Cape Town, 1 t. 8 c., £23.; Cartagena (Col.), 3 t. 11 c., £156.; Durban, 3 t. 15 c., £67.; Dakar, 1 c., £12.; Las Palmas, 1 t., £28.; Madras, 4 t. 2 c., £98.; Pto. Cortes, 10 c., £30.; Quittah, 2 c., £12.; Singapore, 1 t., £33.; Trinidad, 7 c. 2 qrs., £11.; Vera Cruz, 3 c., £10.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 5 t., £746.
Indigo
Tsingtao, 23 t. 16 c., £3,320.
Unspecified
Bombay, 2 qrs., £16.; Barcelona, 14 c. 2 qrs., £160.; Genoa, 2 c., £15.; Lyttleton, 1 t. 8 c., £464.; Montreal, 2 t., £222.; Melbourne, 1 t. 7 c., £442.; Madras, 10 c., £716.; Oamaru, 10 c., £154.; Rio de Janeiro, 1 t. 4 c., £626.; Sydney, 1 c., £13.; Santos, 4 c., £119.; Shanghai, 1 t. 8 c., £380.; Wellington, 1 t. 4 c., £368.

DYESTUFFS (NATURAL)—
Logwood
Para, 2 c., £10.
Orchil
New York, 2 t. 15 c., £176.

ESSENTIAL OILS (SYNTHETIC)—
Durban, 9 c., £557.

FERTILISER (DRIED BLOOD)—
Las Palmas, 6 t. 10 c., £97.
Teneriffe, 2 t. 1 c., £30.

FERTILISERS (*otherwise undes.*)—
Baltimore, 100 t., £600.
Las Palmas, 5 t., £45.
Tarragona, 14 t. 17 c., £25.

FORMALDEHYDE—
Fremantle, 1 t., £77.

GLYCERINE—
Abo, 10 c., £38.; Antwerp, 10 c., £41.; Aarhus, 19 c., £70.; Bourgas, 1 t., £84.; Copenhagen, 8 t. 14 c., £614.; Cape Town, 100 t. 9 c., £5,071.; Dairen, 20 t. 2 c., £1,469.; Hobart, 10 c., £27.; Hong Kong, 15 t. 1 c., £1,244.; Kobe, 163 t. 6 c., £12,422.; Odense, 19 c., £71.

GLYCERINE—
Stockholm, 1 t., £72. ; Shanghai, 85 t. 10 c., £832. ; Yokohama, 45 t. 18 c., £3,473.

HYDROCHLORIC ACID—
Calcutta, 6 c. 2 qrs., £30.

HYDROFLUORIC ACID—
Wellington, 2 c., £14.

IODINE (RESUBLIMED)—
Bombay, 1 c., £110.

IODOFORM—
Calabar, 94 lb., £118.

LACTIC ACID—
Auckland, 14 c., £30.

LEAD ARSENATE—
Callao, 2 t., £205.
Paita, 1 t. 2 c., £183.

MAGNESIA—
Vera Cruz, 1 t., £80.

MAGNESIA (CALCINED)—
Cartagena (Col.), 2 c. 2 qrs., £22.
Vera Cruz, 7 c., £30.

MAGNESIUM CARBONATE—
Bombay, 3 t., £99.
Santos, 10 c., £43.
Vera Cruz, 1 t. 3 c., £119.

MAGNESIUM SULPHATE—
Bonny, 2 c., £3. ; Bombay, 1 t. 3 c., £34. ; Burutu, 1 c., £2. ; Calabar, 16 c., £29. ; Duala, 3 c., £3. ; East London, 1 c., £3. ; Half Assinie, 2 c., £2. 10s. ; Iddo, 1 qr., 7s. ; Lagos, 2 c., £2. 10s. ; Opobo, 3 c., £4. 10s. ; Pt. Harcourt, 2 qrs., 15s. ; Winnebah, 1 c., £1. 10s.

NICKEL OXIDE—
Santos, 5 c., £37.

NITRIC ACID—
Calcutta, 4 c. 1 qr., £20.

PHOSPHORUS (AMORPHOUS)—
Pt. Alegre, 10 c., £117.

PITCH (*otherwise undescribed*)**—**
Bombay, 2 t., £44.
Lyttleton, 16 t. 15 c., £575.

PLATING SALTS (*otherwise undes.*)
Lisbon, 3 c., £31.

POTASSIUM BICHROMATE—
Alexandria, 4 t. 2 c., £196.
Danzig, 5 t. 10 c., £284.

POTASSIUM CHLORIDE—
Wellington, 5 t., £199.

POTASSIUM IODIDE—
Bombay, 2 c., £184. ; Calabar, 2 c. 3 qrs., £291. ; Opobo, 2 qrs., £57. ; Quittah, 13½lbs., £17. ; Sekondi, 1 qr., £16.

POTASSIUM PRUSSIATE—
Barcelona, 3 t., £320.
Rio de Janeiro, 8 c., £46.

SALAMMONIAC—
Marseilles, 1 t. 9c., £88.

SALICYLIC ACID—
Switzerland, 19 c., £166.

SALTCAKE—
New York, 2 t. 4 c., £41.

SALTPETRE—
Sierra Leone, 5 c., £10.

SHEEP DIP—
Buenos Aires, 31 t. 18 c., £1,638. ; Bahia Blanca, 76 t. 1 c., £3,936. ; Delagoa Bay, 3 t. 17 c., £325. ; Pto. Deseado, 13 t. 12 c., £525. ; Para, 1 t. 12 c., £111. ; Pto. Colombo, 2 c., £19. ; San Julian, 7 t., £262. ; Varna, 1 t. 13 c., £133. ; Wellington, 2 t. 10 c., £135.

SULPHURIC ACID—
Arica, 4 t. 15 c., £69.
Antofagasta, 12 t. 14 c., £163.
Calcutta, 9 c. 2 qrs., £27.

TANNING MATERIALS—
Unspecified
Algoa Bay, 3 t., £58. ; Auckland, 5 t. 1 c., £86. ; Cape Town, 2 t. 6 c., £39. ; Catania, 1 t. 2 c., £16. ; Genoa, 3 t. 2 c., £65. ; Melbourne, 14 t. 8 c., £291. ; Mossel Bay, 5 t. 19 c., £131. ; Norrkoping, 9 c. 2 qrs., £11. ; Pt. Elizabeth, 2 t. 6 c., £55. ; Venice, 2 t. 4 c., £33.

TAR (STOCKHOLM)—
Punta Arenas, 11 c., £14.

TARTARIC ACID—
Adelaide, 1 t., £128. ; Brisbane, 1 t., £126. ; Melbourne, 4 t., £506. ; Sydney, 1 t., £126.

VANILLIN—
Gothenburg, 2 qrs., £50.
———, 1 c., £117.

WOOD PRESERVATIVE—
Perth, 1 t., £26.
Rangoon, 11 c., £21.

ZINC OXIDE—
Bombay, 10 t., £422. ; Durban, 1 t., £43. ; Havre, 30 t. 16 c., £1,130. ; Manila, 10 c., £22.

ZINC SULPHATE—
Yokohama, 5 c., £63.

Week ending October 26.

BASIC SLAG—
Wanganui, 50 t.

CALCIUM CHLORATE—
Wellington, 12 pkgs.

CAUSTIC SODA—
Adelaide, 75 drms. ; Algoa Bay, 291 drms. ; Auckland, 16 drms. ; Batavia, 70 tins; Bombay, 40 drms. ; Buenos Aires, 69 drms. ; Cape Town, 24 drms. ; Calcutta, 140 drms. ; Christiania, 20 drms. ; Colombo, 99 drms. ; Constantinople, 100 drms. ; Copenhagen, 20 drms. ; Delagoa Bay, 62 drms. ; Dunedin, 65 drms. ; Durban, 378 drms. ; East London, 272 drms. ; Fremantle, 161 drms. ; Geelong, 9 drms. ; Gisborne, 20 drms. ; Gothenburg, 77 drms. ; Hamburg, 260 drms. ; Jaffa, 17 drms. ; Karachi, 100 drms. ; Kobe, 100 drms. ; La Paz, 24 pkgs. ; Las Palmas, 10 drms. ; Lyttleton, 44 drms. ; Manaos, 10 cs., 10 drms. ; Melbourne, 120 cs. ; Monte Video, 200 drms. ; Montreal, 100 drms. ; Padang, 95 drms. ; Patras, 34 drms. ; Rangoon, 175 drms. ; Penang, 16 drms. ; Perth, 40 drms. ; Rockhampton, 17 drms., 60 pkgs. ; Pt. Said, 35 drms. ; Rotterdam, 15 brls., 101 cs., 171 drms. ; Pt. Elizabeth, 45 drms. ; Rosario, 34 drms. ; Salonika, 30 drms. ; Shanghai, 504 drms. ; Sherbro, 12 cs. ; Sourabaya, 385 drms. ; Sydney, 142 drms. ; Talcahuano, 383 drms. ; Tampico, 864 drms. ; Toulouse, 20 cs. ; Varna, 200 drms. ; Valparaiso, 30 drms. ; Vera Cruz, 206 drms. ; Wasa, 56 drms. ; Wellington, 139 pkgs. ; Wiborg, 485 drms. ; Yokkaichi, 826 drms. ; Zanzibar, 13 drms.

FERRO MANGANESE—
Durban, 50 t. ; New Orleans, 440 t. ; San Francisco, 30 t. ; Santos, 30 t. ; Vancouver, 6 t.

GLUE, SIZE AND GELATINE—
Alexandria, 1 cs. ; Bombay, 20 cs. ; Boston, 120 cks. ; Cartagena, 24 pkgs. ; Cape Town, 40 pkgs. ; Colombo, 10 pkgs. ; Durban, 20 pkgs. ; East London, 4 pkgs. ; Hong Kong, 200 pkgs. ; Lisbon, 40 pkgs. ; Manila, 80 bgs. ; Manzanillo, 5 bgs. ; New York, 55 pkgs. ; Melbourne, 20 bgs. ; Pt. Said, 5 pkgs. ; Pt. Elizabeth, 20 pkgs. ; Samarang, 12 cs. ; Sourabaya, 10 bgs. Sydney, 2 cks.

PARAFFIN WAX—
La Guaira, 180 pkgs.
Pto. Cabello, 160 bgs.
Pto. Colombia, 800 bgs.

SALT—
Aalesund, 32 t. ; Abonema, 40 t. ; Adelaide, 3 t. ; Auckland, 237 t. ; Belize, 4 t. ; Bergen, 116 t. ; Bombay, 5 t. ; Buenos Aires, 3 t. ; Burutu, 52 t. ; Calcutta, 1 t. ; Calabar, 49 t. ; Cape Town, 10 t. ; Christiania, 100 t. ; Conakry, 59 t. ; Duala, 100 t. ; Durban, 57 t. ; Dunedin, 77 t. ; Fremantle, 20 t. ; Gothenburg, 50 t. ; Grand Bassam, 50 t. ; Halifax, N.S., 60 t. ; Half Assinie, 23 t. ; Havre, 6 t.

SALT—
Hobart, 10 t. ; Iddo, 807 t. ; Kingston (Ja.), 79 t. ; Kobe, 40 t. ; Koko, 9 t. ; Livingstone (Guat.), 10 t. ; Lyttleton, 35 t. ; Malmo, 100 t. ; Montreal, 492 t. ; New Orleans, 50 t. ; New York, 50 t. ; Opobo, 8 t. ; Pt. Harcourt, 204 t. ; Rangoon, 35 t. ; Rio de Janeiro, 47 t. ; Saltpond, 16 t. ; Sassandra, 20 t. ; Sekondi, 2 t. ; Sierra Leone, 22 t. ; St. John's, N.F. 9 t. ; Sydney, 10 t. ; Talcahuano, 2 t. ; Trondhjem, 36 t. ; Vancouver, 40 t. ; Victoria, W.C.A., 4 t. 10 c. ; Victoria, B.C., 62 t. ; Warri, 20 t. ; Wellington, 381 t. ; Winnebah, 38 t.

SOAP—
Abonema, 50 pkgs. ; Accra, 350 pkgs. ; Alexandria, 2 pkgs. ; Amboina, 1,000 pkgs. ; Amoerang, 200 pkgs. ; Ampenam, 200 pkgs. ; Antwerp, 103 pkgs. ; Attuaboe, 80 pkgs. ; Auckland, 610 pkgs. ; Axim, 60 pkgs. ; Bandjermassin, 1,200 bxs. ; Bangkok, 686 pkgs. ; Barbadoes, 361 pkgs. ; Balik Papam, 100 bxs. ; Banjoewangic, 25 bxs. ; Batavia, 2,030 pkgs. ; Batjan, 80 bxs. ; Beira, 19 cs. ; Belize, 702 bxs. ; Benkoelen, 25 bxs. ; Blinjoe, 175 bxs. ; Boela, 50 bxs. ; Bolivia, 20 cs. ; Bombay, 2,525 pkgs. ; Bourgas, 100 cs. ; Buenos Aires, 1550 pks. ; Burutu, 235 bxs. ; Calcutta, 516 pkgs. ; Callao, 100 bxs. ; Calabar, 9 bxs. ; Cameroons, 80 bxs. ; Ceuta, 255 bxs. ; Christiania, 2,000 pkgs. ; Christchurch, 238 bxs. ; Colombo, 433 pkgs. ; Corinto, 200 pkgs. ; Danzig, 12 pkgs. ; Dixcove, 25 pkgs. ; Dobo, 50 pkgs. ; Duala, 320 pkgs. ; Durban, 256 bxs. ; Dunedin, 23 pkgs. ; Fak-Fak, 25 pkgs. ; Funchal, 5 pkgs. ; Geser, 50 pkgs. ; Gibraltar, 145 pkgs. ; Grand Bassam, 55 pkgs. ; Gothenburg, 72 pkgs. ; Half Assinie, 20 pkgs. ; Hamilton, 14 pkgs. ; Hong Kong, 4 pkgs. ; Iddo, 500 pkgs. ; Karachi, 1,125 bxs. ; Kokas, 25 pkgs. ; Kingston (Ja.), 3,029 bxs. ; Kota Radja, 15 pkgs. ; Kota Baroe, 25 pkgs. ; Laboen Hadji, 10 pkgs. ; Larache, 175 pkgs. ; Lagos, 31 bxs. ; Las Palmas, 898 bxs. ; Leghorn, 300 pkgs. ; Lho Seumaweh, 10 pkgs. ; Limon, 84 pkgs. ; Liroeng, 15 pkgs. ; Livingston (Guat.) 120 pkgs. ; Macassar, 1,110 bxs. ; Madras, 646 pkgs. ; Manila, 10 bxs. ; Matadi, 5 cs. ; Mauritius, 3 cs., 4,307 bxs. ; Menado 1,550 bxs. ; Melbourne, 10 cs. ; Merauke, 100 bxs. ; Monrovia, 53 bxs. ; Montserrat, 62 cs. ; Montreal, 10 cs., 5 bxs. ; Muntok, 20 bxs. ; New York, 58 bxs. ; Oamaru, 17 cs. ; Okopedi, 125 bxs. ; Olehleh, 125 bxs. ; Opobo, 300 cs. ; Padang, 100 bxs. ; Paita, 50 cs. ; Palembang, 201 bxs. ; Panama, 170 cs. ; Panarockan, 10 bxs. ; Pangkalen, 50 bxs. ; Pangkal Penang, 25 bxs. ; Pasir, 50 bxs. ; Penang, 2,200 bxs. ; Petta, 40 cs. ; Piraeus, 190 cs. ; Pt. Harcourt, 1,308 pkgs. ; Pt. Stanley, 1 cs. ; Punta Arenas, 20 pkgs. ; Puerto Barrios, 136 pkgs. ; Rangoon, 1,456 pkgs. ; Pt. Swettenham, 1,922 bxs. ; Pt. Said, 119 cs., 5 frkns. ; Quittah, 35 bxs. ; Rotterdam, 1 cs. ; Sabang, 35 bxs. ; Saparoea, 300 bxs. ; Salaverry, 30 cs. ; Sapele, 10 cs. ; Salonika, 60 cs. Samarang, 126 bxs. ; Sarawak, 24drms. ; S. Fernando, 150 cs. ; Sekondi, 121 pkgs. ; Shanghai, 500 bxs. ; Siam, 60 bxs. ; Sierra Leone, 37 pkgs. ; Singapore, 2,201 pkgs. ; Soembawa, 35 bxs. ; Sourabaya, 415 bxs. ; St. Lucia, 45 cs. ; St. Thomas (V. Is.), 1 cs. ; St. Vincent, 100 cs. ; Sydney, 4 cs. ; Tagoelandang, 20 bxs. ; Tangiers, 104 bxs. ; Taroena, 80 bxs. ; Teneriffe, 514 pkgs. ; Ternate, 15 bxs. ; Tolat (Java), 50 bxs. ; Trinidad, 62 cs.

SOAP—
Tumaco, 100 cs. ; Varna, 100 cs. ; Victoria, W.C.A., 22 pkgs. ; Vera Cruz, 1 drm. ; Wellington, 746 pkgs. ; Winnebah, 100 bxs.

SODA ASH—
Aalborg, 500 pkgs. ; Aarhus, 500 pkgs. ; Batavia, 77 cks. ; Bombay, 2,761 bgs. ; Cape Town, 16 pkgs. ; Calcutta, 2,001 bgs. ; Colombo, 200 pkgs. ; Dunedin, 85 pkgs. ; East London, 19 pkgs. ; Fremantle, 590 bgs. ; Flekkefjord, 50 pkgs. ; Gothenburg, 500 pkgs. ; Hamburg, 200 pkgs. ; Helsingfors, 100 pkgs. ; Hong Kong, 2,072 pkgs. ; Karachi, 300 pkgs. ; Kobe, 541 pkgs. ; Katka, 2,200 pkgs. ; Lisbon, 100 pkgs. ; Lyttleton, 20 pkgs. ; Moji, 25 bgs. ; Pt. Elizabeth, 19 pkgs. ; Pt. Swettenham, qnty. ; Rangoon, 2,200 pkgs. ; Rockhampton, 34 cks. ; Rotterdam, 5,700 pkgs. ; Stockholm, 500 bgs. ; Vera Cruz, 50 bgs. ; Wellington, 84 bgs. ; Yokkaichi, 10,651 bgs.

SODA CRYSTALS—
Durban, 40 pkgs. ; Gibraltar, 20 brls. ; Karachi, 100 pkgs. ; Kingston, Ja., 7 pkgs. ; Penang, 35 pkgs. ; Port of Spain, 20 pkgs. ; Pt. Said, 10 pkgs. ; Trinidad, 120 kgs.

SODIUM BICARBONATE—
Abo, 200 pkgs. ; Algoa Bay, 27 pkgs. ; Alexandria, 10 kgs. ; Bangkok, 20 kgs. ; Cape Town, 10 pkgs. ; Constantinople, 46 pkgs. ; Dunedin, 20 pkgs. ; Durban, 50 pkgs. ; Geelong, 44 pkgs. ; Genoa, 236 pkgs. ; Gisborne, 20 pkgs. ; Kingston, Ja., 50 pkgs. ; Helsingfors, 50 pkgs. ; Las Palmas 14 pkgs. ; Leghorn, 40 pkgs. ; Lyttleton, 190 pkgs. ; Malta, 20 kgs. ; Malmo, 100 bgs. ; Melbourne, 69 pkgs. ; Monte Video, 50 pkgs. ; Piraeus, 20 pkgs. ; Pt. Swettenham, 20 pkgs. ; Rangoon, 250 pkgs. ; Thursday Is., 20 kgs. ; Trinidad, 220 kgs. ; Wellington, 522 kgs. ; Yokkaichi, 2,153 bgs.

SODIUM BISULPHITE—
Pt. Sudan, 110 drms.
Singapore, 50 drms.

SODIUM HYDROSULPHITE—
Pernambuco, 40 kgs.

SODIUM PHOSPHATE—
Danzig, 6 cs.

SODIUM PRUSSIATE—
Montreal, 10 cks.

SODIUM SILICATE—
Abo, 27 drms. ; Adelaide, 57 pkgs. ; Alexandria, 64 cks. ; Auckland, 32 pkgs. ; Brisbane, 10 pkgs. ; Buenos Aires, 74 drms. ; Delagoa Bay, 100 pkgs. ; Durban, 345 pkgs. ; Fremantle, 115 pkgs. ; Lyttleton, 10 pkgs. ; Monte Video, 30 bgs. ; Montreal, 16 pkgs. ; Shanghai, 250 bgs. ; Sydney, 120 cks., 29 dble. bgs. ; Tampico, 20 bgs. ; Vera Cruz, 82 cks.

SODIUM SULPHIDE—
Alexandria, 4 drms. ; Melbourne, 63 drms. ; Montreal, 95 drms. ; Rotterdam, 20 drms. ; Syra, 6 drms.

STEARINE—
Santander, 40 bgs.

TALLOW—
Danzig, 72 brls.

LONDON.

OFFICIAL AMENDMENTS.

From return for week ending July 4, 1923, deduct—

CITRIC ACID—
Cape Town, (F.), 15 c., £144.

From return for week ending July 11, 1923, deduct—

CHEMICALS (*otherwise undescribed*)
Antwerp, 50 pkgs., £143.

From return for week ending July 18, 1923, deduct—

BORIC ACID—
Colombo, 12 c., £66.

Week ending October 24.

ACETIC ACID—
Dunedin, 25 cs., £79.
Fremantle, 2 cs., £6.
Sydney, 14 pkgs. (pt.), £19.

ACETONE—
Sydney, 14 pkgs. (pt.), £17.

ACETYL SALICYLIC ACID
Adelaida, 3 cs. (pt.), £35. ; Calcutta, 1 cs. (pt.), £9. ; Cape Town, 4 cs. (pt.), £18. ; Melbourne, 2 cs., £35. ; Montreal, 6 cs. (pt.), £81. ; Sydney, 2 cs. (pt.), £46.

ALUM—
Cape Town, 8 brls., £37.
Mossel Bay, 8 brls., £37.
Pt. Elizabeth, 8 brls., 25 cs., £48.

AMMONIA—
Barcelona, 28 drms., £280. ; Bombay, 10 cs., £18. ; Buenos Aires, 10 cs., £18. ; Calcutta, 6 cs., £17. ; Channel Is., 6 cs., £11. ; Demerara, 2 cs., £5. ; Durban, 26 cs., £46. ; East London, 10 cs., £17. ; Monte Video, 40 pkgs., £55. ; Pt. Said, 4 cs., £7. ; Rio de Janeiro, 8 cs., £14. ; Shanghai, 5 cs., £9. ; Tientsin, 5 cs., £18.

AMMONIA (ANHYDROUS)
Aden, 6 cylds., £35. ; Bagdad, 9 cylds., £80. ; Bombay, 30 cs., £300. ; Durban, 55 cylds., £412. ; East London, 40 cylds., £300. ; Pt. Said, 6 cylds., £18.

AMMONIUM BROMIDE
Adelaide, 3 cs. (pt.), £5.
Sydney, 3 cs., £15.

AMMONIUM CARBONATE—
Calcutta, 3 c., £12. ; Dunedin, 5 c., £11. ; Durban, 2 c., £6. ; Memel, 1 t. 14 c., £42. ; Pt. Elizabeth, 4 c., £8. ; Valparaiso, 8 c., £23.

AMMONIUM CHLORIDE—
Calcutta, 2 cs., £15.
Pt. Swettenham, 8 kgs., £11.
Vancouver, 18 t. 11 c., £631.

AMMONIUM CITRATE—
Brisbane, 2 cs., £19.
Calcutta, 1 cs., £5.

AMMONIUM NITRATE
Antwerp, 30 t., £780.

AMMONIUM PERSULPHATE—
Sydney, 1 cs., £7.

AMMONIUM PHOSPHATE—
Santos, 3 c., £11.

AMMONIUM SULPHATE—
Cologne, 100 t., £1,400. ; Durban, 20 t., £270. ; Hong Kong, 100 t., £1,500. ; Las Palmas, 5 t. 10 c., £77.

ANTIMONY OXIDE—
Progress, 5 cks., £22.

ANTIMONY SULPHIDE—
Barcelona, 1 ck., £18. ; Copenhagen, 1 ck., £25. ; Christiania, 1 ck., £17. ; Hamburg, 5 cks., £87. ; Stockholm, 2 cks., £29.

ARSENIC—
Rotterdam, (F.), 100 cs., £375.
Wellington, 5 drms., £21.

BARIUM PEROXIDE—
Melbourne, 46 drms., £309.
Rotterdam, 30 drms., £445.

BENZOIC ACID—
Cape Town, 1 kg., £12.

BISMUTH AMMONIUM CITRATE
Calcutta, 1 cs., £9.

BISMUTH CARBONATE—
East London, 1 cs. (pt.), £18.
Perth, 1 cs., £71.
Wellington, 1 cs. (pt.), £73.

BISMUTH SALTS (*otherwise undes.*)
Athens, 1 cs., £31. ; Bombay, 1 cs. (pt.), £8. ; Calcutta, 1 cs., £49. ; Chungking, 16 cs. (pt.), £8. ; Famagusta, 1 cs., £9.

BITUMEN—
Pt. Swettenham, 46 cks., £138.

BONE MEAL—
Channel Is., 58 t., £484.

BORAX—
Amsterdam, 2 t. (F.), £52. ; Durban, 4 c., £11. ; Petrograd, 2 t. 4 c., £60. ; Pt. Elizabeth, 2 c., £5. ; Rotterdam, 2 t. (F.), £52. ; Singapore, 6 c., £9.

BORAX GLASS—
Cape Town, 3 c., £12.

BORIC ACID—
Famagusta, 3 c., £11. ; Fremantle, 2 c., £7. ; Mauritius, 2 c., £7. ; Pisco, 2 c., £11. ; Pt. Sudan, 3 c., £18. ; Salaverry, 10 c., £30.

BROMIDES (*otherwise undescribed*)
Sydney, 25 cs., £100.

CALCIUM CARBIDE—
Accra, (F.), 10 c., £8.
Madeira, 5 cs., £30.
Pt. Harcourt, 1 t., £19.

CALCIUM CHLORIDE—
Jamaica, 50 drms., £37.
Perth, 8 cks., £9.
Pt. Sudan, 20 drms., £49.

CALCIUM GLYCEROPHOSPHATE
Adelaide, 1 cs. (pt.), £13.

CALCIUM HYPOPHOSPHITE—
Yokohama, 5 cs., £60.

CALCIUM LACTATE—
Sydney, 1 cs., £11.

CARBON (RETORT)—
Boulogne, bulk, 149 t. 10 c., £449.

CARBON BISULPHIDE—
Delagoa Bay, 14 drms., £28.
Durban, 10 cs., £28.

CARBON TETRACHLORIDE—
Colombo, 1 cs., £6.

CAUSTIC POTASH—
Sydney, (F.), 3 drms., £7.
Wanganui, 2 drms., £20.

CHEMICALS (*otherwise undescribed*)
Adelaide, 1 cs. (pt.), 21 pkgs. (pt.), £62. ; Aden, 4 cs. (pt.), £7. ; Alexandria, 22 pkgs. (pt.), £73. ; Ascension Is., 5 cs., £60. ; Auckland, 2 pkgs., £6. ; Batavia, 6 cs., £9. ; Barcelona, 60 pkgs., £150. ; Barbados, 10 pkgs. (pt.), £18. ; Barranquilla, 10 pkgs. (pt.), £11. ; Beira, 2 pkgs. (pt.), £6. ; Bombay, 17 pkgs. (pt.), £48. ; Brisbane, 15 cs., £97. ; Calabar, 1 cs. (pt.), £5. ; Calcutta, 20 pkgs. (pt.), £59. ; Cape Town, 22 pkgs. (pt.), £49. ; Channel Is., 1 t. 6 c., £13. ; Chungking, 16 cs. (pt.), £11. ; Colombo, 11 cs. (pt.), £34. ; Demerara, 8 pkgs., £6. ; East London, 2 cs., £6. ; Fremantle, 1 cs., £30. ; Gothenburg, 10 pkgs. (F.), £50. ; Hankow, 5 cs. (pt.), £10. ; Hong Kong, 2 cs., £6. ; Inhambane, 4 kgs., £6. ; Jamaica, 7 pkgs. (pt.), £24. ; Karachi, 4 cs., £9. ; Kilindini, 4 cs., £144. ; Kobe, 1 cs. (pt.), £8. ; Madras, 8 pkgs., £11. ; Mauritius, 3 cs., £6. ; Melbourne, 7 cs. (pt.), £31. ; Montreal, 5 cs. (pt.), £38. ; Napier, 1 cs., £9. ; Pisco, 2 pkgs. (pt.), £5. ; Pt. Swettenham, 6 cs., £25. ; Rangoon, 15 pkgs. (pt.), £46. ; Ronneby, 200 pkgs., £500. ; Rotterdam, 4 pkgs., £6. ; Sekondi, 17 pkgs., £60. ; Seychelles, 4 pkgs., £5. ; Shanghai, 4 cs. (pt.), £9. ; Stockholm, 26 pkgs., £123. ; Sydney, 40 pkgs. (pt.), £619. ; Trinidad, 2 pkgs. (pt.), £6. ; Wellington, 3 pkgs., (F.), £8. ; Wellington, 28 pkgs. (pt.), £184. ; Yokohama, 2 cs. (F.), £140.

CHROMIUM OXIDE—
Rotterdam, 1 kg., £15.

CITRIC ACID—
Adelaide, 5 c., £38. ; Antwerp, 15 c., £114. ; Auckland, 8 c., £60. ; Basra, 1 c., £6. ; Beira, 1 c., £8. ; Calcutta, 3 cks., 2 c., £65. ; Hobart, 10 c., £75. ; Kobe, 10 c., £76. ; Limon, 1 c., £11. ; Melbourne, 2 t. 10 c., £377. ; Pt. Said, 2 c., £16. ; Pt. Sudan, 1 c., £12. ; Sydney, 3 t. 3 c., £477.

COAL TAR PYODUCTS
Benzol
Germany (F.), bulk, 373,153 galls., £24,877.
Trinidad, 1 cs., £6.
Carbolic Acid
Alexandria, 20 drms., £22.
Basra, 5 drms., £12.
Lagos, 8 drms., £7.
Wanganui, 10 drms., £12.
Creosote
Channel Is., 8 cks., £31.
Hamburg, bulk, 66,632 galls., £2,812.
N. Orleans and Galveston, bulk, 460,931 galls., £18,836.
Mirbane Oil
Christchurch, 1 brl., £15.
Naphthalene
Aden, 85 cks., £400. ; Bangkok, 5 cs., £11. ; Calcutta, 3 cks., £7. ; East London (F.), 10 cks., £11. ; Lagos, 1 cks., £7. ; New York, 387 bgs., £278.
Pitch
Colombo, 4 cks., £13. ; Demerara, 20 frkns., £29. ; Dunkirk, bulk, 249 t. 15 c., £1,561. ; Jamaica, 10 brls., £22. ; Kobe, 30 brls., £69. ; Sables d'Olonne, bulk, 1,010 t., £5,303.
Tar
Calcutta, 2 brls., £6.
Delagoa Bay, 50 drms., £13.

COBALT OXIDE—
Genoa, 5 pkgs., £1,113.
Tsingtau, 10 cs., £412.

COBALT SULPHATE—
Brussels, 5 cks., £75.
Gothenburg, 1 cs., £33.

COPPER SUBOXIDE—
Rotterdam (F.), 1 drm., £10.

COPPER SULPHATE—
Delagoa Bay, 15 c., £25.
Durban, 9 c., £11.

COPPERAS—
Barbados, 1 t., £9.

CREAM OF TARTAR—
Adelaide, 5 t., £425. ; Belize, 1 c. (F.), £8. ; Christiania, 2 c., £8. ; Durban, 2 c. (F.), £13. ; Durban, 2 c., £13. ; Karachi, 2 c. (F.), £12. ; Kobe, 5 t., £425. ; Launceston, 1 c., £5. ; Limon, 2 c., £10. ; Melbourne, 25 t., £2,128. ; Newcastle, 1 t., £85. ; Sydney, 17 t., £1,443.

CUPROUS OXIDE—
Calcutta, 2 drms., £31.

DIPHENYL OXIDE—
Newcastle, (F.), 2 cs. (pt.), £6.

DISINFECTANTS (*otherwise undes.*)
Aden, 2 c., £8. ; Alexandria, 3 c., £10. ; Amoy, 3 c., £10. ; Bangkok, 4, c., £8. ; Bombay, 6 c., £34. ; Calabar, 2 c., £6. ; Calcutta, 3 c., £70. ; Canton, 2 c., £22. ; Cape Town, 11 t. 8 c., £438. ; Christchurch, 3 c., £28. ; Colombo, 11 t. 10 c., £387. ; Demerara, 1 t. 4 c., £35. ; Durban, 4 t. 1 c., £113. ; East London, 2 t. 6 c., £88. ; Gibraltar, 4 c., £13. ; Iddo, 6 c., £8. ; Jamaica, 1 t. 17 c., £55. ; Kilindini, 2 c., £7. ; Lagos, 1 t. 1 c., £123. ; Limon, 2 c., £9. ; Lourenco Marques, 1 c., £32. ; Melbourne, 5 c., £63. ; Paris, 4 t. 12 c., £75. ; Penang, 1 t. 17 c., £48. ; Pt. Harcourt, 16 c., £49. ; Pt. Elizabeth, 2 c., £10. ; Pt. Swettenham, 5 c., £22. ; Sandakan, 3 c., £5. ; Sekondi, 8 c., £8. ; Shanghai, 2 c., £5. ; Singapore, 1 t. 11 c., £56. ; St. Kitts, 1 c., £5. ; St. Lucia, 4 c., £6. ; Sydney, 5 c., £47. ; Toronto, 1 cs., £5.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 11 cks., £318.
Unspecified
Cape Town, 1 cs. (pt.), £18. ; Melbourne, (F.), 4 kgs., £20., 41 pkgs., £1,238. ; Perth, 2 cs. (pt.), £25. ; Rosario, 1 cs. (pt.), £6. ; Sydney, 1 kg., £6. ; Trinidad, 1 cs., £6. ; Valencia, 1 cs. (pt.), £7.

ETHER—
Alexandria, 2 cs., £11. ; Batavia, 3 cs., £6. ; Bombay, 6 cs., £27. ; Chungking, 16 cs. (pt.), £6.

FERTILISERS (*otherwise undes.*)—
Boston, 1 t. 10 c., £40.
Channel Is., 14 t. 11 c., £120.

FORMALDEHYDE—
Barcelona, (F.), 5 cks., £69.
Madras, 1 ck., £17.

GALLIC ACID—
Melbourne, 1 cs., £17.

GLYCERINE—
Amsterdam (crude), 18 t. 6 c., £903. ; Amsterdam, 3 t. 18 c., £271. ; Barcelona, 1 t., £90. ; Barranquilla, 1 c., £6. ; Bombay, 1 c., £13. ; Fremantle, 3 c., £23. ; New York, 25 t. 3 c., £1,330. ; Pisco, 1 c., £7.

GUANO—
Barbados, 49 t. 2 c., £400.

GUANO (FISH)—
Yokohama, 50 t., £650.

HYDROCHLORIC ACID—
Madras, 5 c., £9.

HYDROFLUORIC ACID—
Bombay, 1 cs., £7. ; Brussels, 12 pkgs., £65. ; Pt. Elizabeth, 2 pkgs. (pt.), £19. ; Sydney, 4 cs., £35.

HYDROGEN PEROXIDE—
Iddo, 1 cs. (pt.), £15.
Kinshasa, 3 cs., £19.
Melbourne, 5 cs., £31.

HYPOPHOSPHITE OF LIME—
Paris, 6 cs., £112.
Sydney, 4 cs., £75.

HYPOPHOSPHOROUS ACID—
Sydney, 1 cs. (pt.), £6.

IODIDES (*otherwise undescribed*)—
Calcutta, 4 cs. (pt.), £112.
Copenhagen, 1 cs., £99.

IODINE—
Calcutta, 1 cs., £106. ; Calcutta, 1 cs. (pt.), £53. ; Perth, 1 cs., £79.

IODINE (RESUBLIMED)—
Bombay, 1 cs., £28.
Sydnay, 1 cs., £53.

IRON AMMONIUM CITRATE—
Bombay, 1 cs., £6.
Calcutta, 1 cs., £6.

IRON PERCHLORIDE—
Sydney, 5 drms., £7.

IRON SULPHATE—
Abadan, 6 cks., £6.
Sydney, 2 kgs., £6.

KIESELGUHR—
Piraeus, 10 c., £13.
Rio de Janeiro, (F.), 1 t. 8 c., £24.

LEAD NITRATE—
Sydney, 4 cks., £42.

LITHIUM BENZOATE—
Rio de Janeiro, 1 cs., £11.

MAGNESIA—
Auckland, 4 cs., £10. ; Basra, 1 cs., £5. ; Brisbane, 3 cs., £7. ; Bombay, 3 cs., £11. ; Christchurch, 8 cs., £19. ; Napier, 5 cs., £12. ; Newcastle, 10 cs., £24. ; Rio de Janeiro, 1 cs., £15. ; Wellington, 10 cs., £24.

MAGNESIUM CARBONATE—
Adelaide, 5 cs., £12. ; Barranquilla, 1 cs., £7. ; Perth, 10 cs., £12. ; Sydney, 12 cs., £31.

MAGNESIUM CITRATE—
Fremantle, 2 cs., £12.
Mollendo, 4 cs., £31.

MAGNESIUM SULPHATE—
Accra, 5 c., £6. ; Auckland, 15 c., £20. ; Bombay, 10 c., £14. ; Durban, 10 c., £11. ; East London, 10 c., £12. ; Fremantle, 5 c., £6. ; Honolulu, 10 c., £13. ; Jaffa, 17 c., £22. ; Jamaica, 4 c., £6. ; Karachi, 15 c., £22. ; Madras, 6 c., £6. ; Managua, 10 c., £13. ; Melbourne, 1 t. 6 c., £30. ; Monte Video, 6 c., £16. ; Newcastle, 10 c., £12. ; Pisco, 5 c., £6. ; Pt. Sudan, 5 t., £104. ; Sydney, 6 t. 5 c., £141.

MAGNESIUM SULPHITE—
Melbourne, 1 kg., £5.

MERCURIALS (*otherwise undes.*)—
Shanghai, 1 cs. (pt.), £13.
Singapore, 1 cs. (pt.), £11.

MERCURY OXIDE—
Calcutta, 1 kg., £45.

METHYL SALICYLATE—
Durban, (F.), 1 cs. (pt.), £8.

NITRIC ACID—
Madras, 5 c., £15.

OLEIC ACID—
Cape Town, 1 cs., £7.

OSMIC ACID—
Barranquilla, 2 cs. (pt.), £9.

OXALIC ACID—
Calcutta, 1 cs., £5.
Wellington, (F.), 1 ck., £7.

PHOSPHATE OF LIME—
Santos, 6 c., £8.

PHOSPHORIC ACID—
Dunedin, 2 cs., (pt.), £5.
Perth, 2 cs., £5.
Sydney, 48 cs., £140.

PHOSPHORUS—
Trinidad, 3 cs., £32.

POTASSIUM BICARBONATE—
Brussels, 2 cks., £6.
Calcutta, 1 ck., £6.

POTASSIUM CARBONATE—
Hong Kong, 5 cs., £18.

POTASSIUM CHLORATE—
Bombay, 4 cs., £7.
Trinidad, (F.), 10 cs., £19.

POTASSIUM CITRATE—
Bombay, 6 cs., £48.; Calcutta, 1 cs., £6.; Colombo, 1 cs. (pt.), £6.; Wellington, 2 cs., £23.

POTASSIUM CYANIDE—
Hong Kong, 3 cs., £49.
Petrograd, 9 kgs., £130.

POTASSIUM IODIDE—
Bangkok, 2 cs., £205.; Beira, 1 cs. (pt.), £22.; Bombay, 6 cs., £447.; Brisbane, 1 cs., £88.; Calcutta, 2 cs., 1 cs. (pt.), £198.; Changking, 16 cs. (pt.), £9.; Hankow, 5 cs. (pt.), £10.; Iddo, 2 cs., £96.; Jamaica, 2 cs. (pt.), £30.; Karachi, 1 cs., £22.; Pt. Sudan, 1 cs. (pt.), £43.; Singapore, 1 cs. (pt.), £65.; Sydney, 5 cs., £437.

POTASSIUM PRUSSIATE—
Hamburg, 23 cks., £515.; Melbourne, 6 kgs., £52.; Paris, 10 pkgs., £155.; Pt. Said, 1 kg., £10.; Rotterdam, 19 cks., £88.; Sydney, 1 kg., £7.

POTASSIUM SALTS (*otherwise un.*)
Colombo, 1 cs. (pt.), £5.
Toronto, 6 cs., £59.

POTASSIUM SULPHIDE—
Toronto, 6 kgs., £20.

POTASSIUM TARTRATE—
Pt. Sudan, 5 cs. (pt.), £51.

SALICYLATES (*otherwise undes.*)—
Montreal, 2 cs. (pt.), £17.

SALICYLIC ACID—
Calcutta, 1 cs., £13.
Shanghai, 1 cs., £12.
Switzerland, 10 cks., £177.

SALTPETRE—
Adelaide, 2 t., £82.; Bahia, 2 t. 9 c., £98.; Beira, 5 c. (F.), £9.; Cape Town, 15 c., £32.; Copenhagen, 6 c., £46.; Durban, 13 c., £28.; Sydney, 5 t., £204.

SHEEP DIP—
Buenos Aires, 17 c., £60.
Durban, 1 t. 18 c., £43.

SILVER NITRATE—
Auckland, 1 cs., £20.; C. Town, 1 cs. (pt.), £10.; Dunedin, 1 cs. (pt.) £19.; Rangoon, 1 cs. (pt.) £8.

SODA CRYSTALS—
Perth, 5 c., £19.

SODIUM ARSENITE—
Durban, 8 t. 18 c., £616.

SODIUM BENZOATE—
Calcutta, 1 c., £7.
Paris, 10 c., £130.
Shanghai, 9 c., £117.

SODIUM BICARBONATE—
Calcutta, 5 c., £15.; East London, 10 c., £14.; Fremantle, 5 c., £10.; Karachi, 2 c., £8.

SODIUM BISULPHITE
Bordeaux, 1 t., £21.

SODIUM CARBONATE—
Karachi, 1 c., £7.

SODIUM HYDROSULPHITE—
Cape Town, 1 kg., £11.

SODIUM HYPOPHOSPHITE—
Paris, 3 c., £64.
Sydney, 2 c., £43.

SODIUM HYPOSULPHITE—
Wellington, 3 c., £6.

SODIUM SALICYLATE—
Sydney, 1 c., £11.

SODIUM SILICATE—
Durban, 1 t. 1 c., £21.

SODIUM SULPHATE—
Timaru, 5 t., £64.
Wellington, 5 t., £64.

SODIUM SULPHIDE—
Wellington, 60 t. 7 c., £784.

SODIUM TARTRATE—
Brussels, 5 c., £24.
Fremantle, 5 c., £18.

SPENT OXIDE—
France, 180 t. £333.

STEARIC ACID—
Calcutta, 3 cs., £15.

SULPHUR—
Brussels, 6 c., £15.; Gothenburg, (F.), 5 t., £56.; Sydney, 2 c., £7.; Tientsin, 1 t., £10.

SULPHUR (FLOWERS)—
Aden, 5 c., £6.

SULPHURIC ACID—
Beira, 1 t., £21.; Madras, 1 t. 3 c., £30.; Mauritius, 1 c., £8.; Pt. Swettenham, 2 t. 2 c., £64.; Santos, 2 t., £143.

TARTARIC ACID—
Auckland, 7 c., £43.; Bermuda, 1 c., £7.; Calcutta, 2 c., £19.; Christiania, 2 t., (F.), £330.; Delagoa Bay, 6 c., £41.; Kobe, 11 t. 10 c., £1,380.; Limon, 2 c., £16.; Melbourne, 2 t. 10 c., £300.; Paris, 6 c., (F.), £17.; Pt. Elizabeth, 2 c., £14.; Reval, 5 c., (F.), £35.; Sydney, 1 t., £122.

ZINC OXIDE—
Adelaide, 2 kgs., £7.; Alexandria, 2 cks., £6.; Brisbane, 1 cs., £6.; Christiania, 20 cks., £37.; Hamburg, 53 cks., £210.; Perth, 2 kgs., £7.; Petrograd, 30 brls., £160.; Sydney, 4 cks., £51.

ZINC SULPHATE—
Sydney, 1 cs., £9.

Week ending October 27.

ANTIMONY REGULUS—
Durban, 2 t.
Iquique, 6 c.
Wellington, 10 t.

BEESWAX—
Belgrade, 1 t.

CARNAUBA WAX—
Kobe, 1 t.

CASEIN—
Pasages, £882.

CERESINE WAX—
Sydney, 5 c.

FERRO VANADIUM—
Paris, £460.

FULLER'S EARTH—
Boston, 2 t. 10 c.; Christiania, 25 t.; Los Angeles, 50 t.; Montreal, 25 t.; San Francisco, 45 t.; Seville, 20 t.; Tacoma, 50 t.; Toronto, 30 t.; Treport, 7 t.; Vancouver, 5 t.

GLUE, SIZE AND GELATINE—
Calcutta, 17 t. 10 c.; Colombo, 2 c.; Dunedin, 1 c.; Durban, 1 t. 14 c.; East London, 1 c.; Ghent, 25 t. 10 c.; Guayaquil, 1 c.; Hong Kong, 5 c.; Karachi, 1 c.; Kilindini, 1 t.; Lagos, 4 c.; Madras, 10 c.; Melbourne, 19 c.; Montreal, 2 t. 14 c.; Nelson, 1 c.; Paris, 4 t. 5 c.; New Plymouth, 3 c.; Perth, 3 c.; Philadelphia, 13 t. 8 c.; Pt. Elizabeth, 1 c.; Shanghai, 4 c.; Sydney, 3 c.; Wanganui, 1 c.

MINERAL WAX—
Brussels, 12 t.; Rouen, 10 c.; Sydney, 3 t.; Trieste, 17 c.

PLUMBAGO—
Malmo, 1 t.
Sekondi, 5 c.
Wellington, 10 c.

QUININE—
Bombay, 11,011 oz.
Calcutta, 10,064 oz.
Copenhagen, 1,938 oz.
Singapore, 1,600 oz.
Shanghai, 333 oz.
Sydney, 8,116 oz.
Toronto, 1,000 oz.

ROSIN—
Penang, 1 t. 1 c.
Rangoon, 3 t. 8 c.
Rotterdam, 1 t. 1 c.

SALT—
Bombay, 12 c.; Durban, 3 t. 19 c.; East London, 13 c.; Jamaica, 6 c.; Kilindini, 2 c.; Madras, 4 c.; Pt. Said, 3 c.; Pt. Sudan, 13 c.

SOAP—
Abadan, 3 c.; Addah, 3 t. 15 c.; Adelaide, 7 c.; Acera, 4 t. 15 c.; Ahwaz, 3 c.; Antwerp, 4 c.; Auckland, 5 c.; Brussels, 8 c.; Bombay, 11 t. 19 c.; Boston, 17 c.; Bremen, 1 c.; Calcutta, 14 c.; Constantinople, 2 c.; Delagoa Bay, 3 c.; Demerara, 3 c.; Dunedin, 1 c.; Durban, 3 t. 4 c.; East London, 3 c.; Fiji Is., 1 c.; Gibraltar, 9 c.; Gisborne, 1 c.; Hamburg, 11 c.; Hong Kong, 4 c.; Iddo, 2 c.; Jamaica, 1 t.; Karachi, 13 c.; Kilindini, 2 t. 14 c.; La Libertad, 1 c.; Lagos, 2 t. 10 c.; Lyttleton 1 c.; Madras, 5 c.; Mauritius, 1 t. 10 c.; Mombasa, 1 c.; Monte Video, 2 c.; Montreal, 8 c.; Naples, 2 c.; Penang, 12 c.; Pt. Elizabeth, 12 c.; Pt. Harcourt, 6 c.; Pt. Said, 1 t. 5 c.; Pt. Swettenham, 9 c.; Praia, 6 c.; Punta Arenas, 1 c.; Rio Gallegos, 8 c.; Rotterdam, 40 t. 2 c.; St. Helena, 2 c.; St. Lucia, 1 c.; Saltpond, 10 t.; Sekondi, 13 t. 19 c.; Shanghai, 1 c.; Sierra Leone, 1 c.; Sydney, 4 c.; Talcahuano, 3 c.; Tientsin, 4 c.; Toronto, 1 t. 4 c.; Trinidad, 11 t. 1 c.; Wellington, 7 c.; Winnebah, 8 t.; Zanzibar, 1 c.

STEARINE—
Rotterdam, 1,100 t.

TALLOW—
Antwerp, 13 t. 15 c.; Danzig, 20 t. 2 c.; Genoa, 40 t.; Hamburg, 25 t. 3 c.; Naples, 11 t. 10 c.; Rotterdam, 55 t. 18 c.; Wasa (Finland), 12 t. 1 c.

TAR (STOCKHOLM)—
Durban, 18 c
Kilindini, 12 c.
Rockhampton, 4 t. 10 c.

WAX (*otherwise undescribed*)—
Bordeaux, 1 t. 3 c.
Osaka, 18 c.

WHITE LEAD—
Auckland, £198.; Brussels, £40.; Channel Is., £40.; Christchurch, £80.; Delagoa Bay, £30.; East London, £53.; Dunedin, £12.; Fremantle, £85.; Irish Free State, £6.; Halifax, £80.; Iquique, £19.; Karachi, £4.; Lyttleton, £222.; Limon, £1.; Malta, £117.; Melbourne, £43.; Mossel Bay, £19.; Oamaru, £23.; Pt. Moresby, £85.; Pt. Said, £159.; Rangoon, £259.; Rosario £666.; Rotterdam, £23.; Singapore, £71.; Shanghai, £27.; Sydney, £583.; Timaru, £144.; Townsville, £45.; Trinidad, £41.; Wellington, £1,377.

MANCHESTER.

Week ending October 30.

AMMONIUM CARBONATE—
Portuguese Africa, 50 cks.

BLEACHING POWDER—
Brisbane, 11 cks.

CARBON BLACK—
Germany, a qnty.

COAL TAR PRODUCTS—
Naphthalene—
New York, 265 bgs.
Pitch
Aviles, 1,385 t.
Unspecified
Switzerland, 93 drms., 12 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bombay 1 drm., 4 cks.

FERRO MANGANESE—
Antwerp, 25 t.

SALT—
Montreal, 3,200 sks.
Quebec, 3,200 sks., 1,680 bgs.

SALTCAKE—
Gothenburg, 200 t. 3 c.

SODIUM SULPHATE—
Bombay, 2 cks.

SULPHUR—
Sydney, 10 cks.

NEWCASTLE-ON-TYNE

Week ending October 27.

ALUMINA—
Antwerp, 309 lbs.

AMMONIA—
Copenhagen, 5 brls.
Rotterdam, 1,541 bgs.

ANTIMONY—
Antwerp, 44 cks.; Montreal, 48 cks.; New York, 109 cks.; Rotterdam, 8 cks.

BARIUM SULPHATE (BLANC FIXE)—
Bergen, 12 cks.
Montreal, 39 cks.

BLEACHING POWDER—
Christiania, 73 cks.
Rotterdam, 155 cks., 96 pkgs.

CAUSTIC SODA—
Bergen, 21 drms.; Christiania, 121 drms.; Copenhagen, 82 drms.; Hamburg, 277 drms.; Rotterdam, 276 drms.

COAL TAR PRODUCTS—
Pitch
Antwerp, 1 kg.; Copenhagen, 1,281 t.; Dunkirk, 431 t.; Rotterdam, 2 crts.

COBALT SULPHATE—
Bergen, 1 cs.

IRON OXIDE—
Copenhagen, 2 cks.

LITHARGE—
Antwerp, 13 cks.; Copenhagen, 9 cks.; Hamburg, 6 cks.; Rotterdam, 106 cks.

MAGNESIA—
Hamburg, 6 cs.
Montreal, 19 cs.

MAGNESIUM CARBONATE—
Antwerp, 10 cs., 70 bgs.

MANGANESE—
Montreal, qnty.

RED LEAD—
Antwerp, 1 kg., 45 cks.; Bergen, 16 cks.; Copenhagen, 91 cks.; Christiania, 57 cks.; Montreal, 4 cks.; Rotterdam, 25t., 50 cks.

SOAP—
Bergen, 1 cs.
Copenhagen, 1 bx.
Rotterdam, 7 cks., 5 bgs.

SODA CRYSTALS—
Rotterdam, 5 bgs.

SODIUM SULPHATE—
Antwerp, 149 t.

TURPENTINE—
Rotterdam, 2 drms.

WHITE LEAD—
Antwerp, 2 pkgs., 2 trusses, 20 cks.; Copenhagen, 10 cks.; Rotterdam, 88 cks.

ZINC OXIDE—
Rotterdam, 1 ck.

ZINC ASHES—
Antwerp, 302 bgs.

N. & S. SHIELDS.

Week ending October 27.

NIL.

PRICES CURRENT.

WEDNESDAY, OCT. 31, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & Co., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23- / &	46/-	
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	85	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	4
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	1
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	3
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	6	17	6
Pyridin	gallon	1	2	6
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	66	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	81	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	0	0
Formaldehyde, 40%	ton	65	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	0	0
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	42	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	43	0	0
Lime Acetate (brown)	*ton	12	0	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge (British)	ton	40	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	0
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	0
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	23	10	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8½
Potassium Prussiate (yellow)	lb.	0	0	11
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/-	&	57/-
Sodium Acetate	ton	24	5	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	0	0
Sodium Perborate	lb.	0	0	11½
Sodium Phosphate	ton	14	0	0
Sodium Prussiate	lb.	0	0	5¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	0	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	10	0
Sulphur (Roll Brimstone)	ton	8	10	0
Sulphur (Texas Gulf)	ton	5	7	6
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	3
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	38	10	0
Copper	ton	60	0	0
Lead (Chemical Sheet), delivered	cwt.	1	17	6
Lead (Foreign Pig)	ton	31	10	0
Nickel	ton	130	0	0
Silver	oz.	0	2	8
Tin, English Ingots	ton	207	0	0
Zinc (Spelter)	ton	33	10	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	42	10	0
Linseed, Raw	*ton	45	10	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	13	6

* *Packages extra or returnable*; otherwise prices usually include packages.
† Makers' prices for home consumption only

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
The Economic Conference at Work	541
The British Industries Fair	542
Pharmaceutical - chemical Prices	542
The Chemists' Dinner	542
Electro-plating with Chromium	543
Disinfectants and Preservatives	545
Chemical Stocks in Japan	546
The Manufacture of Soft Soaps	547
Sillimanite	548
British Industries Fair, 1924	548
Riparian Owners and River Pollution	549
Norwegian Aluminium Industry	549
Chemical Societies' Conjoint Dinner	550
Stock and Share List	550
Legal Intelligence	551
The Indian Indigo Crop	551
Correspondence	551
Fire Risks in Pigment Grinding	552
Sulphuric-acid Tank Explosion	552
Electrometric Methods in Analysis	552
Notes on the Italian Chemical Industry	553
South Wales Notes	553
Items of Interest	554
Coming Events	555
Reports of Companies	556
New Companies	556
Cumberland Coking and By-product Industries	556
Fertiliser News	557
Gazette News	557
The Patent List:—	
Applications for British Letters Patent	558
Complete Specifications Accepted	558
Complete Specifications Open to Public Inspection before Acceptance	558
Abstracts of Latest Complete Specifications	558
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	559
Publications Received	559
Market Reports:	
London "Open Market" Report	560
Italian Chemical Market	561
London Metal Market	562
Manchester Chemical Market	562
Swansea Market Report	562
Liverpool Chemical Market	562
West of Scotland Chemicals	563
Imports of Chemical Products	563
Exports of Chemical Products	566
Prices Current	570

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CURRENT TOPICS.

THE ECONOMIC CONFERENCE AT WORK.

THE interest of the general public in the work of the Imperial Conference is already beginning to wane. It would, perhaps, have been too much to expect that after the broad outlines of policy had been formulated by the various Dominion and Colonial representatives, the detailed proceedings of the various committees should keep public interest sustained at its original high level. Yet the comparatively small amount of attention devoted at present by the general Press to the proceedings may easily give a wrong idea of the value of the work being done. The subject of outstanding importance was, of course, the extension of the system of mutual preferential tariffs within the Empire, and this has now become merged in the political controversy which threatens to bring upon us within the next few months the upheaval of a general election. Apart from this main question, however, there are under discussion many points of detail which, if settled satisfactorily, should go far in improving inter-Imperial commercial relationships and in smoothing the difficulties out of the path of Empire trade. These minor points include the immunity of State enterprises from taxation, a common Empire form of invoice and certificate for use by exporters, the improvement of Empire trade statistics, uniform enforcement of arbitration awards, and the elaboration of a common Empire patent system. On all of these matters special committees of the Imperial Economic Conference have presented their reports. So far as the first is concerned, the unanimous opinion is expressed that State enterprises shall be treated on exactly the same basis as private enterprises for the purposes of taxation. With regard to the second matter, a common form of invoice and shipping document has already been adopted by Australia, New Zealand, South Africa, and Newfoundland, and the Conference urges strongly that the system be adopted throughout the Empire. Concerning statistics, the Conference recommends that the British Board of Trade furnish inter-Empire trade statistics in greater detail than given at present. No one can question the value of reliable and up-to-date statistics in promoting the development of trade, and current British official statistics, valuable as they undoubtedly are, are certainly capable of improvement. To cite, for example, the case of chemical products; there is considerable room for increasing the number of individual products tabulated in the monthly

returns. It is to be hoped, therefore, that this particular recommendation of the Conference is destined to bear fruit. The desirability of establishing a uniform reciprocal system for the enforcement of arbitration awards is also emphasised by the Conference, and whilst there are many practical difficulties in the way of the realisation of this ideal, yet if the aim be kept consistently in view, such a system must in time be established. On the question of Empire patents, objections have been raised by the Canadian Government on the grounds that no reciprocal registration for Dominion patents exists at present, and until this state of affairs is modified, no important progress can be made, although the Conference recommends that the provisional scheme of the British Empire Patent Conference, 1922, be adopted by the Colonies and Protectorates. A further important matter under discussion by the Conference is whether a permanent committee should be established to act as a connecting link between the formal Conferences, and to see that the recommendations of these latter are kept constantly in sight. With the exception of the Canadian representative, unanimous approval of the project has been expressed by the delegates. It is difficult to see that much weight can be attached to the Canadian argument that the existence of a permanent Imperial Economic Committee will jeopardise the effectiveness of the periodic Conferences.

THE BRITISH INDUSTRIES FAIR.

As we indicate elsewhere in this issue, the arrangements for next year's British Industries Fair are now well advanced, both at Birmingham and at London, and there is every reason for believing that from the standpoints both of attendance of overseas buyers and of actual business directly or indirectly transacted, the success of the 1923 Fair will be eclipsed. At one time the opinion was generally expressed that the promotion of a Fair in 1924 would prove an undertaking doomed to failure, since many potential overseas customers who intended visiting England would postpone their visit until the British Empire Exhibition was opened. There is little doubt that such would have actually been the case had the dates at which the Fair is to be held remained the same as those of previous years. By altering the dates so as to bring them within the period at which the Wembley Exhibition will be open, however, the position has been entirely changed, and the confidence of the Fair promoters that the Empire Exhibition will, far from harming, materially aid the success of their enterprise, appears to be well founded. After all, the two projects have aims which are not altogether identical. The British Empire Exhibition is planned so as to attract the general public, and its success will depend very largely upon popular support. Its ultimate effects will, it is true, be reflected in increased trade both home and overseas, but its immediate economic results cannot be so marked as those of a trade fair. A further change for the better in the organisation of the Fair is the decision not to hold the Birmingham and London sections concurrently. This removes the cause for a complaint which we have heard on several occasions in past years. The main difficulty confronting the organisers of the 1924 British Industries Fair has been not so much to attract trade visitors, as to impress upon those home manufacturers who are exhibiting at Wembley the advisability of not neglecting the Fair. We understand, however, that the majority of the manufacturers who, at the outset, looked askance at the idea of organising two comprehensive exhibits, are beginning to see that a dual outlay and effort will probably be well rewarded.

PHARMACEUTICAL-CHEMICAL PRICES.

Inspection of our market reports will reveal the fact that during the past two or three weeks most pharmaceutical chemicals have shown marked increases in price, and that in some few instances the rise has been very great. Thus, in the case of methyl sulphonal and sulphonal, these products could be obtained last week at prices of about 15s. 6d. and 15s. per pound, respectively. To-day, however, the buyer who is fortunate enough to obtain small supplies has to pay almost double the above figures. In the majority of cases, however, the price increase has not been anything so pronounced, 10 per cent. probably being an average figure representing the rise during the period under consideration. These movements in the spot market are due to the practically complete cessation of German imports, the phenomenal rises occurring in those cases where the chemicals are not made here at all and the less pronounced rises indicating the sympathetic reaction of competitive British manufactures. Germany seems to be rapidly approaching complete economic and political chaos and to be reaping the reward of the deliberate policy of currency debasement she adopted three years ago. It is highly probable that the spot market for pharmaceutical chemicals which has reacted so promptly to the failure in German supply will continue firm, and that further alterations in prices will all be towards a higher level. Our fine chemical manufacturers are thus given an opportunity similar to that afforded the dyestuffs industry in the early days of the French occupation of the Ruhr, and we have little doubt they will respond with increased output. The slightly higher prices which consumers will be compelled to pay in the near future are an inevitable consequence of the law of supply and demand, but the benefit afforded the home industry by the temporary elimination of unfair competition must in the long run prove of as great an advantage to British consumers as to the manufacturers themselves.

THE CHEMISTS' DINNER.

The general approval which greeted the suggestion that the occasion be made the first of a series of similar dinners, to be held annually, was but one of a number of factors which indicated the success of the joint dinner held in London on Wednesday week by the Society of Chemical Industry, the Chemical Society, and the Institute of Chemistry. It was made clearly evident to those of us who were present that it is by social gatherings of this kind that the movement towards co-operation can best be advanced.

ELECTRO-PLATING WITH CHROMIUM.*

NEW METHOD USING CHROMIUM ANODES.

By K. W. Schwartz.†

CHROMIUM is a bluish-white metal with a specific gravity, when crystalline, of 6.92 at 20° C. It is exceedingly hard and can be drilled only with great care and difficulty. It maintains its bright, silver-like lustre almost indefinitely. Samples which were exposed to laboratory fumes for many months did not show any signs of tarnish or corrosion.

Chromium metal occurs in both an active and a passive state. In this respect it resembles iron, nickel, and cobalt. When active the metal dissolves readily in hydrochloric and hot sulphuric acids to give chromous salts. Hittorf (*Z. Phys. Chem.*, 30, 505 (1899)) states that in the presence of most strong oxidising agents, such as free chlorine, bromine, strong nitric acid, chromic acid, etc., chromium becomes passive. This probably accounts for the fact that chromium anodes have not been used hitherto in depositing the metal from chromic-acid solutions. Chromium metal can be immediately activated by making it cathode in an acid solution, by contact with concentrated acids at room temperature, by immersion in solutions of the chlorides of the alkalies or alkaline earths at temperatures near their boiling points.

According to Carveth, electrolytic chromium may occlude as much as 250 times its volume of hydrogen. The theoretical ampère-hour yield of the pure metal from a valency of three is 0.6458 gramme, and from a valency of six it is 0.3229 gramme.

Chromium has at least three different valencies. The single potentials, according to Luther (*Z. Phys. Chem.*, 36, 389 (1900)), assuming 0.56 volt for the Ostwald calomel electrode, are 0.3 volt for chromium against its divalent salts, 0.2 volt against its trivalent salts, and 0.9 volt against its hexavalent salts. Chromic oxide belongs to a class of oxides, including those of V, U, Ti, and Mn, which are not readily reduced to the metal. Chromic oxide is not reduced by hydrogen or CO at ordinary pressures. It is not acted upon by chlorine or sulphur fumes. Exposed to water or weak electrolytes it hydrolyses extremely slowly as compared with oxides of most other heavy metals. Chromic oxide forms a very adherent film on the chromium-metal or chromium-alloy surface. It is largely on account of these valuable properties of the metal and its oxide that we undertook the study of chromium-plating steel.

Historical Survey of Chromium-plating Processes.

Bunsen produced metallic chromium electrolytically by using a two-compartment cell and the chloride as electrolyte. Moller and Street (1898) took out patents in England and used as their cathode solution, chrome alum, sodium sulphate, and water, in equal parts by weight. Their current density was 40amps./sq. dm., and temperature 90° C. Their yield per ampère-hour indicates an efficiency of 30 per cent. Cowper-Coles (1900) found that a chromic-chloride solution 250g./L., at a temperature of 88° C. and a current density of 40-50amp./sq. ft. (5amp./sq. dm.) gave good deposits of chromium, especially when hydrochloric acid was added to redissolve the precipitated oxide.

J. Férée electrolysed solutions containing 100g./L. hydrochloric acid and 160g./L. crystalline chromic chloride with current densities of 15amp./sq. dm., obtaining, as he claimed, excellent deposits. Glaser (*Z. f. Elektrochemie*, 7, 656 (1901)) worked with chromic chloride, sulphate, and acetate in the cathode chamber, while the anolyte consisted of mineral acid or salt solutions. His results do not bear ready duplication, however.

Carveth and Mott (*J. Phys. Chem.*, 9, 231) investigated the electro-deposition of chromium from chloride and sulphate solutions, using a double-cell arrangement with lead anodes and copper cathodes. They concluded that chromium can be deposited from these solutions and that the presence of chromous salt appears essential to the successful depositions of the metal from chloride and sulphate solutions. Stirring was found to be undesirable. They recommend as yielding good results a solution containing 340g./L. chromium sulphate in the catholyte and dilute sulphuric acid (density 1.12 in anolyte, with a current density of 14ams./sq. dm. (130amps./sq. ft.). The nature of the anolyte affects the efficiency and deposit materially, as does also the temperature used.

Le Blanc (*Trans. Am. Electrochem. Soc.*, 9, 315 (1906)) found he could deposit chromium using a double-cell arrangement with lead anodes and copper cathodes, a current density of 15-20amp./sq. dm. and a catholyte concentration of 89g./L. of chromium. The anolyte was sulphuric acid of a specific gravity of 1.12, and the temperature used was 38-50° C. Only thin deposits were obtained; thicker deposits showed a tendency to crack and tree.

G. J. Sargent (*Trans Am. Electrochem. Soc.*, 37, 479 (1920)) examined various mixtures of chromic sulphate and chromic acid, and showed that the yield of chromium from chromic-acid solutions is greatly increased by the addition of small amounts of chromium sulphate. He obtained good thick deposits on copper, using a platinum anode and a single-cell arrangement.

E. Liebreich (*Z. f. Elektrochemie*, 27, 94 (1921)) used a lower voltage, with a carefully reduced chromic-acid solution. He obtained adherent deposits on iron, copper, nickel, and brass. His anodes were of platinum and also of iron; the current density was 10-85amp./sq. dm. His solutions contained from 100g./L. to 1,000g./L. of chromic acid, partially reduced to chromous acid. Without the addition of a little sulphuric acid there was a tendency for the cathode to coat over with a green deposit, presumably Cr_2O_3. The fluctuating voltages he obtained in the chromic-acid solutions he attributed "not to passivity," but to alternate reduction and reoxidation of the cathode product. Liebreich is continuing his investigations at the Reichsanstalt, Berlin.

Range of Present Investigations.

On account of the wide diversity of results and opinions of previous investigators, we decided to study: (1) The effect of chromium sulphate concentration at various current densities; (2) the effect of hydrogen-ion concentration; (3) the effect on the deposit upon substituting chromium anodes in place of lead and of platinum anodes; (4) the extent of the passivity of the chromium anodes after prolonged electrolysis. We also investigated the electrolytic corrosion of the chomium deposit, as compared to other metals and alloys, in such media as concentrated nitric acid, dilute nitric acid, sea water, molten tin, zinc, and brass.

Apparatus and Method.

In the cases where a two-compartment cell was used it consisted of an 800 c.c. beaker, into which a porous cup was placed to act as a diaphragm. The outer chamber was filled with dilute sulphuric acid with a specific gravity of 1.12. The anode used was a sheet-lead cylinder closely fitted around the porous cup. The cathode was either copper or sheet iron. In most cases, however, a single cell was used. This consisted of a 600 c.c. beaker, with two anodes (usually chromium) suspended in the solution, preferably by means of chromium-plated iron wires. The anodes of chromium were prepared by the Goldschmidt process. They were approximately 5 × 3.7 × 3.7cm. (2 × 1.5 × 1.5in.) in size.

The chromium sulphate and chromic acid used were Eimer and Amend's "chemically pure grade." All solutions were filtered before using. Cold chromic-acid solutions have little or no effect on the filter paper. The iron cathodes were electrolytically cleaned.

Discussion of Results.

Results of tests made on chromium-sulphate solutions varying from 395g./L. to 80g./L., and current densities varying from 16 to 2.7amp./sq. dm. (150 to 25amp./sq. ft.) were not encouraging. No satisfactory crystalline adherent plate of chromium on iron was obtained. At the lowest concentration used (80g./L.) a uniformly distributed deposit of a green oxide of chromium was produced.

With high concentrations of chromium sulphate, 350-400g./L., at current densities ranging from 2.7 to 16amp./sq.dm. (25-150amp./sq. ft.), with the hydrogen-ion concentration varied by introducing sulphuric acid into the bath in increasing amounts, no satisfactory deposit was obtained. At any given current density, as soon as a definite hydrogen-ion concentration was exceeded no deposit resulted. It appeared that the higher the acidity the higher the current density required for the deposition of chromium from its sulphate solution.

We next tried the solution recommended by G. J. Sargent —245g./L. chromic acid plus 3g./L. $Cr_2(SO_4)_3$. The anode was platinum and the cathode copper. The current density was

* Paper read before the American Electrochemical Society at Dayton, Ohio, U.S.A., on September 27, 1923.

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10amp./sq. dm. (93amp./sq. ft.). A bright crystalline deposit was obtained, which proved satisfactory in all respects. In the next experiment an iron cathode was used and two chromium anodes were used in place of platinum. The cell was allowed to run for 22.5 hours. The voltage at the beginning and end of the run was 2.3; the current density was 10amp./sq. dm. (93amp./sq. ft.). The deposit was grey, adherent, crystalline, and satisfactory. The temperature of the electrolyte was 25° C.; there was no stirring aside from that brought about by the evolution of hydrogen. The chromium anodes showed no tendency to become passive, as would be ordinarily expected, since chromic acid is such a strong oxidising agent. It is possible that the presence of the sulphate ions counteracted the tendency for the anodes to become passive. The anodes lost appreciably in weight, and took on a smooth, silky appearance, as compared with the original rough and scratched surface which had been produced by grinding on an emery wheel.

We next made a series of runs, varying the concentration of the chromic acid, but keeping the content of chromium sulphate and the current density constant. It was found that good deposits could be obtained on iron, using chromium anodes, anywhere within the range from 200 to 400g./L. of chromic acid. The best concentration was found to be 245g./L. chromic acid plus 3g./L. chromium sulphate, which solution was designated as "C."

Using this solution "C," the effect of current density was determined over the range from 2.7 to 54amp./sq. dm. (25 to 500amp./sq. ft.). Good deposits were obtained up to about 16amp./sq. dm. (150amp./sq. ft.). Above this the deposits were dark at first, and after continued plating showed signs of cracking. The best current density to use for a bright adherent deposit proved to be between 10.8 and 13.4amp./sq. dm. (100 and 125amp./sq. ft.), with the electrolyte at room temperature. See the following table:—

Effect of Current Density on Deposit.

Solution: 245 g./L chromic acid, plus chromium sulphate 3 g./L. Room temperature. Anodes, chromium. Cathode, Fe, with exposed surface of 1 sq. in. No mechanical stirring.

Sample.	Time Min.	C.D. amp. sq. ft.	Voltage.	Description of Deposit.
1	120	90	2.3	Crystalline and adherent
2	60	45	2.3	Surface barely covered
3	120	125	2.5	Very good, bright, adherent
4	120	144	2.5	Grey, crystalline.
5	60	345	2.9	Dull, adherent, tendency to form yellow coating.
6	120	540	3.5	Grey at first, then turned yellow and finally cracked.

Cathode current efficiency tests were run with solution "C," using a copper coulometer in series, a current density of 13.8amp./sq. dm. (125amp./sq. ft.), chromium anodes and electrolyte at room temperature. A cathode current efficiency of 20 per cent. was obtained for bright deposits. This, at first glance, would seem low, but is explained by the fact that, together with chromium metal, hydrogen is always evolved at the cathode.

Again using solution "C," a run was made to study the effect of temperature. The current density used for the room temperature run was 13.4amp./sq. dm. (125amp./sq. ft.). The deposit was satisfactory. On making a run at 55–60° C. and the same current density, no plate resulted after two hours' operation, although the evolution of hydrogen at the cathode was quite rapid. However, upon doubling the current density a good plate resulted at this higher temperature.

Why Low-current Densities Cannot be Used.

The above phenomena suggest the following explanation:—Hydrogen was evolved in all of our plating experiments where metallic chromium was deposited, and it seems that the formation of a protective layer of hydrogen gas over the chromium is essential. At higher temperatures the tendency for hydrogen to escape and leave the surface of the cathode is much increased. To counteract this loss, hydrogen must be evolved more rapidly. To do this a higher current density is necessary. On making a determination of cathodic-current efficiency, using a copper coulometer, it was found that at higher current density, using a temperature of 55–60° C., there was no increase in efficiency. Hence nothing is gained in employing the higher temperature. This theory also explains why low-current densities cannot be used in chromium plating, for with low-current densities the hydrogen evolved is not sufficient to produce the protective layer needed to furnish the reducing atmosphere for preventing the newly deposited chromium from dissolving with the formation of a chromous salt.

Properties of Chromium Plate.

Exposure for weeks to the corrosive atmosphere of the laboratory produced no effect on the chromium plate, whereas iron corroded rapidly. Chromium-plated iron immersed in tap-water for a period of three weeks showed no signs of losing its lustre or of a tendency to corrode. Dipping the chromium plate into hot sulphuric acid or hydrochloric acid caused it to dissolve. Boiling in hot concentrated nitric acid for two hours produced no appreciable effect on the chromium plate.

A series of corrosion tests on various metals in order to compare them with chromium plate under similar conditions was then undertaken. These consisted in exposing weighed samples in closed containers to air saturated with (*a*) ammonia, (*b*) hydrochloric acid, (*c*) nitric acid, and (*d*) hydrogen-sulphide fumes, for a period of 192 hours. At the end of this period the samples were again weighed and the loss or gain in weight per unit of surface per year was calculated. The results show that the chromium plate stands up well in ammonia vapour, nitric-acid fumes, and hydrogen-sulphide fumes. It is practically on a par with duriron on exposure to nitric-acid fumes. Hydrochloric-acid vapour attacks chromium almost immediately.

The effect of electrolytic corrosion of chromium plate as compared to other metals was then determined. The corrosive media used were solutions of concentrated nitric acid, dilute nitric acid (concentrated acid plus an equal volume of water), and sea-water. Two runs were made, one using a current density of about 3.2amp./sq. dm. (30amp./sq. ft.), and the other using a current density of 1.6amp./sq. dm. (15amp./sq. ft.). Each extended over a period of 24 hours, weighings of cathode and anode being made before and after each run. The results show that chromium does not stand up under electrolytic corrosion nearly as well as it does under atmospheric corrosion. Of the materials tested—namely, chromium-plated iron, ordinary iron, aluminium, and duriron, —the last showed smallest loss due to electrolytic corrosion.

We attribute the inability of chromium-plated steel to withstand electrolytic corrosion to a "breakdown" of the protective surface film by the action of the electric current. With the aid of the current the acid ions will pass readily through the surface film and attack the virgin metal beneath, whereas in the case of atmospheric corrosion the migration of the acid through the film is extremely slow in comparison.

Under the microscope the chromium plate is uniform and free from holes due to occluded gases. Chromium plate has wearing qualities and hardness superior to ordinary iron, galvanised iron, and tinned iron. Chromium-covered iron is not attacked by molten tin, zinc, or brass, whereas ordinary iron disintegrates rapidly.

Conclusions.

1. Good adherent deposits of chromium on iron were obtained, using solutions containing 3g./L. chromium sulphate and from 200 to 400g./L. chromic acid.

2. The cathode-current density range for good deposits was found to be from 9.3 to 16amp./sq. dm. (100-150amp./sq. ft.).

3. Best results were obtained using Sargent's solution, containing 3g./L. chromium sulphate, 245g./L. chromic acid, and a current density of 13.4amp./sq. dm. (125amp./sq. ft.). The anodes used were chromium. The solution was at room temperature, and stirring in addition to that caused by the evolution of hydrogen was found unnecessary.

4. Chromium anodes in the above solution show no tendency to become passive, even after long and continuous plating operations. Chromium anodes are cheaper than platinum and better than lead.

5. The simultaneous evolution of hydrogen with chromium deposition on iron is essential to good results. The hydrogen appears to protect the freshly discharged metal and to counteract the great tendency of chromium to pass back to the chromous-ion stage. This tendency is particularly marked in the strongly oxidising medium of chromic acid.

6. Steel does not lose its temper during chromium plating.

DISINFECTANTS AND PRESERVATIVES.

A GENERAL SURVEY OF THE WHOLE FIELD.

By S. N. Brown, F.C.S.

IN the following article, a résumé is given of the germicidal powers of a number of products well-known in the chemical and allied industries. Owing to the strict control over these products made possible by the Rideal Walker test, consumers are now well safeguarded, and are able to satisfy themselves better as to the comparative merits of different brands of disinfectants acting under similar conditions.

Coal-tar Fluids.

These products are widely used for their excellent bactericidal action. They consist chiefly of phenolic bodies, and are usually of a dark colour, with a pronounced odour of coal tar. According to their solubility they can be divided into two classes:—(1) Those which form an emulsion with water; (2) those which form a clear solution in water.

In the first group, the insoluble constituents are emulsified with soda, soap, gelatine, resin or neutral oils. The second group consists of saponified tar acids. In their manufacture, potash, glycerine, alcohol and other agents are added to increase their solubility in water. A number of these are sold as proprietary articles and are not allowed to contain above 3 per cent. carbolic acid. In general, commercial disinfectant fluids are free from phenol and are in consequence less poisonous. The strength of these proprietary articles varies considerably, and the germicidal value has to be specified in certain contracts. Since the adoption of the Rideal Walker test, however, there has been a steady rise in the efficiency of commercial disinfectants.

The majority of commercial coal-tar disinfectants contain cresols which are less soluble than phenol. The well-known disinfectant "Lysol" contains 50 per cent. of cresols, but does not contain any carbolic acid. It is prepared by dissolving that portion of tar oil which distils between 190° and 200° C., in a neutral fat and afterwards saponifying the solution. The product is recommended for use as a 2 per cent. solution. "Izal" is a product obtained from the carbonisation of coke in close ovens. It is a reddish-brown liquid insoluble in water. It is a very good disinfectant, is non-toxic and non-caustic to higher animal life. It mixes with water in all proportions to form a milk-white emulsion. The strength of solution usually applied is 5 per cent. "Cyllen" is also a good disinfectant. It is made on the principle that the diphenyl radicle is less toxic and higher in germicidal power than the phenyl radicle.

Chlorine, Bleaching Powder, and Hypochlorites.

Under certain conditions chlorine is an efficient germicide, but its detrimental effect on plants, cotton, silk, and linen and also on the respiratory organs detracts from its general value. Although bleaching powder itself has strong deodourising properties, it is not a good germicide. It has been found indeed that a 1 per cent. solution takes so long as 12 hours to kill the less-resistant organisms. There are a number of hypochlorite solutions on the market containing varying amounts of available chlorine. "Eau de Javel," a chlorinated soda solution, contains 2.5 per cent. available chlorine. "Chloros" contains 10 per cent. of available chlorine. "Antifornin" is a solution of caustic soda and hypochlorites used in breweries.

The electrolytically-prepared solutions are somewhat more active than the ordinary hypochlorite solutions. The effective strength for local disinfection is 0.35 per cent. available chlorine. This solution kills non-sporing organisms in 5-10 minutes. Anthrax and enteritides spores are killed in 1½ hours. The soda preparations are better than bleaching powder for use in water purification. Sodium hypochlorite is best for sterilising swimming baths, as it removes algæ and fungi.

Other Halogen Disinfectant Products.

Iodine treatment combined with sodium thiosulphate has been successfully used in sterilising drinking water. Bromine is a powerful although dangerous disinfectant. It has been found that 20 parts per million sterilises *B. Typhosus* (in water) in less than 30 minutes.

Although largely employed in surgery, iodoform is much inferior to free iodine in germicidal action. Its reputation is far in advance of its merit. Chloroform is a mild disinfectant. To be effective a solution should be at least 1 per cent. in strength. Its volatility, insolubility in water, and narcotic effects are detrimental to its use.

Manganese and Arsenic Compounds.

The permanganates and manganates are known as Condy's fluids (red and green). In their use, care has to be taken to have an excess present such as is evidenced by a pink colour remaining. This colour, however, is very difficult to detect owing to the oxidation product (manganese dioxide) being formed. Hence, the use of these compounds may be very costly and inefficient. Nevertheless a good number of patents are still being taken out for the use of permanganate in water purification.

Arsenic is the basis of valuable insecticides—*e.g.*, sheep-dips from arsenious oxide and the sulphides of arsenic. Commercial preparations often contain arsenic compounds combined with tar products and nicotine. (See *Chemist and Druggist*, June 11, 1904; and *Rep. Dept. Commis. B. of Agric.*, leading to Sheep-dip Act, 1903; and Quibell, *J.S.C.I.*, 1907, 1266). The copper compounds "Paris Green" (aceto-arsenite), etc., are used for spraying and dusting trees.

Copper and Mercury Salts.

Cuprous chloride is considered to be the most active bactericidal salt of copper. It has a distinct action on lower organisms. The efficiency of cupric salts depends on the percentage of copper. Copper sulphate is largely used in killing agricultural parasites. Copper salts are also used for soaking seeds and as a preventive against potato blight. Copper lime sugar, and copper soap washes are used for trees. Bordeaux mixture (copper sulphate and lime) is used for vines and other crops. A mixture containing 75 per cent. of copper sulphate together with sulpho-carbolate and some free sulphur dioxide is sold as "Microsol" for use in stables and drains.

One of the most powerful disinfectants is mercuric chloride (corrosive sublimate). Its extended use is prohibited, however, by its relative high cost, its poisonous action on plants and animals and its precipitation by a large number of products such as hard water, sulphides, metals, and numerous salts. The addition of common salt or ammonium chloride increases the stability, but diminishes germicidal power. The Local Government Board recommend for disinfection: mercuric chloride, ½oz.; spirits of salt, 1oz. fluid; aniline blue, 5 grains (safety colouring), and water 3 gallons (1 in 962). Mercuric iodide and mercuric oxycyanide are both used in surgery. There are also a number of organic-mercury compounds on the market for use in medicine and surgery.

Formaldehyde.

The British Departmental Commission on Preservatives 1901 absolutely prohibits the use of formaldehyde in foods and drinks. The preservative action of wood smoke in smoked provisions is due entirely to formaldehyde. It is more powerful against bacteria than against yeast and mould fungi. Its advantages are its application in gaseous, liquid or solid form for fumigation, spraying, etc., its behaviour to other chemicals by which it is unaffected and also its negative action on metals and fabrics. As an insecticide formaldehyde is inferior to sulphurous acid, but it is an excellent deodourant.

Benzoic and Salicylic Acids.

Benzoic acid is a powerful antiseptic both in solution and in the vapour form. A saturated solution kills *B. Typhosus* in a few minutes. It is largely used in good preservatives, and for preventing the souring of milk. It also finds application in Friars Balsam.

As a food preservative salicylic acid is equal in effect to benzoic acid, although its physiological effect is more marked. The British Departmental Committee referred to above restricts its use to 1 gram per lb. in food and 1 grain per pint in liquids. A large number of food preservatives on the market are derivatives of salicylic acid.

Formic Acid-Preservatives.

Formic acid is a strong antiseptic, its Rideal-Walker co-efficient being much higher than that of acetic acid, for *B. Typhosus*. It has been found that 1 per cent. formic acid is equal in preservative action to 5 per cent. acetic acid. In the destruction of spores, however, it is less active than formaldehyde. Used as a preservative in foods, its taste is more pleasant than that of acetic acid and the odour not so noticeable. Foods containing up to 0.15 per cent. of formic acid have been proved to be physiologically harmless. There are a number of formic acid preservatives sold for use in fruit preservation. These contain various proportions of formic acid—*e.g.*, "Werderol" and "Fructol" contain

10-14 per cent., and "Alaret" from the "Nitrit Fabrik, Köpernick, 50-60 per cent. formic acid.

Boric Acid and Sulphur Compounds.

Though it is not a disinfectant, boric acid restricts the action of bacteria on food. Within certain limits, it keeps milk sweet for 24 hours without any appreciable effect on digestion. A British Departmental Committee recommends that boric acid and borax are to be used for milk, cream or margarine only in the following proportions:—0.50 per cent. H_3BO_3 in butter and margarine; and 0.40 per cent. H_3BO_3 in cream. (*Food Report* 10, *L.G.B* 1909).

The action of sulphur in the destruction of fungi and insects on plants is due to the formation of sulphurous acid. A solution made by boiling milk of lime with flowers of sulphur is largely used externally as an insecticide. The use of sulphur dioxide as a gas is of value in destroying vermin and combating insect-born diseases, but it has very little effect on micro-organisms. Sulphurous acid and bisulphites are widely used for checking fermentation and preserving food. The limit of SO_2 allowed is open to question, although 0.01 per cent. SO_2 has been suggested as a maximum.

Prussic acid and cyanogen are more destructive to insects than to lower organisms. In view of the highly poisonous nature of prussic acid, its use is restricted, although the gas has been used lately in fumigating ships.* Fruit trees are sometimes fumigated with prussic acid, as this is considered a better practice than spraying.

Ozone and Hydrogen Peroxide.

The use of ozone for sewage and water purification is well-known. Ozone in a concentration of 6lb. per million gallons destroyed all the bacteria in a sample of river water (sand-filtered Marne water) containing 28-320 bacteria per 1 c.c., with a mean frequency of *Coli* organisms of 1 per 100 c.c., with the exception of 1 per c.c. of spore-bearing organisms of the *Subtilles* type. Ozonised air under pressure has been used for destroying moulds and bacteria in brewers foul casks, and has been introduced into the wort in the latter part of fermentation to destroy noxious germs. In cold storage ozone is used for removing injurious organisms and odours and lessening the amount of refrigeration required.

Hydrogen peroxide is a bactericide. It does not injure foods, is innocuous and non-corrosive. A concentration of 1 in 100 H_2O_2, is sufficient to kill pathogenic organisms in 24 hours. It is of service in effecting pasteurisation at lower temperatures.

Hydrocarbons, Essential Oils, and Camphor.

Petroleum is well known as an insecticide, although dry cleaning with petroleum or petroleum-benzene does not kill *Typhosus*, whereas carbon tetrachloride is germicidal to *Typhosus* in 30 minutes. Benzene soap dissolved in benzene has no germicidal value. Products consisting of terpenes and oxidised products—*e.g.*, camphor, menthol, thymol, and eucalyptus have a limited sanitary value. A saturated solution of thymol in water arrests putrefaction and fermentation. Camphor is used as a personal prophylactic, but is insufficient to sterilise the air. It is used much in medicine and in block disinfectants such as "Sanoscent," "Camphotar," etc. The essential oil of eucalyptus is strongly germicidal.

Coal-tar Dyestuffs and Intermediates.

Considerable prominence was given last year to some very valuable work carried out by Fairbrother and Renshaw on the use of coal-tar dyes in medicine.† Among the intermediate products, naphthalene is a very feeble antiseptic and is absolutely no use as a disinfectant, but it is useful against domestic insects. Beta naphthol is an official remedy for disinfection in cases of cholera, typhoid, and scabies. Bechold (*Zeit. Angew. Chem.*, 1909, xxii, 2033) states that halogen substituted naphthols are more powerful than any other disinfectant except corrosive sublimate.

Pyridine is a strong insecticide. It mixes freely with water, has a very unpleasant odour and is volatile. In fact tobacco smoke owes its smell not to nicotine but to pyridine and its compounds. Tobacco smoke has been proved to kill the bacilli of cholera and pneumonia in 10-30 minutes. Nasal catarrh has also been overcome by tobacco smoke. Nicotine is used as an insecticide, and usually sold with the official guarantee of the percentage of nicotine. Richards cakes for fumigation are nicotine and camphor in definite proportions.

* Cyanogen chloride is to be substituted for hydrocyanic acid gas in the U.S. Quarantine Regulations relating to fumigation procedure. The change is based on the fact that cyanogen chloride is highly lachrymatory, even in non-lethal quantities, and for this reason it gives ample warning of its presence before it becomes concentrated in sufficient quantities to become fatal.—Ed. *C.T.J. and C.E.*

† See *The Chemical Trade Journal and Chemical Engineer*, April 7, 1922, page 415, and February 9, 1923, page 161.—Ed. *C.T.J. and C.E.*

CHEMICAL STOCKS IN JAPAN.

LOSSES OCCASIONED BY THE EARTHQUAKE.

OUR Japanese commercial correspondent, writing from Osaka under date October 8, gives some important particulars as to the losses occasioned by the earthquake in the stocks of chemical products held in Japan. He states that as the majority of leading dealers in chemicals and drugs were situated in the Nippon-bashi district—the main business centre of Tokyo—the amount of damage and loss occasioned to their stocks was very great. One huge warehouse entirely devoted to the storing of chemicals was completely destroyed by fire, and many other warehouses suffered to almost as great an extent. The total value of the chemicals stored in Tokyo in the middle of August may be given as 3,200,000 yen, and it is estimated that goods to the value of well over 2,000,000 yen have been destroyed.

Possible Shortage of Caustic Soda.

The principal products included in this huge loss figure were sulphuric acid, potassium chlorate, caustic soda, and boric acid. With regard to caustic soda, Japanese chemical circles estimate that the total loss has been 4,500,000lb. in Tokyo and 4,000,000lb. in Yokohama. The loss of bleaching powder, however, was small, since it is customary not to keep large stocks in the seaports during the summer, but to ship the product inland to the ultimate consumers. Of the nine soda-manufacturing concerns in Japan, four sustained more or less damage to their plants, and it is calculated that they will not be able to resume full operations for at least another three months. It is evident that the supply of soda products both in Tokyo and Yokohama will fall short of the demand. The average yearly consumption of caustic soda in Japan is estimated at 40,000,000lb. for recent years, whilst the domestic production is given as 37,000,000lb. in 1922 and 21,000,000lb. in 1921, the balance being supplied by imports. It is possible though that the shortage of caustic soda in Tokyo and Yokohama may be relieved to some extent by transhipments from Kobe, since it is known that large stocks were accumulated at this latter port during the first half of this year.

Imports of Bleaching Powder and Potassium Chlorate Essential.

It would appear, however, that increased imports of bleaching powder and other chemicals are essential to meet the shortage in supply. This is particularly true in the case of potassium chlorate. Ever since May last, imports of this product have been of only limited extent, and a period of acute shortage in the Japanese market is inevitable. It is difficult to obtain exact figures as to the loss of sulphuric acid occasioned by the earthquake, yet it is generally believed that the total loss in Tokyo and Yokohama alone exceeds 4,000,000lb.

Silesian Zinc Industry. — The Polish-Silesian zinc industry is considerably affected by conditions in the Ruhr. The industry mines and smelts local ore, but manufactures only semi-finished products. Of these semi-manufactures, 50 per cent. are normally sent to the industries of the Ruhr for finishing. The development of a domestic refining industry in Polish Silesia is therefore advocated on the ground that it will, on the one hand, overcome the dependency on Germany and, on the other, enable a cheaper marketing of refined zinc and allied products in the domestic, Balkan, and eventually in the Russian markets. Such development, however, must look to foreign investment for its accomplishment, since sufficient domestic capital for expansion is not at present available.

THE MANUFACTURE OF SOFT SOAPS.

PRACTICABILITY OF POTASSIUM-FREE PRODUCTS.

DURING the war, when the shortage of potassium compounds was very acute in the United States, every effort was made to substitute sodium compounds in their place with the view to the preservation of the potash supplies for the essential needs of pharmacy, scientific work, and agriculture. One of the active steps taken was the formation of a joint committee of the American Chemical Society and the National Research Council under the title of the Committee on the Substitution of Potash by Soda. A suggestion put forward by this committee was the possibility of making commercially satisfactory soft soaps without the use of potash, and work to this end was carried out by F. C. Vilbrandt and E. V. Kyser, of the University of North Carolina. This work, which has only recently been completed, is described in the *American Perfumer and Essential Oil Review* (October, 1923), and from the account given we abstract what follows.

The article presents a series of formulæ for soft soaps, wherein the sodium salts have been partly and totally substituted for potassium compounds. The soaps thus produced are not haphazard substitutes, but are the equal of potassium-containing products in detergent and cleansing properties and for the preparation of certain pharmaceuticals. They are also inexpensive. The transparent variety, made from rosin, caustic soda, and fatty-acid stock is clear, lustrous, firm of texture, freely lathering, and readily soluble.

Definition of Soft Soap.

Considerable amounts of potassium salts are used annually in the manufacture of transparent and other soft soaps. In no place in the literature is it stated that a soft soap, clear and transparent the year round, can be produced with sodium salts to the exclusion of potash. Soft soap is understood to be a soap prepared chiefly from potash lye, and oil, of a soft, salve-like consistency, and containing more water chemically fixed than hard soap. According to Thorpe (*Dict. Appl. Chem.*) it is one in which the base used is preponderantly potash, small quantities, if any, of sodium hydroxide being employed in warm and hot seasons. It also is clearly stated that the presence of potassium carbonate is necessary to produce a clear transparency and of the proper consistency for handling, this compound being required to act as a filler to retain chemically the amount of water to hold it as soft soap.

Lambourn defines soft soap as made from low melting-point stock with potash, and states that modern practice has compelled the distinction that while all potash soaps are soft, all soft soaps are not exclusively made with potash; however, in the preparation of such a soap, "a potash-linseed oil soap is the only combination that will retain its transparency throughout winter and summer." For clear transparent soap, very soft soap stock and caustic potash are essential, because the presence of sodium compounds produce figging. Other references all show potassium salts to be an essential constituent. According to Brannt, the substitution of one-half of the potash by caustic soda causes the product to become turbid, short, and friable, but one-quarter substitution can be used in hot climates.

American Experimental Work.

The usual "boil" method of soft soap manufacture was used—*i.e.*, the fatty acid stock was cut and boiled in hot caustic, no salting out being required and "fitting" being eliminated. Mixtures were made beginning with pure caustic potash and substituting until pure caustic soda was used. Only a limited number of oils were used, an effort being made to obtain merely a relationship between the products using potash and soda.

The formulæ studied, the yields and the cost of materials used in each formula are classified in the accompanyng table. In many instances large repeat batches were made to check up the results. Where sodium entirely replaced potassium, as in I, J, K, L, and M, three and four runs were made; in all such check experiments no differences were noticed in yield or quantity of product. The limited number of oils used does not indicate that other olein stock could not be substituted for those used in the above formulæ. The proportions may vary for different stocks, but a little experimentation will yield formulæ from which satisfactory soft soaps can be made.

Wherever caustic soda has been substituted in part for potash the yield of soft soap of a definite consistency from a given stock decreases in proportion as the caustic soda is substituted; not alone, because a lesser weight of caustic soda than potash is absorbed, but hydration of the resulting soap is reduced. However, the slight increase in yield with potash is offset by the higher cost of this chemical, the cost per pound of sodium soaps being considerably less.

DATA ON THE PREPARATION OF SOFT SOAPS.

Formula.	Oil Stock: Pounds.					Alkali: Pounds.			Water	Gross Yield	Net Yield	Materials. Cost per Lb. Dollars.	Clouding Temperature. Degrees F.	Time before Apparent Hardening.
	Coconut Oil Fatty Acids	Soya Bean Oil.	Corn Oil.	Rosin.	Tallow.	Caustic Soda.	Caustic Potash.	Sodium Carb.	Lbs.	Lbs.	Lbs.			
A	12.5	—	87.5	—	—	—	20.0	—	120	240	232	0.0524	44.8	2 years
B	25.0	—	75.0	—	—	—	21.0	—	104	225	223	0.0544	48.0	2 years
C	25.0	—	75.0	—	—	—	19.0	—	111	230	221	0.0546	39.0	Discarded
D	30.0	—	70.0	—	—	—	19.5	—	110.5	230	220	0.0549	44.6	2 years
E	5.0	—	95.0	—	—	—	17.0	—	100	207	202	0.0548	38.2	Discarded
F	39.0	—	39.0	22.0	—	—	15.4	—	92.6	208	204	0.0462	33.1	6 weeks
G	51.0	24.0	—	25.0	—	12.0	4.0	—	113	229	224	0.0488	33.2	6 weeks
H	51.0	16.0	—	25.0	8.0	15.2	—	—	103.8	218	213	0.0434	54.6	3 weeks
I	51.0	24.0	—	25.0	—	15.2	—	—	104.8	220	216	0.0446	32.8	2 years
J	51.0	24.0	—	25.0	—	15.0	—	2.0	103	220	216	0.0452	34.1	2 years
K	51.0	—	24.0	25.0	—	15.0	—	2.0	103	220	216	0.0416	33.7	2 years
L	68.0	—	—	32.0	—	20.6	—	—	99.4	220	216	0.0397	32.8	3 weeks
M	71.5	—	—	28.5	—	16.5	—	3.5	100	220	214	0.0396	33.8	3 weeks
N	100.0	—	—	—	—	18.0	—	—	137	250	245	0.0445	48.0	2 weeks

Discussion of Results.

The products produced according to formulæ I, J, and K, wherein no potash was used, dissolve very readily, lather instantly into hard, soft, hot, or cold water, and yet do not contain as much water as the pure potash formulæ A, B, and D, which were almost equal in value to the above-mentioned sodium soaps. Due to a lack of sufficient lye, formulæ C and E produce greasy soaps. A mixture of rosin with olein stock with a decreased amount of water gave a soap that was too soft and thin. Even the introduction of some caustic soda to increase the hardness did not help, although it did increase the yield, but also the cost of materials per pound of product.

The introduction of tallow into the stock and elimination of all the potash, gave a product that was too hard. Omitting the tallow from this formula gave the best soaps yet made. Changing the composition of the oils and adding sodium carbonate for "fitting" did not change the results, although the substitution of the cheaper corn oil for the more expensive soya bean oil reduces the costs. The products of formulæ I, J, and K, after many weeks of standing showed only a faint trace of a film on the surface, but no separation or change of consistency.

The use of single oil stocks with rosin and caustic soda, as in formulæ L and M, showed that although the consistency was fair when first made, the product lost some of its water on ageing and got too hard. Mixed oils seem to be essential for a good quality soap. Rosin is also essential, since its omission in formula N produced a soap that was not transparent, too hard on ageing for a soft soap, in addition to high cost.

Green soap, soap liniment, and other pharmaceuticals calling for potash soaps were made from the transparent soaps produced from formulæ I, J, and K, and were equal in all

respects to those made from the pure potash formula soaps A, B, and D.

Since a high-grade, clear, transparent, all-year non-figging soft soap can be made by the use of mixed olein stock, rosin and caustic soda in the total absence of potassium compounds, it is safe to assume that all other grades of soft soaps wherein figging and turbidity are not detrimental properties can be made without the use of potassium compounds in any form.

SILLIMANITE.

A HIGH-GRADE REFRACTORY MATERIAL.

CRYSTALLINE anhydrous aluminium silicate occurs in rocks in three forms, as sillimanite or fibrolite, as andalusite, and as cyanite. These three minerals, although identical chemically, have quite distinct physical properties. Sillimanite is much the most stable of the three, and the others may be converted into this form by heating to above 1,320° C.; it may be produced artificially by fusing together silica and alumina in the correct proportions or by other methods.

Massive Deposit Discovered in India.

Sillimanite is found widely distributed in gneisses and crystalline schists and in the detrital rocks derived from these; less often it occurs in zones of contact metamorphism, and still more rarely in granites. It is especially characteristic of the khondalite gneiss of India. In most cases the mineral is disseminated in grains or aggregates of fibres throughout the rock, the massive variety being extremely scarce. Recently, however, the occurrence in India of massive sillimanite has been brought to the notice of the Imperial Institute, and reference is made to the matter in the current issue of the *Bulletin* of the Institute. The mineral is stated to occur near Nongmaweit in the Khasia Hills of Assam, in the form of boulders. Details are at present lacking, but if the experimental work now being carried out proves successful and the difficulties of transport (which are very great in this mountainous tract) can be overcome, an attempt will be made to develop the deposit and place the sillimanite on the market as a high-grade refractory material.

Sillimanite has many valuable properties which render it suitable for use as a refractory material, amongst which are strength and toughness, high melting-point (about 1,810° C.) and stability up to that temperature, low co-efficient of expansion, low electrical conductivity, freedom from volume changes, neutral reaction, and resistivity to corrosive slags and to oxidising and reducing conditions.

This suggested use of sillimanite seems to arise naturally out of its synthetic development in furnace linings and pots used in glass-making, where it is formed by the action of fluxes, derived from the glass or present in the hot gases, on the aluminous materials of which these linings, etc., are made. Under these conditions a layer of sillimanite is produced, which acts as a protective coating and prevents the molten glass from coming into direct contact with the clay body of the tank or pot. It is obvious, therefore, that from a theoretical point of view a refractory material composed wholly or mainly of sillimanite would be ideal for use in glass manufacture.

Artificial Sillimanites.

In practice, however, the use of sillimanite as a refractory material is still in the experimental stage; and in spite of the desirable qualities mentioned above, it is not yet commercially available owing to the scarcity of the natural mineral and the expense involved in producing it artificially. Fused artificial sillimanite has been produced by the Malinite process of smelting aluminous rocks or minerals with a reducing agent. Experiments have also been carried out with mixtures resembling sillimanite in composition by the American Refractories Company in conjunction with the Mellon Institute, and it is said that the production of such refractory materials in quantity has already commenced. Published results, however, refer to tests performed on bricks containing a much higher percentage of alumina than does sillimanite, but it is stated that the composition of the material used will eventually approximate as closely to that of sillimanite as possible.

A process has been patented in America for the manufacture of refractory bricks from a mixture of artificial sillimanite and of finely ground natural zirconia, the amount of the latter varying from 5 to 75 per cent. Though the first cost of sillimanite refractories may be higher than that of less refractory materials, it is probable that eventually it will be found that their greater durability will more than compensate for the difference.

BRITISH INDUSTRIES FAIR, 1924.

PROGRESS IN ORGANISATION AND PUBLICITY CAMPAIGN.

THE announcement some time ago by the Department of Overseas Trade of the alteration of date in the holding of the annual British Industries Fair for 1924 promises to be thoroughly justified by the results. For the past nine years the Fair has been held regularly during the later half of February, occasionally running on into the first week of March. The next, the tenth Fair, will be held two months later, from April 28 to May 9, and the Birmingham Section, instead of being concurrent with or overlapping the London Section (the White City, Shepherd's Bush, April 28—May 9, 1923) as has been the case in previous years, will follow, opening on May 12 and closing on May 23. Before coming to a decision on this question of date, the Department gave the fullest consideration to the views expressed by the exhibitors in the various sections. It is obvious that the holding of an exhibition on the scale of the British Empire Exhibition outweighs all normal considerations, and that the Department was fully justified in its decision to depart from the usual date.

It appeared possible, however, that this radical change in the policy of the Fair, which had hitherto ante-dated Leipzig by a week to ten days, might have adversely affected the representative character of the exhibits. It is therefore reassuring to find that the Department has received substantial support for its point of view in the form of an increased number of applications as compared with an equivalent stage of the organisation a year ago.

Growth of the B.I.F. from Its Inception in 1914.

It is now nine years since the first British Industries Fair was organised with the limited purpose of promoting the manufacture in the United Kingdom of articles previously imported from abroad. The cutting off of certain imports caused by the war had revealed deficiencies which were seriously handicapping home industries. This situation was promptly dealt with by the Commercial Intelligence Branch of the Board of Trade (converted in 1917 into the Department of Overseas Trade), who organised a series of conferences known as Exchange Meetings where British manufacturers might inspect samples, obtain particulars of the goods affected, and meet interested buyers. It became evident in 1915 that having stimulated the production of these various lines the Government must go a step further and help to provide a market where the goods could be shown to the Dominions and neutral nations; hence the first British Industries Fair.

Imperial Significance of the Fair.

The fact that the Fair has been held annually since that date is ample evidence of its utility both to the exhibitor and the buyer. In the meanwhile it has far outstripped its original limited purpose, and has taken its place as a great annual event in the British commercial calendar. In addition the widening Imperial aspect of the Fair has in the last few years been appealing with increasing force to the manufacturer as well as to the buyer from the Dominions. For several years individual Dominion firms have participated, and an official Indian exhibit has been included. Last year the Dominion interest was reinforced by a combined exhibit organised by the Canadian Chamber of Commerce in London, with the most successful results.

Interesting the Overseas Buyer.

The world-wide propaganda campaign conducted on behalf of the Fair during the past four years by the Department of Overseas Trade is cumulative in its effects, and will be enormously reinforced next year by the co-operative publicity arranged between the Department and the authorities of the British Empire Exhibition. The main drive for securing the attendance of the overseas buyer is made through a series of "follow-up" letters sent direct to approximately 50,000 selected firms. These firms are known to be interested in one or several of the trades included within the scope of the Fair. The letters, which are four in number, are already

in process of issue to buyers in the more distant markets. This personal campaign is supported by display advertisements in the British export press, in trade journals circulating overseas, and in the home press having direct interest in the Fair. The general campaign will be further reinforced for next year by the fact that much of the British Empire Exhibition literature, which will be broadcasted in enormous quantities, will carry references to the holding of the Fair.

The opportunity for the overseas visitor will next year be exceptional. His visit to England will be at a time when the country is at its most beautiful and when the English climate is normally at its best. He will be able to make his survey of the goods of Britain's most enterprising manufacturers at the Fair at the White City, London, and at Birmingham, and then see at his leisure the wonders of the British Empire Exhibition, the greatest exhibition ever held, where he can review the output in art, science, industry and raw materials of the whole British Empire. The fact that admission to the Fair buildings is limited by personal invitation to the *bona fide* trade buyer contributes to the desirable end that the Fair shall be a business market for business men.

The Scope of the Exhibits.

The 1924 Fair will have the usual schedule of trade exhibits, including: Glassware; earthenware; stoneware; scientific and optical instruments; photographic and cinematographic requisites; chemicals, light and heavy; domestic chemical products; drugs and druggists' sundries; perfumery, and dyes, at London. The Birmingham exhibits, which are organised by the Birmingham Municipality and Chamber of Commerce, with the support and under the auspices of the Board of Trade, will include: Paints, colours and varnishes; metals of all descriptions; and brewing and distilling plant.

RIPARIAN OWNERS AND RIVER POLLUTION.

THE CHEMIST IN RECENT WATER-RIGHT CASES.

IN the course of a paper on "Some Aspects of Water-Right Cases" read before the Manchester Section of the Institute of Chemistry on Wednesday, October 24, Mr. S. E. Melling, F.I.C., outlined his experience consequent upon the claims of certain riparian owners. In the first place he stressed the importance of the clean water problem to the full development of the textile and other industries, and compared present-day conditions with those which led to the passing of the Rivers Pollution Prevention Act of 1876. Distinction was drawn between the scope and powers of this Act and the common law as affecting riparian owners, and attention was directed to the part played in the prevention of abuse of the rivers of the industrial North by the several Joint Rivers Authorities.

As specific instances of water-right contentions, involving technical evidence, Mr. Melling reviewed two recent Chancery Court cases upon which important judgments had been delivered. In *Hulley v. Silversprings Company*, the plaintiff as riparian owner established that the defendants, in carrying on their bleaching and dyeing business, had so interfered with the character of the water as to entitle him to an injunction, despite the plea of prescriptive right set up by the defendants. Dealing with the position brought about by the relevant facts, one or two points of considerable interest were noted. In the first place, defendants had no right to discharge their effluent at a spot some 130 yards nearer to the plaintiff's boundary unless they could show that such a change could not possibly affect the plaintiff. The onus of so doing rested on the defendants and they had not discharged it. The evidence showed that in the above distance sedimentation and the natural self-purifying agencies would have materially improved the polluting effluent carried down to the plaintiff's land. Secondly, no prescriptive right to pollute could follow, even if all other difficulties had been removed; and, thirdly, the prescriptive easement claimed absolutely violated the provisions of the Rivers Pollution Prevention Act.

The Question of Water Sampling.

In the more recent case, the *Calico Printers' Association v. J. Makin and Son*, the issue was as to whether the defendants, a firm of paper-makers, had, since the date upon which undisputed pollution had ceased, by reason of the discharge of their effluent into the river about a quarter of a mile above the plaintiffs' intake invaded the riparian rights of the plaintiffs. This case, said Mr. Melling, was a little unusual in that the effluent was of such a quality as to satisfy all due requirements of the Rivers Pollution Prevention Act, the "foul, noxious, and polluting matter" complained of being essentially salts contributing to hardness, mainly calcium chloride. The onus of proof was on the plaintiffs in respect of (1) a sensibly increased impurity at their intake in comparison with the condition at the defendants intake and that (2) such increase was caused or contributed to by the defendants' effluent. The learned Judge interpreted "sensibly" as "something more than an increase capable of being detected by a meticulous analysis" but which is "capable of being detected in the purposes, be they domestic, agricultural or industrial, from which the water is used." The character of the river both in volume and quality, its temporary retardation of flow by up-stream riparian owners, the nature and amount of defendants' effluent, and so forth, were all common ground, so that the factors of dilution and diffusion became all-important.

In giving judgment in defendants' favour it was held, *inter alia*, to be quite unsafe to deduce any conclusions from the analysis of isolated samples taken at each intake simultaneously or after an interval, unless calculated with reference to the time that must elapse before the water at the upper point reaches the lower point. In other words, nothing short of a continuous and contemporaneous sampling over a reasonable period could satisfactorily determine the relative conditions at the two critical points. Details were given of the method by which the plaintiffs' suggestion as to unequal diffusion or short-circuiting of the saline matters in the effluent were negatived, and, in conclusion, the author stressed the importance of collecting all the physical, chemical, and engineering data which might have some bearing, however little, on cases of the type he had described.

THE NORWEGIAN ALUMINIUM INDUSTRY.

WIDE VARIETY OF ARTICLES MADE.

THE manufacture of aluminium goods has of recent years become an industry of considerable importance in Norway. There are several firms engaged in the production of a steadily increasing range of articles, the high quality of which has been widely acknowledged. One of the most important works of this kind, states the *Anglo-Norwegian Trade Journal*, is that belonging to A/S Nordisk Aluminiumindustri at Holmestrand. This company, which has its sales office at Lokkeveien 9, Christiania, was formed in 1917, and is closely connected with Aktieselskapet Norsk Aluminium Company, who are makers of the metal. The aluminium articles manufactured by A/S Nordisk Aluminiumindustri may be classified under the following main heads: Plates, kitchen utensils, dairy equipment, brewery vats and containers for the chemical industry. The company are manufacturers of large containers and tanks of almost any size and shape for breweries, canning factories, margarine factories, mineral water factories, and for such chemical industries as nitric acid works, explosives works, dye works, rubber, soap, and glycerine works. Castings in aluminium and alloys are carried out according to models or specifications. In addition to the foregoing a great variety of articles, many of which have hitherto chiefly been made in other metals or in wood, glass, etc., are now made by the company in aluminium or suitable aluminium alloys. Especially may be mentioned aluminium conductors for electricity, the company having supplied cables of that material for several Norwegian power transmission lines.

Aluminium from Norwegian Clay.

Professor Harold Pedersen, who has for a number of years been engaged in investigating the possibility of producing aluminium oxide from Norwegian clay, in a recent lecture before the Chemical Society at Trondhjem, stated that he had succeeded in solving this problem with the co-operation of the Hoyangfaldene aluminium works. Owing to the present unfavourable times it had, however, been found impracticable to construct the necessary works. The Norwegian aluminium works have a capacity of about 20,000 tons annually and are at present dependent on the import of 40,000 tons aluminium oxide which is at present produced only from bauxite, found chiefly in France, U.S.A., and South America. It would, therefore, be of great national importance if the necessary aluminium oxide could be produced in Norway. Owing to the potassium content of the Norwegian clay it is estimated that with a production of 20,000 tons of aluminium 16,000 tons of sulphate of potassium could be obtained annually, thus paying for part of the running costs.

CHEMICAL SOCIETIES' CONJOINT DINNER.

OPPORTUNITIES FOR CO-OPERATION.

At the Hotel Victoria, London, on Wednesday, October 31, a dinner was held under the auspices of the Chemical Society, the Institute of Chemistry, and the Society of Chemical Industry, at which Sir William Pope, K.B.E., F.R.S., presided. The dinner was intended to be something in the nature of an informal gathering of members of the three bodies, and there were nearly 200 present, including a large number of ladies. Among the company were Lord Wargrave, P.C., Lord Exmouth, Dr. E. F. Armstrong, Mr. A. Chaston Chapman, Mr. J. L. Baker, Professor J. C. Philip, Dr. W. R. Ormandy, Mr. E. V. Evans, Mr. G. Keville Davis, Dr. B. Dyer, Dr. C. H. Herty, Dr. J. P. Longstaff, Dr. S. E. Carr, Dr. Monier-Williams, Dr. E. Mond, Dr. R. S. Morrell, Mr. F. H. Carr, Dr. S. Miall, Dr. E. K. Ridcal, Sir Robert Robertson, Mr. J. Ronca, Dr. R. Seligman, Mr. W. J. U. Woolcock, and Dr. T. M. Lowry.

After the loyal toasts, Lord Wargrave, proposing the toast of "Chemistry and the Nation" referred to the remarkable things done by chemists during the war. A new chapter of the requirements and wants of the nations lay before use, and he ventured to hope that the great experience which had been gained by the chemical manufacturers during the war period was not going to be lost, but that we should see security was given to it to enable chemists further to develop the discoveries which they then made.

Sir William Pope, replying to the toast, said that during the war we heard a great deal of the importance of chemistry to the nation, but he was afraid that feeling on the matter of the importance of chemistry to the nation is becoming more and more feeble, and that we are dropping back into the old situation of letting things run on and trusting to luck that they will right themselves when the proper moment comes.

The Federal Council and Its Activities.

Mr. W. J. U. Woolcock, C.B.E., proposing "Our Chemical Organisations," said that chemical science and technology in this country was very well served with Associations. He was not quite sure whether some of these societies might not be able, in the interests of economy and effort and in the interest of efficiency, to find some form of combination, some form, perhaps, even of loose linking up. A considerable amount of co-operation and linking up had indeed taken place. Recently there had been arranged as between the American Chemical Society and our own Chemical Society co-operation in producing the *Journal of Physical Chemistry*, which was all to the good, and was an instance of co-operation of the learned bodies. If to-day was the day of anything, it was the day of co-operation and co-operative effort. There was one body to which he wished specially to refer, the Federal Council, and to suggest two things. He did not himself think that as far as the Federal Council is concerned that it was its business to act independently. He did not detect on that Council a desire to usurp the position of any of the other bodies, but he did think there was room in the Federal Council to act, perhaps in two ways. The first was that the Federal Council might quite easily be a forum, and ideas with regard to progress among the various societies could be offered to the Federal Council for their consideration to reject or accept. There was also a thing the Federal Council had set out to do but had not yet accomplished, although be believed it would ultimately be accomplished—viz., the idea of having a central home for chemical organisations. Ultimately, perhaps, that would be the first great achievement of the Federal Council.

Professor W. P. Wynne, F.R.S., acknowledging the toast, said that when considering the various chemical organisations it was impossible not to be struck by one fact, that only two of them possessed homes of their own. One of them was the Institute of Chemistry. The other was the Chemical Society, which however, was merely a tenant in its own house, and in that house accommodation was severely restricted. The accommodation is so small that the use of the library is very difficult, and they had been told that within the next twelve months they would not be able to find room for their books in the library, which was supported by various chemical associations, and was the most important chemical library in London and therefore in this country. We had been told that the progress of the nation during the last century was due to the efforts and work of engineers. No one would deny that the work of the engineers had been magnificent; but how could the engineer have carried out this work without the assistance of the chemist. It seemed to him that what was required at the present time, is a campaign of publicity.

The final toast of the evening was "The Universities." Dr. E. F. Armstrong, F.R.S., proposing this, said this was a joint meeting of a number of the chemical societies, and what he wanted to suggest was that they should have more faith in themselves and in those whom they chose as their leaders. To the Universities he said that if they were going to do anything for the industry of chemistry they must turn out students who, above all, possessed the hall-mark of personality.

STOCK AND SHARE LIST.

LONDON QUOTATIONS DURING OCTOBER.

Div. or Int.	Paid	Name of Company.	Sh're Val.	Sep. 27—Oct.* Highest	Lowest
1/–	7/7/23	Allen Liversidge	£1	23/9	–/6
7%†	17/6/22	Aluminium Corp., Pref. Stk. (7% Cum.)	100	67	66
1/–	16/4/23	Ass. Port. Cement	1	26/10½	23/4½
–/7½	1/10/23	Benzol and By-products, 6% Cum. Ptg. Pref.	1	16/4½	13/3
3/–	23/6/23	Bleachers' Assn.	1	48/3	46/6
5/–	2/7/23	Boake, Roberts, 5% Cum. Pf.	10	*6⅝	6
1/6	17/2/23	Borax Consolidated Def.	1	40/–	38/–
1/–	3/9/23	Bradford Dyers' Assn.	1	57/3	54/3
–/6	1/10/23	British Aluminium	1	18/9	17/–
—	—	British Celanese 7½% Cum. Ptg. Pref.	1	13/0¾	9/6
–/9	31/5/23	British Cotton and Wool Dyers	5/–	9/–	7/10½
1/–	16/12/20	British Cyanides	1	23/1½	18/9
—	—	British Dyestuffs, Def.	1	2/7½	2/–
—	—	British Glues and Chemicals	1	5/3	4/6
1/–	3/9/23	British Oil and Cake	1	27/6	25/10½
1/9	12/7/23	British Oxygen	1	47/3	43/9
1/–	31/3/23	British Portland Cement	1	30/7½	27/6
1/5⅜	12/6/23	Brunner, Mond	1	40/6	35/9
–/9⅜	1/11/23	Bryant and May	1	48/3	44/4½
2/6	1/10/23	Bush (W. J.) and Co., 5% Cum. Pref.	5	58/–	58/–
2/6	29/9/23	Calico Printers' Assn.	1	30/6	26/6
–/3	30/6/23	Cassel Cyanide**	5/–	16/9	16/–
4½%	1/8/23	Castner-Kellner, 4½% 1st Mt. Db. Sk. Rd.	100	*85	82½
2/–	22/3/22	Cerebos	1	31/5½	31/–
1/6	11/1/22	Champion and Slee	1	*16/–	10/3
–/9⅜	2/7/23	Cory (Horace) and Co.	1	16/–	15/6
1/3	3/8/23	Courtalds	1	63/6	58/7½
–/7½	2/7/23	Crosfield (J.), Cum. 6% Pref.	1	20/9	19/6
3/8	8/1/23	Egypt. Salt and Soda (Bearer)	1	24/9	22/–
–/7½	18/8/23	English Velvet Dyers	1	26/6	26/6
1/–	10/7/20	Evans, Sons, Lescher and Webb	1	*8/9	5/–
1/3	3/7/23	Field (J. C. and J.)	10/–	14/3	12/6
–/7½	2/7/23	Gossage (Wm.), 6½% Cum. Pf.	1	20/4½	19/1½
2/6	1/8/23	Knight (J.), 25% Cum. Pref. Ord.	1	60/–	57/6
1/6	18/10/20	Lawes' Chem. Manure	1	2/6¾	2/6¾
–/8⅝	2/7/23	Lever Bros., 7% Cum. Pref.	1	22/1½	21/3
—	—	Magadi Soda	1	1/9	1/–
1/6	3/8/23	Mond Nickel	1	40/–	38/3
–/9⅝	2/7/23	New Transvaal Chemi. A Pf. (8% Cum.)	1	23/9	22/–
1/4¼	2/7/23	Nobel Industries	1	21/3	19/9
5%	2/7/23	Pears (A. and F.), 5% Deb. Stk. Irred.	100	93	92
1/2⅝	8/9/23	Pinchin, Johnson	1	38/9	37/–
–/6⅝	23/10/23	Sadler & Co. (14⅞/– paid up)	1	*15/3	15/3
2/–	14/4/23	Salt Union	1	21/6	19/9
–/10½	1/6/23	"Sanitas," 9% Cum. Pref.	1	*24/6	21/6
–/7½	2/7/23	Stevenson and Howell, 6¼% Cum. Pref.	1	17/3	17/3
–/9⅝	1/9/23	United Alkali	1	31/5¼	28/4½
–/5	1/9/23	United Indigo and Chemi.	3/4	*6/7½	4/3
1/–	28/3/23	United Premier Oil and Cake	1	11/–	10/–
–/9⅜	30/6/23	Wall Paper Manfrs.	1	24/9	23/–
1/6	20/7/23	Welsbach Light	1	15/–	12/6
2/6	2/7/23	Wheen (R.), 5% Cum. Pref.	5	49/6	45/–
2/–	27/6/23	White, Tomkins and Courage	1	25/–	23/9
3/4½	20/6/23	Yorkshire Dyeware and Chem.	15/–	*29/9	21/3
52/– p.c. †	1/9/23	Gas Light and Coke (4% Stand.)	100	97⅛	95
5%	3/9/23	South Metropolitan Gas, Ord. Stk.	100	99½	98
2/6	2/5/23	Aguas Blancas Nitrate	5/–	35/–	33/–
1/–	21/6/23	London Nitrate	1	57/–	50/3
4/–	4/5/23	Salar del Carmen Nitrate	1	68/–	64/6¾
7/6	26/4/23	Mason and Barry (Bearer)	1	48/1½	45/–
10/–	1/11/23	Rio Tinto (Bearer)	5	34⅞	29¾
5/–	10/5/23	Tharsis Sulphur (Reg.)	2	75/–	66/3

All ordinary shares except where otherwise specified.
*January 2 to September 26, 1923. † Actual.
** Quoted at Glasgow.

LEGAL INTELLIGENCE.

FAILURE OF DYESTUFFS MANUFACTURERS.

J. B. and W. R. Sharp, Ltd.

A largely attended meeting of the creditors of J. B. and W. R. Sharp, Ltd., Lumb Works, Edenfield, Lancashire, was held on November 1 at the Cannon Street Hotel, London, E.C. The chair was occupied by Sir William McClintock, of 71, Queen Street, E.C., who had been appointed to act as the liquidator in the voluntary liquidation of the company. The statement of affairs presented showed unsecured liabilities of £48,443., and total assets of £42,839., from which had to be deducted £2,025. for preferential claims and £9,559. in respect of liabilities incurred by the receiver. The net assets available for the debenture holders therefore totalled £31,255. There were first debentures held by the bank totalling £6,000., and those would be paid in full. The amount available to meet the second debenture holders was £25,255., whilst the claims totalled £38,684. The deficiency as regarded the second debenture holders was £13,429. There was nothing available for the third debenture holders, and as regarded the creditors there was a deficiency of £48,443.

The original capital of the company was £25,000., divided into 5,000 preference shares carrying interest at the rate of 7 per cent. per annum, and 19,000 ordinary shares and 1,000 deferred shares. The latter shares had since been converted into ordinary shares. On June 21, 1922, the company passed a resolution increasing the capital from £25,000. to £70,000. by the creation of a further 45,000 ordinary shares. At that time the company's financial position was not wholly satisfactory, and the resolution for the increase of the capital had never been acted on. The company, having regard to the small amount of shares subscribed for in cash, entered on a very ambitious programme, which they were able to carry through to some extent with the assistance and approval of the Board of Trade. Facilities were also granted by the bank. The company applied under the State Assistance to the Dye Industry Order for a £12,000. loan in April, 1920. They also received a free grant from the Government of £8,000. In December, 1920, the Government loan was increased to £17,000. and the grant to £10,000. With regard to the loan, £16,250. had actually been received, although the total due to the Board of Trade was £19,086. in respect of which second debentures for £17,000. were held.

The Chairman then presented a statement showing how the deficiency had arisen. The directors had hoped that it would be possible for the company to tide over the acute depression in trade, but he was appointed as the receiver for all the debenture holders on December 11, 1922.

A creditor stated that in January last a balance-sheet of the company was seen in Manchester which showed about 15s. in the £ for the unsecured creditors. He asked how that 15s. had disappeared, and the present deficiency taken its place.

The Chairman said that in the balance-sheet referred to the machinery, etc., was taken down at the figure at which it appeared in the books. The machinery, etc., had cost the company £98,000., but it was quite unlikely that anyone would ever be found who would give such a figure for it.

Mr. Stephens, of Messrs. W. J. Bush and Co., Ltd., asked what the Chairman proposed to do—shut down and sell off, or continue trading.

The Chairman: Mr. J. B. Sharp is still sanguine and thinks he can get someone with finance to come in and buy the assets at a price. Frankly, however, the best I shall get for them will not, in my judgment, be sufficient to fully discharge the claims of the debenture holders in full.

Mr. Stephens: How long would you trade before you put the business up for sale?

The Chairman: It will be put up at once.

After a short discussion a resolution was unanimously passed confirming the voluntary liquidation of the company, with the Chairman as liquidator, and an informal committee was appointed consisting of the representatives of the British Dyestuffs Corporation and Phineas Drake and Co., and Mr. A. Livesey.

MANUFACTURING CHEMISTS' LIQUIDATION.

Preston, Hull and Co., Ltd.

The statement of affairs issued by the Official Receiver in the matter of the above-named company, of 112, High Holborn, W.C., shows as regards creditors liabilities expected to rank for dividend £7,444. 12s. 3d., and net assets £356. 1s. 2d. As regards contributories the paid-up capital was £11,503., and the total deficiency amounted to £18,591. 11s. 1d. The company was registered on January 14, 1920, with a nominal capital of £12,500., and was formed, *inter alia*, to acquire as a going concern the business of manufacturing chemists and druggists carried on by Colvin Preston and Lucile Preston, his wife, at Holborn House, 112, High Holborn, W.C., under the style of the "Coal By-Products Company," since the year 1916, also all trade marks, the several processes for the manufacture of "Spots" and "Fumo Taracine," plant, machinery, office furniture, etc., and the benefit of a tenancy agreement relating to premises in High Holborn. The purchase price payable under the agreement was £6,000.

The purchase price was fixed without any independent valuation by Colvin Preston, who has admitted that no profits had been made prior to the registration of the company. Branches were opened by the company at Manchester, Birmingham, and Newcastle, in conjunction with C. P. Preston Co., Ltd. (also promoted by Colvin Preston). In each case the branches proved to be a failure and were closed down in 1922. The failure of the company was attributed by Colvin Preston to (*a*) inability to obtain supplies of benzol for its manufactures; (*b*) the depression generally in the motor trade, which caused heavy losses from bad debts incurred; and (*c*) insufficient capital to advertise the manufactures.

THE INDIAN INDIGO CROP.

FIRST FORECAST FOR 1923-1924.

The following forecast is based on reports received by the Department of Statistics, India, from the undermentioned six provinces, which contain practically the whole area under indigo in British India.

The total area sown is estimated at 163,700 acres, which is 28 per cent. below the corresponding estimate of last year. As compared with the final estimate (296,800 acres) of last year the present estimate shows a decrease of 133,100 acres or 45 per cent. The total yield of dye is at present estimated at 30,400cwt. as against 39,900cwt., the revised estimate at this time last year, or a decrease of 24 per cent. As compared with the final estimate (54,600cwt.) of last year, the present estimate shows a decrease of 44 per cent. Seasonal conditions have not been quite favourable, and the present condition of the crop is, on the whole, reported to be fair.

The detailed figures for the provinces are given below:—

Provinces.	Area (Acres).		Yield (Cwts.).		Yield Per Acre (Lbs.).	
	1923–24	1922–23	1923–24	1922–23	1923–24	1922–23
Madras	64,700	102,600	14,000	22,000(*a*)	24	24
United Provinces.	20,800	35,000	2,300	4,200	12	13
Bihar and Orissa.	24,800	35,200	3,800	4,300	17	14
Punjab	45,900	37,500	9,300	7,600	23	23
Bengal.....	1,300	7,300	100	200(*a*)	9	3
Bombay and Sind (including Indian States)...	6,200	9,300	900	1,600	16	19
Total	163,700	226,900	30,400	39,900(*a*)	21	20

(*a*) Revised.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

OFF-PEAK ELECTRICAL POWER.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—A very important central station in Belgium, wishing to dispose of 5,000 to 10,000kw. of off-peak power during an 8-hour night shift, has requested me to find employment for this intermittent surplus power. Perhaps you will be kind enough to place my problem before your readers. I shall be very glad to receive any suggestions they may be obliging enough to offer. It seems to me that the difficulty in finding uses for such power is sufficiently great and of such general interest as to warrant thorough discussion.—

Yours, etc.,

Ivar J. Moltkehansen.

15, Rue Bréderode,
Brussels, Belgium,
November 2, 1923.

FIRE RISKS IN PIGMENT GRINDING.

STUDIES ON PRUSSIAN BLUE.

PRUSSIAN blue is liable to take fire in grinding, especially when it is being milled in an edge-runner with chrome yellow in the production of chrome green. Although the usual way of making chrome green is to precipitate the two colours together, it is often found necessary to adjust the shade subsequently to an exact standard by dry blending, and unless great care is taken combustion is liable to occur.

E. Renkwitz has investigated the safety limits of temperature of such a mixture, and designed an apparatus for measuring the temperature at which ignition occurs. This is 234° C. for pure Prussian blue, but lower for impure products. The presence of ferrous sulphate, for instance, has a marked lowering effect on the temperature of ignition. A mixture of 80 per cent. of lead chromate and 20 per cent. of dry technical Prussian blue decomposes explosively at 238° C.; a mixture of 92 per cent. of lead chromate and 8 per cent. of Prussian blue burns slowly at 270° C., and a mixture of 96 per cent. of chromate and 4 per cent. of Prussian blue does not burn at 280° C., although the Prussian blue is completely decomposed at this temperature with evolution of ammonia.

It is found that the addition of a small quantity of petroleum has a pronounced effect in reducing the inflammability. For example, a chrome green which alone ignited at 238° C. ignited at 246° C. when mixed with 2 per cent. of petrolatum. To avoid accidents in practice the edge-runner should not be too heavy, and the addition of 2 per cent. of petrolatum is recommended; this also has the effect of greatly facilitating the mixing and grinding. The addition of inert material such as barytes naturally has the effect of reducing the risk of firing almost to vanishing point, so that this trouble does not occur in the dry blending of Brunswick greens.—*Oil, Paint, and Drug Reporter.*

SULPHURIC-ACID TANK EXPLOSION.

FATALITY AT STOCKWITH CHEMICAL WORKS.

THE adjourned inquiry was held on Tuesday concerning the death of George Henry Carr (45), a workman employed at the works of Messrs. Morris and Co. (Stockwith), Limited, on the Trent bank at West Stockwith. It was stated at the opening of the inquiry that Carr was on an acid tank wagon with a naked light in the act of examining the valve, when an explosion occurred and he was instantly killed.

Henry Kellington, a foreman at the works, said he was inspecting the cleaning of the acid tanks which were on railway wagons, and which, owing to the conditions of trade, had not been in use since April, 1921. He understood the lid of the tank had been off half-an-hour when deceased asked him to inspect the tanks they had dealt with, and requested a fellow workman to give him a lamp so that he could see into the tank and examine the valve. Witness turned to inspect other tanks, when he heard the explosion. It was the first time he had ever heard of an explosion of an acid tank.

The Coroner (Mr. E. S. Spencer): Do you always have naked lights to examine the tanks?—Not always, but it was dark under the shed.

Edwin Rufus Hunt said he had been working with the deceased loosening the valves of the empty sulphuric acid tanks. They had completed two of them, and were engaged on the third. He had been working over 20 years on this job. They adopted precisely the same method with all the tanks, and used a little paraffin waste round the spindle which operated the valves. When this waste was lighted it blazed up above the manhole, and the waste loosened the spindle which operated the valve. The manhole lid had been off half an hour. Deceased asked witness to pass him a light. He handed him an open paraffin lamp, and the explosion took place just as deceased got hold of it

The Coroner: Have you ever been warned there might be explosive gas in the tank?—No. Never.

Is it possible to get the spindle loose without burning paraffin waste round it?—It is the method they always adopted.

John Robert Tomlinson, chemist at the works, said these tanks were used to contain sulphuric acid, which was not an explosive acid. Questioned, he said sulphuric acid of itself did not give off an explosive gas, and at full strength it had no effect on iron, but weak sulphuric acid was affected by iron, and generated hydrogen, which was highly explosive when mixed with air. As the tank had been empty so long, the strength of the sulphuric acid it contained would gradually weaken, and hydrogen might be generated.

The Coroner asked the works manager if they took any precautions to ascertain if any dangerous gases were present. Mr. Jones (works manager): We had no reason to suspect explosive gases.

The Inspector of Explosives (Mr. Warren): I entirely disagree with you. They ought to have apprehended danger. The Coroner returned a verdict that the deceased was killed by the accidental explosion of gas inside the tank.

Mr. Dalton Holmes, a director, said he would like to say how greatly the company regretted the accident, and on their behalf to express their deep sympathy with the bereaved.

ELECTROMETRIC METHODS IN ANALYSIS.

PAPER BY PROFESSOR TREADWELL, OF ZURICH.

A JOINT meeting of the Manchester Sections of the Society of Chemical Industry, the Society of Dyers and Colourists, the Institute of Chemistry, and the Manchester Literary and Philosophical Society was held at the Textile Institute, Manchester, on November 2. There were about 300 representatives of the various societies present. Dr. Levinstein, extended a very hearty welcome to their distinguished visitor, Professor W. D. Treadwell, Ph.D., Professor of Analytical Chemistry at the Eidgenössische Technische Hochschule, Zurich. Mr. William Marshall, J.P., F.I.C., Chairman of the Manchester Section of the Society of Dyers and Colourists, then took the chair, and in also extending a welcome to Professor Treadwell stated that this was the first time that gentleman had been to England, and, as Manchester societies, they were very highly honoured indeed in having him come among them. Professor Treadwell and his father had both worked indefatigably in the cause of chemical analysis, and had done, he thought, more than any other two chemists to place analytical chemistry in the high position it holds to-day. Professor Treadwell had broken new ground, and was in the forefront of those who were successfully applying the laws of physical chemistry to analytical purposes.

Professor Treadwell then read his paper, entitled "Electrometric Methods in Analytical Chemistry." He stated that in volumetric analysis the endpoint of a titration may be indicated very accurately by electric methods, either by measurement of potential or of conductivity. In potentiometric titrations a suitable electrode is used as an indicator, the endpoint being marked by a sudden change of potential. In conductivity titrations the endpoint of a chemical reaction is recognised by a sudden change in the conductivity of the solution.

These methods were first used in chemical research about thirty years ago, in a form, however, which proved to be too complicated for technical chemical analysis. During the last few years a rapid development of electro-titrations has been brought about, consisting mainly in the application of the above-mentioned electric indicators to all kinds of chemical titrations. Professor Treadwell described the simplification which had been devised in the necessary equipment, and these were such as would allow the use of these methods, even in the most primitive technical laboratory. The wiring devices for the different methods were explained by a number of diagrams. The applications of various titration-electrodes were illustrated by numerous examples taken from different branches of technical analysis.

The lecturer indicated the lines along which further systematic study of the behaviour of titration electrodes was required. In numerous cases the phenomena of activity await explanation. In spite of the very considerable literature on surface reaction, an exact knowledge of these phenomena, based on the electrostatic attraction of the effective atoms and molecules has hardly begun to be obtained. Much work is now being devoted to these problems, and progress may be expected in the near future, which will certainly also help to extend the possibilities of electrotitrations. Electrometric methods are predestined to be carried out in the form of microtitrations. It would be interesting to try them also with molten electrolytes. Finally, electrometric methods are of value, as they constitute the most reliable means for the scientific criticism of our common titrations.

A very exhaustive discussion then took place, to which Professor Treadwell replied in detail.

NOTES ON THE ITALIAN CHEMICAL INDUSTRY.

(From Our Own Correspondent).

Genoa, October 31.

Payment for Overtime Work.—A new agreement between the Federazione delle Associazioni Industriali Chimici and the Confederazioni delle Corporazioni Sindacali, has been concluded at Rome. By this agreement overtime work will be paid for on week days, with a twenty per cent. increase on the normal rate for the first two hours; twenty-five per cent. for the next three hours, and fifty per cent. for the following hours. On general holidays such overtime will be paid for with an increase twenty per cent. above the nominal rate for the first two hours, forty per cent. for the next three hours, and eighty per cent. for the following hours. If overtime work is done during the night (week days or holidays) it is remunerated as follows:—Twenty-five per cent. above the standard pay for the first two hours, fifty per cent. for the next three hours, and one hundred per cent. for the following hours. The hours from 8 p.m. to 6 a.m. are to be considered as night hours from October 1 to March 31, and from 9 p.m. to 5 a.m. from April 1 to September 30. The above agreement is to be valid for the whole of Italy.

The Citric Acid Industry.—The Italian citric acid industry unlike that of citrate of lime, has never been subjected to Government control. Until quite recently Italy consumed citric acid produced wholly by foreign firms, supplied with Italian citrate of lime. At the present day there are only two citric acid works in Italy, one of which, the Società Goldenberg, was founded in 1909 at Palermo. This firm had originally a German directorate and was financed by German capitalists In 1916, however, after working at a loss for some years, it came under Italian control, and is to-day on a firm financial basis, having increased its capital and accumulated substantial reserves. The second citric acid producing concern was established in Messina in 1919 under the name of Industria Siciliana di Acido Citrico, with a capital of 4,250,000 lire.

Overseas Chemical Trade.—During the first six months of this year Italy imported 984 tons of caustic soda from Great Britain, 5,423 tons from France, 3,127 tons from Spain, 1,740 tons from the United States, and 391 tons from other countries. She also imported from France 7,693 tons of phosphatic fertilisers; 830 tons from Germany; 1,246 tons from Luxemburg, and 139 tons from other countries. The exports of sulphur reached during the above period a total of 121,630 tons, of which 33,514 tons went to Great Britain, 21,581 tons to France, 15,409 tons to Greece, 7,090 tons to South Africa, 5,280 tons to Sweden, 5,869 tons to British India, 4,221 tons to Spain, 3,576 tons to Portugal, 3,605 tons to Austria, 3,167 tons to Germany, etc.

Production Statistics.—Italian production of metallurgical coke reached 34,022 tons in 1921, against 95,725 tons in 1920, 447,387 tons in 1917, 453,000 tons in 1914, and 396,560 tons in 1910. Production of coal in Italy reached 197,920 tons in 1922, against 114,236 tons in 1921, and 151,862 tons in 1920; whereas the 1922 production of lignite was 704,600 tons, against 1,026,035 tons in 1921, and 1,571,735 tons in 1920. The Italian production of sulphuric acid of 50° Baumé reaches about half a million tons per year.

Company News.—At an extraordinary meeting of shareholders at Genoa it was decided to liquidate the firm "La Tannica," owing to bad business. This firm was founded originally with a capital of half a million lire. There has been established at Milan, with a capital of half a million lire the firm Società Italiana Kerament for the production and sale of the product "Kerament" (the property of the Kerament Werke G.m.b.H. of Breslau Gerbovitz), for Italy and the Italian Colonies. The firm Prima Fabbrica Italiana di Lithopone Gelpi e Consonno, of Milan, at an extraordinary meeting decided to increase its capital from one million to two million lire. With a capital of two million lire there has been founded at Bologna the firm Ditta Antonio Bonora-Successori, for the manufacture and sale of fertilisers both natural and artificial. Another fertiliser-manufacturing firm Conti e Amati, has been established at Milan with a capital of 200,000 lire. The Stabilimento Minerario del Siele of Leghorn, is to increase its capital of 1,056,000 lire, by bringing the nominal value of the 400 lire shares to 500 lire. At Naples, the shareholders of the firm Caolino di Conza decided, at a recent meeting, to increase the capital from 100,000 to 400,000 lire. At Fiume, the Società Anonima Raffineria di Olii Minerali has decided to raise its capital of seven million lire to fifteen million lire by the issue of new shares. The Milan firm Società Generale Italiana del Tetrafosfato has decided to reduce its capital from 450,000 to 135,000 lire, and the value of the individual ordinary shares from 100 to 30 lire.

State of the Chemical Market.—The market remains fairly active. There is a good demand for caustic soda, anhydrous sulphate of soda, potassium nitrate, nitrite of soda, sulphuric acid, nitric acid, chlorate of potash, etc. Almost complete absence of business with Germany is now to be noted. During the month there was a slight demand for acetates, especially for sodium acetate, for bichromate of soda and potash, and for carbonate of potash. The amount of coal-tar products on the market was limited, but sufficient to meet a demand which did not obtain large proportions.

The consumption of mineral superphosphates is increasing, and the home works are kept fully occupied. The demand for bone superphosphate is also good, and in the season just closed about forty per cent. more superphosphate was consumed than in the 1922 fertiliser season. Several purchases of ammonium sulphate were made abroad, and have led to a decided reduction in prices during the past month. While England is offering the fertiliser at about £15. 10s. c.i.f. Genoa, better offers are coming in from Austria and Belgium. At the beginning of the month a reduction in Chilean nitrate of soda was hoped for, and this kept the market rather inactive. For sulphate of copper the market is not very active.

In shellac the "leaf" quality was scarce, whereas the "Angelos" quality was quite unobtainable. Regular deliveries of these materials are only expected after December 15. The Italian market resents keenly the effects of the increases that took place at Calcutta. Offers for shellac are also received from Germany at fairly low prices. The September rains have bettered the prospects of the olive oil harvest, but the market conditions have remained firm.

SOUTH WALES NOTES.

(Specially Contributed.)

The tinplate industry remains very steady and employment is regular. Orders have been received for small parcels in greater number, and at many of the establishments work is assured for the next five months. The locomotive men and firemen gave in their 28 days' notice on Monday last, but this action was taken without permission of their Union. Orders are expected from America for a large canning company, who are pressing for early delivery. The patent fuel trade remains rather quiet, makers being unwilling to reduce quotations. The export inquiry is good, and supplies are going chiefly to Egypt, France, Italy, and Spain. The coke ovens are being well utilised, large consignments of coke going to France, Germany, and Java. The residuals are selling well and the outlook is encouraging. The Blaenavon Co., Ltd., have decided to put into operation another blast-furnace. Galvanised sheet business is not so active, and although quotations are being upheld in most cases there is an inclination on the part of sellers to make concessions, as some works are not too well off for orders.

Among the imports during the week were 23cwt. graphite, 114 tons zinc dross from New York, 362cwt. phosphorus from Montreal to Cardiff; 250 tons phosphate, 300 tons basic slag from Ghent, 61 tons ferro silicon, 21 tons calcium carbide, from Antwerp to Newport; 698 tons iron pyrites from Pomaron, 14 tons magnesite from Hamburg, 29 tons calcium carbide from Amsterdam, 5 tons red lead from Genoa, 11 tons copper ore from Amsterdam, 49 tons ferro silicon from Fredrikstad to Swansea. Among the exports were 200 gallons benzol to Ramelton from Cardiff; 30 tons mineral pitch and 5½ tons sulphite of iron to Hennebont, 1 ton painters' colours, 2 tons lubricating oil, 1 ton various chemicals to Buenos Ayres, 5 tons zinc chloride, 1 ton copper sulphate to Bombay from Newport

Japanese Railway Losses.—According to a statement issued by Mr. Okada, Chief of the Kobe Railway Bureau, who has visited the district devastated by the earthquake, the damage sustained by the Japanese railways amounts to ninety-five million yen (about £9,500,000).

ITEMS OF INTEREST.

British Coal Output.—During the week ended October 27, 5,673,500 tons of coal were raised from the mines of Great Britain, as against 5,678,600 tons in the previous week, and 5,388,300 tons in the corresponding week last year.

Physical Society.—It was announced at a Council meeting held on October 26, that Mr. F. E. Smith had found it necessary to resign his position as Hon. Secretary of the Physical Society, and that Professor A. O. Rankine had been elected to the position.

Unemployment Statistics.—The number of persons on October 29, 1923, recorded on the live registers of the Employment Exchanges in Great Britain was 1,256,000. This was 6,563 more than in the preceding week, and 229,878 less than the figure recorded on January 1, 1923.

Cement Industry Developments.—In connection with the rumours prevailing during the past week that the control of the Associated Portland Cement Manufacturers, Ltd., has passed into the hands of another financial group, an official denial has been published by the secretary of the former company.

Safeguarding Act Complaints.—The Board of Trade have received formal notices of complaint under Part I. of the Act that rongalite, sodium formaldehyde sulphoxylate, and zinc formaldehyde sulphoxylate have been improperly included in the lists of articles chargeable with duty under the above Section.

Internal Transport in the Empire Exhibition.—Three types of mechanical transport will be available next April when the British Empire Exhibition opens at Wembley —a "never-stop" railway, the first to be installed in this country on more than an experimental scale, a "road-rail" system and a fleet of electric cars.

Progress in Insulin Research.—Experiments conducted on rabbits and described in the *Journal of Physiology* show that if alcohol be added in small quantities, insulin-containing fluid may be administered direct by the mouth and yet exert its full physiological effect. Without alcohol the insulin is destroyed by the gastric juice.

Italian Market for Paraffin Wax. — Paraffin wax probably finds the readiest market of all petroleum products in Italy, states an American Consular Report. Italy's per capita consumption of paraffin is the highest in the world. The normal import requirements are somewhat above 20,000 tons annually, of which about 75 per cent. comes from the United States.

Trade Inquiry from Holland.—A firm of wholesale mermerchants importing, on a commission basis, at The Hague desire the representation in the Netherlands of British manufacturers of basic slag, sulphate of ammonia, superphosphate, etc. Further information can be obtained on application to the Department of Overseas Trade, 35, Old Queen Street, S.W. 1, quoting Reference 485.

Casein Manufacture in Finland.—A product the manufacture of which has been introduced into Finland of late years and which has prospects of becoming an important article of export is casein. Taking into consideration the highly developed state of the dairying industry in Finland, it ought not to be difficult, states a report in the Board of Trade *Journal*, to organise quite an important trade in this commodity. Part of the casein produced is utilised at Tammerfors, in a factory which manufactures combs and other articles in imitation bone, whilst the remainder is exported.

Dyestuffs Licences in October. — The total number of applications for licences under the Dyestuffs (Import Regulation) Act, 1920, received during October was 520, of which 428 were from merchants or importers. To these should be added the 40 cases outstanding on October 1, making a total for the month of 560. These were dealt with as follows: Granted, 423 (of which 381 were dealt with within seven days of receipt). Referred to British makers of similar products, 75 (of which 63 were dealt with within seven days of receipt). Referred to Reparation supplies available, 53 (all dealt with within two days of receipt). Cancelled, 1. Outstanding on October 31, 8. Of the total of 560 applications received, 498, or 89 per cent., were dealt with within seven days of receipt.

Personal.—The Council of the Institution of Civil Engineers have awarded a "Watt" gold medal to Mr. T. E. Houghton for his paper entitled "Evaporation by the Vapour Compression Method." Mr. Houghton is on the engineering staff of the United Alkali Company.

The Trade Mark "Solignum."—The Dorset Farmers, Ltd., consented, in the Chancery Division on Tuesday, to a perpetual injunction restraining them from passing off as Solignum any article not manufactured by Major and Co., Ltd., the patentees of Solignum, a wood preservative.

New Tees-side Copper Works.—The Rio Tinto Company, Ltd., has obtained a large area of land on the south side of the River Tees, in the neighbourhood of the Cargo Fleet iron and steel works, where new works are to be erected for the manufacture of copper and dealing with by-products.

Rhodesian Mineral Output. — The British South Africa Company announces the following mineral output from Southern Rhodesia during the month of September: Gold, 57,144oz.; silver, 13,335oz.; coal, 58,624 tons; chrome ore, 4,548 tons; copper, 240 tons; asbestos, 2,062 tons; arsenic, 27 tons; mica, 7 tons.

Grain Warehouse Explosion. — Three men were burned and otherwise injured by an explosion which occurred in a grain warehouse at King's Dock, Liverpool, on Saturday last. The cause of the explosion is believed to be spontaneous combustion among the dust which was being cleared from the bearings of the elevators.

Chilean Package Regulations.—A recent Law provides that no sack of produce to be carried on the shoulders (man-handled) in Chile may have a weight greater than 80 kilogs. This applies to imported produce, but goods may be sent to Chile in sacks of a greater weight provided that the produce is re-sacked after arrival if it is to be man-handled.

Perkin Medallist.—Dr. F. M. Becket, metallurgist and director of the Union Carbide and Carbon Research Laboratories, Inc., has been elected to receive the 1923 Perkin Medal. The award will be made at the January, 1924, meeting of the American Section of the Society of Chemical Industry. His most noteworthy achievement was the discovery and development of the process for reducing ores by silicon, which is ranked with the aluminothermic process of reduction of Goldschmidt.

The Royal Institution. — At a general meeting of the Royal Institution, held on Monday, the thanks of the members were returned to Mr. F. Coston Taylor for his donation of 100 guineas to the Research Fund, and to Mr. Robert Mond for his gift of busts and medallions of Dr. Ludwig Mond, Cannizzaro, Liebig, Berzelius, and others, statuette of Sir James Dewar, and many portraits and photographs. Mr. H. A. Gwynne, Professor J. C. McLennan, and Colonel H. G. Wait were elected members.

Tariff Notes.—The Governor of Nigeria has decided to reduce the export duties on palm kernels from 40s. to 22s. 6d., palm oil from 60s. to 40s., and ground nuts from 20s. to 10s.—A duty of £1. per ton has been imposed upon copra exported from the Gilbert and Ellice Islands Colony.—Until December 31, the prohibition on the exportation of basic slag from France is reimposed.—Potassium permanganate (B.P. crystals) have been brought under the operation of the Australian Customs Tariff (Industries Preservation) Act when imported from Germany.—The Polish excise duties on 100 per cent. alcohol have been further increased.

University News. — The late Mr. William Prescott, of Liverpool, who died on October 26, has made provision in his will for the establishment and endowment of a chair at the University of Liverpool. The executors are empowered to offer the University up to £20,000, for the founding of a chair of agriculture or of some cognate subject, such as agricultural chemistry, the study of crops, or kindred lines of investigation bearing on the industry.—The Lancashire County Council have renewed their annual grant of £2,000. to the Manchester University. Simon-Carves, Ltd., have renewed the offer of an Industrial Research Scholarship, and the cholarship for the present year has been awarded to M. D. Pearson, B.Sc. Brunner, Mond and Co., Ltd., have given £150. for the assistance of research in the Metallurgical Department. The following awards have been made: Osborne Reynolds Fellowship: F. D. Reynolds, M.Sc. (for a second year). Elected Research Studentship: Bernard Cavanagh. Degree of Ph.D.: Burrows Moore, M.Sc.Tech. (in Technological Chemistry).

Oil Evaporation from Tanks. — The evaporation of oil from storage tanks, in the tests of the U.S. Bureau of Mines, was 1 to 1½ per cent. less when the tanks were painted white than when painted red and 2½ per cent. less than when painted black. The loss was lowest with tinplate and aluminium paint, but as neither is durable for outside work, the search for a satisfactory oil-saving paint continues.

Scientific Novelties Exhibition. — The Scientific Novelties Exhibition held in London last year was so successful that it has been decided to repeat the experiment. It will be held at King's College from December 29 to January 9, between 2 and 9 p.m. Many eminent scientists have promised to give short lectures with illustrations. The proceeds will be given to King Edward's Hospital Fund for London.

Royal Society Awards.—The following awards have been made by the President and Council: The Copley Medal to Professor H. Lamb, F.R.S., for his researches in mathematical physics; the Davy Medal to Professor H. B. Baker, F.R.S., for his researches on the complete drying of gases and liquids; the Hughes Medal to Professor R. A. Millikan for his determination of the electronic charge and of other physical constants.

Technical Staff Councils.—The Society of Technical Engineers, which, from its foundation, has claimed for the technical and administrative staffs in the engineering industries the position of a third party in industry, is extending its activities by promoting the formation of staff councils. The staff councils suggested will have no official association with the society, but will, by independent action, seek to forward the same objects as the society.

Australian Copper Mine Fails.—The Wallaroo and Moonta Mining and Smelting Company, whose copper mines have been working since 1860, is to be wound up. The production in September involved a loss of £18. a ton, and the estimated cost of continuing operations is £5,000. a month. The Government has offered support, provided that the outlook is satisfactory, but the report of the company's experts has discouraged the directors from seeking assistance.

Chemical Manufacturer's Affairs.—The first meeting of the creditors of John L. Stansfield, Waterfoot, Bacup, Lancashire, was held on November 1 at Manchester. The statement of affairs showed liabilities of £1,607. and there was a deficiency of £1,598. The Official Receiver said that a receiving order was made against debtor in the Salford Court in 1909, when a dividend of 1s. in the £. was paid on liabilities of £482., but debtor had not applied for his discharge under those proceedings. The matter was left with the Official Receiver as trustee of the estate.

Transmission of Heat Through Steel Pipes.—In a study of transmission of heat through steel pipes, being conducted at the Pittsburgh and Minneapolis stations of the United States Bureau of Mines, work on several sizes of steel pipes, calorised and plain, has been completed. It has been found that steel pipes offer a higher resistance to the transmission of heat after calorising than before. Under the conditions of the test but slight effect was noticed on the calorised pipe, while the plain steel pipe oxidised quite readily.—*Colliery Guardian.*

Possible Anglo-Swiss-American Chemical Entente.—According to a statement in *Chemical and Metallurgical Engineering* (New York), a chemical entente embracing portions of the industry in the United States, Great Britain, and Switzerland is believed to be an early probability. The step, it is said, is being taken to meet the "economic accord" being perfected between the German and French industry, which is likely to be extended to include Italy and Czecho-Slovakia. The recent agreement between American, Swiss, and British indigo producers is looked upon as the first step in the formation of the chemical entente.

Obituary.—The death is announced from Berlin of Professor Carl Harries, Ph.D., of the Technical High School at Charlottenburg. From 1904 to 1916 Dr. Harries, who was born at Luckenwalde, Prussia, in 1866, occupied the Chair of Chemistry at Kiel University. He was an accomplished organic chemist and was probably best known for his investigation on the effect of ozone on unsaturated organic compounds. This work led up to the elucidation of the structure of the rubber molecule by the study of the decomposition products of the rubber ozonides. Dr. Harries worked also on the synthesis of rubber, and elaborated the method of polymerising isoprene by means of metallic sodium.

COMING EVENTS.

Institute of Metals (Scottish Section).—Meeting, **Monday, November 12,** at **7.30 p.m.**, at 39, Elmbank Crescent, Glasgow. Paper: "Nickel Alloys," by D. Turner.—**(Birmingham Section):** Meeting, **Tuesday, November 13,** at **7 p.m.**, at the Chamber of Commerce, New Street. Paper: "X-Rays and Crystal Structure," by Dr. H. B. Keene.—**(N.-E. Coast Section):** Meeting, **Tuesday, November 13,** at **7.30 p.m.**, at the Armstrong College, Newcastle-on-Tyne. Paper: "General Scientific Brass Foundry Work," by Dr. P. Longmuir. — **(Swansea Section):** Meeting, **Friday, November 16,** at **7.15 p.m.**, at University College, Singleton Park. Paper: "The Density of Alloys," by Professor Thomas Turner.

Institution of Petroleum Technologists. — Meeting, **Tuesday, November 13,** at **5.30 p.m.**, at the Royal Society of Arts, John Street, Adelphi, W.C. 2. Paper by A. Millar.

Hull Chemical and Engineering Society. — Meeting, **Tuesday, November 13,** at **7.45 p.m.**, at the Photographic Society's Rooms, Grey Street. Paper: "Heating Mediums, Past and Present," by E. G. T. Hill.

Institute of Chemistry (Leeds Section).—Annual meeting. **Wednesday, November 14,** at **7 p.m.**, at the Queen's Hotel. Chairman's address by Wm. Mc. D. Mackey.

Institution of Chemical Engineers.—Meeting, **Wednesday, November 14,** at **7.30 p.m.**, at the Engineers' Club, Coventry Street, London, W. 1. Papers: "A Study of the Conditions of Constant Rate of Flow in Filter Presses," by M. B. Donald and R. D. Hunneman; "A Study of the Absorption Tower," by M. B. Donald and C. W. Tyson.

Society of Dyers and Colourists (West Riding Section).—Meeting, **Thursday, November 15.** Paper: "The Romance of Science," by Professor E. C. C. Baly.—**(Manchester Section):** Meeting, **Friday, November 16.** Paper: "Investigations into the Changes which Occur in Cotton Fabrics During Calendering and Beetling," by J. Huebner and V. Malwin.

Institution of the Rubber Industry.—Annual meeting and dinner, **Friday, November 16,** at the Hotel Victoria, London.

Institute of Chemistry (Glasgow Section).—Discussion, **Friday, November 16,** at the Royal Technical College.—**(South Wales Section):** Annual general meeting, **Friday, November 16,** to be followed by dinner.

Society of Chemical Industry (Chemical Engineering Group).—Meeting, **Friday, November 16,** at **8 p.m.**, at the Chemical Industry Club, 2, Whitehall Court, London, S.W. 1. Paper: "A New Source of Potash and Its Industrial Exploitation," by Professor J. W. Hinchley.—**(South Wales Section):** Meeting, **Friday, November 16,** at **7.15 p.m.**, in the Technical College, Mount Pleasant, Swansea. Paper by E. A. Tyler.

Institution of the Rubber Industry.—Meeting, **Monday, November 19,** at **7.30 p.m.**, at the Midland Hotel, Manchester. Paper: "Costing in the Rubber Industry as an Essential Factor to Successful Production," by C. A. Fryer.

Society of Dyers and Colourists (Midlands Section).—Meeting, **Tuesday, November 20,** at Leicester. Paper: "Bleaching with Hydrogen Peroxide," by I. E. Weber.

Society of Glass Technology. — Meeting, **Wednesday, November 21,** at the University, Leeds.

Society of Dyers and Colourists (London Section).—Meeting, **Thursday, November 22,** at **7 p.m.**, at the Dyers' Hall, Dowgate Hill, E.C. 3. Paper: "Macbeth Artificial Daylight, and the Fade-ometer," by A. D. Lang.

Society of Chemical Industry (Glasgow Section).—Meeting, **Friday, November 23,** at **7.15 p.m.**, at 39, Elmbank Crescent. Paper: "Artificial Resins: Their Preparations and Uses," by Dr. H. Hepworth.—**(Manchester Section):** Annual dinner, **Friday, November 23,** at **7.30 p.m.**, at the Queen's Hotel.

West of Scotland Iron and Steel Institute.—Meeting, **Friday, November 23,** at **7 p.m.**, at the Royal Technical College, George Street, Glasgow. Paper: "Effects of Time and Temperature on High Speed and Similar Steels," by W. E. Woodward.

Institute of Chemistry (Bristol Section).—Meeting, **Saturday, November 24,** at Exeter. Papers by A. Marsden and F. Southerden

REPORTS OF COMPANIES.

Amalgamated Zinc (De Bavay's) Company, Ltd.

The report for the half-year ended June 30 states that after transferring £6,796. to reserve for depreciation the gross profit was £26,885. (against £28,264. for the first half of 1922). The net profit was £26,732., which, added to the balance brought forward made available £65,810. From this dividends Nos. 32 and 33 were paid, leaving £15,810. to be carried forward. There was received £5,763. from dividends on shares of other companies, and since the close of the period an additional £12,000. in respect of the holding of ordinary shares in the Electrolytic Zinc Company of Australasia and also further dividends totalling £7,718. from Minerals Separation and De Bavay's Processes Australia Proprietary shares.

Langdale's Chemical Manure Company, Ltd.

Profit for year to September 30 last, £5,532.; add reserves transferred to profit and loss account, £10,170.; total, £15,702.; deduct debit balance brought in, £15,592.; credit balance carried forward, £110. Competition by Continental makers has been most severe during past year, states the report, and the quantity of foreign superphosphate sold to United Kingdom below cost of manufacture to home producer has considerably increased. The company has been enabled, however, to dispose of a larger output of sulphuric acid and fertilisers from its works than last year.

Santiago Nitrate Company, Ltd.

The directors announce a gross profit of £20,019. for the year ended June 30. After deducting stoppage expenses, London charges, and a provision for income tax, there remains a net sum of £12,692. (against £12,333. for the preceding year), which is added to £9,504. from the last accounts. A dividend of 7½ per cent., less tax, is now proposed (the same), and the balance of £10,196. is carried forward. The company's quota for the current nitrate year having been sold, the oficina remains closed, but it is proposed to resume working operations early next year.

Benzol and By-Products, Ltd.

The board has decided upon adoption of September 30 as being the most convenient date to terminate the company's financial period. It is believed that this will enable convention of the annual ordinary general meeting of the company in January of each year. At the next meeting (which is accordingly intended to be held in January, 1924) there will therefore be presented the accounts as from April 1, 1922, to September 30, 1923. Payment of fixed dividends, which it has been decided to distribute, will be made in each year on April 1 and October 1. Subject to audit, any adjustments and taxation reserves, the net profit is estimated at about £48,000., whilst cash and investments in British Government securities are more than doubled in comparison with those set forth in the last accounts. With regard to the future outlook, trading shows satisfactory progressive increase, and forward sales contracts extending to a considerable period of 1924 have been effected upon terms profitable to the company.

DIVIDENDS.

Fullers' Earth Union, Ltd.—Interim dividend of 11 per cent. per annum, less tax, on the preferred ordinary shares, payable on November 15. A year ago a dividend of 10 per cent. per annum was declared.

North Broken Hill Co., Ltd.—Dividend of 2s. per share, less tax, payable on December 12. This dividend will be paid on the increased number of shares in the company so that the amount of the dividend will be £70,000.

Castner-Kellner Alkali Company, Ltd.—Final dividend of 12 per cent., payable December 5, making 20 per cent. for year to September 30. For the preceding year the dividend was the same.

Ropp Tin, Ltd.—Interim dividend at the rate of 15 per cent., less tax, payable on November 22. The interim dividend for the preceding year was 10 per cent.

Santa Catalina Nitrate Company, Ltd. — Directors recommend final dividend of 10 per cent. (2s. per share), less tax, making 15 per cent. for year.

Joseph Nathan and Co., Ltd.—The directors do not propose to pay any dividend on the eight per cent. preferred ordinary shares for the year ended September 30 last. They anticipate that the interim dividend on the seven per cent. preference shares due on January 1 next will be paid.

NEW COMPANIES.

White Island (N.Z.) Sulphur and Fertiliser Company, Ltd.—Capital £100,000. Office: 638, Salisbury House, E.C.

Armourite (Laboratories), Ltd.—Private company. Capital £100., 1s. shares. Soap-powder manufacturers, etc. Office: 26, Stanley Road, East Sheen, S.W.

Bertram Thomas and Co., Ltd.—Private company. Capital £2,500., £1. shares (2,000 8 per cent. cumulative preference). Importers and merchants of paints, etc. Office: 28-29, Brooke Street, Holborn, E.C.

Byerley and Gut, Ltd.—Private company. Capital £2,500. Manufacturers of and dealers in artificial silk, etc. Address: 128, Fellows Road, N.W. 3.

Carlton Bleaching and Dyeing Company (1923), Ltd.—Private company. Capital £15,000. Office: Armitage Chambers, Victoria Street, Nottingham.

Eclipse Oil Company, Ltd.—Private company. Capital £3,000., £1. shares (1,000 7½ per cent. cumulative preference). Manufacturers and vendors of oils, colours, and paints, etc. Office: 458, Commercial Road, Portsmouth.

Fine Chemicals, Ltd.—Private company. Capital £4,000. Manufacturers of and dealers in resins, shellac, etc. Office: Calrow's Works, Bury, Lancs.

Pyorrhosal, Ltd.—Private company. Capital £5,000. Experimental and pharmaceutical chemists, etc. Office: 346, Strand, W.C.

"Statu" Manufacturing Company, Ltd.—Private company. Capital £3,000. Manufacturers of wax products, etc. Office: Phoenix Works, 2A, Bunyan Road, Bedford.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

(Specially Contributed.)

There is very little change to record in the condition of the industries in the district, and there is still no increase in the production of hematite pig-iron. It is interesting to note that at a conference of local authorities held here on Saturday last to discuss unemployment schemes Mr. Watson Smith, the manager of the Whitehaven Colliery Company, spoke regarding the scale on which the development of the undertaking is to take place. Mr. Smith deplored the fact that it should be necessary to obtain so much coke from the East Coast, and pointed out that as long as this continued the district is at a disadvantage. He reiterated the fact mentioned in these notes sometime ago that the Whitehaven collieries are capable of producing 3,000,000 tons of coal as against the 500,000 tons being raised annually at the present time, and said that he looked forward in two years time to the company's employing 4,000 additional workers. The point as to the need for a larger output of local coke of a quality approximating to that of the East Coast was driven home by Mr. Danks, the manager of the Whitehaven Hematite Iron and Steel Company, who said that if they could eliminate the phosphorus from the Cumberland coke the smelters of iron on the North East Coast would be able to use it in larger quantities. The hope of the Whitehaven Colliery Company is, of course, that by taking selected coal from the Bannock Bands, a seam that has not hitherto been worked on a large scale, it may be found possible to produce coke with which special qualities of hematite pig-iron may be smelted.

Insulin Production.—Reuter's Indianapolis correspondent says that insulin is now being produced at Indianapolis in quantities sufficient to meet the world's needs at a price intended to make it available to the poorest sufferers.

FERTILISER NEWS.

Nitrate of Soda.—Exports of this fertiliser from Chile during October totalled 136,000 tons, of which 85,000 tons was intended for Europe, 39,000 tons for America, and 12,000 tons for Japan and other countries. The estimated production of 163,000 tons, which will probably be found to be too high, thus increases stocks in Chile to about 954,000 tons as at October 31 last. Compared with a year ago, shipments have considerably declined, and yet the visible supply at the end of last month, 405,000 tons, was larger than at the corresponding date in 1922, by some 60,000 tons. It is estimated that the visible supply for the United States and all other countries excluding Europe and Egypt, amounted on October 31, to 98,000 tons, so that the total supply in sight on that date, was under 1½ million tons—a lower figure than at the same date in 1913. Sales by the Producers' Association during the month, reaching some 60,000 tons, increased the total sales for delivery over the present fertiliser year to about 1,300,000, as compared with 950,000 tons twelve months ago. In view of this, it is not anticipated that there will be much further purchasing on f.o.b. account until the end of the year. C.i.f. cargoes have been neglected on this side, and owing to lack of inquiry amongst consumers on the Continent, the market has been very quiet over the month. Labour trouble in Chile, which is considerably disorganising the production and shipment of nitrate from Chile, is not the only difficulty with which producers of nitrate are faced at the present time. Apart from the necessity for improved methods of production, the question of transport is engaging attention. The application by the Nitrate Railways Co., Ltd.—an English concern operating about 400 miles of line in Chile—for the renewal of certain concessions in connection with their lines in the northern nitrate areas has been turned down by the Chilean Government. The company had offered to spend over £1,000,000. in raising the daily carrying capacity, and to cope with the heavier demands of the nitrate industry; but in view of this rejection, the money has been utilised elsewhere. What effect this decision will have upon the nitrate industry itself it is impossible to say. The first concession expires in 1936, when a stretch of railway between Iquique and La Noria, 42 miles, will pass into the possession of the Government.

Sulphate of Ammonia.—Users of fertilisers in this country appear to be holding back their orders indefinitely—particularly in the case of the nitrogenous fertilisers. Very little nitrate of soda is being purchased in this country for use as a fertiliser, and the demand for sulphate of ammonia is likewise very depressed at the moment. The latter fertiliser, nevertheless, is much the cheaper, and is certain to meet with a revival in demand as the season for application approaches. The rise of 2s. 6d. per ton at the beginning of the present month has not provoked any wider inquiry, and it almost seems that the £14. 10s. per ton price might have been maintained until the turn of the year without any serious loss. The stimulating effect on buying, of one fairly large rise might have proved to be much more effectual than the graduated schedule of price increases now in operation. The supply of sulphate is well maintained, and the export trade continues to be a valuable outlet for the producers in view of the quiet domestic demand. News from the United States indicates that the market for sulphate in America is anything but stable. Prices have already been reduced considerably, and "resales" are being effected at prices below the lowered quotations. As yet, there is said to be little export demand, the main reason being the high price in comparison with the British material. Were it not for the duty on imported sulphate, it would be profitable to export British material to the States at the present time; in fact, some Canadian material has been imported and sold at a price which competed strongly with offers by brokers for domestic requirements. The outlook is perhaps best summed up in the report that certain large consumers who contracted for their annual requirements last spring, have offered this material for resale at the actual cost price, believing that to make fresh purchases in the open market would ultimately result in a saving.

Carbon Dioxide in Butter-making.—A more durable butter is being produced in Holland by churning in an atmosphere of carbon dioxide. The air is easily withdrawn from the churn and replaced with the heavier gas, and the portion of this worked into the butter remains a long time with ordinary handling, thus keeping out the oxygen to which natural deterioration is chiefly due.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

British Magnesite Calcining Company, Ltd., London, S.W.—Registered October 19, mort., to Barclays Bank, Ltd., securing all moneys due or to become due to the Bank.

Greenhill and Sons, Ltd., London, E.C., celluloid manufacturers.—Registered October 20, £50,000. debs.

Landore Zinc Works, Ltd.—Registered October 19, £20,000. deb., to J. R. Down, Penybryn, Sketty.

Spencer (George) Moulton and Co., Ltd., London, S.W., indiarubber manufacturers.—Registered October 10, mort., securing £5,856. and further advances, to Halifax Permanent Benefit Building Society.

Taylors' Drug Company, Ltd., Leeds. — Registered October 22, £1,000. mort., to J. H. Armitage, Hookholm Park, View Crescent, Roundhay, and ano.

SATISFACTIONS.

British Cyanides Company, Ltd., London, E.C.—Satisfaction registered October 18, £25,000., registered July 7, 1914.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Alby United Carbide Factories, Ltd., London, E.C.—R. H. Hoare ceased to act as receiver June 20, 1923.

Bodelva China Clay Company, Ltd., St. Austell.—F. W. Heape, Cotton Exchange Buildings, Liverpool, appointed receiver October 17.

Industrial Soap Company, Ltd.—Resolved October 6: That the company be voluntarily wound up. F. Binns, 35, Westgate, Huddersfield, chartered accountant, liquidator.

Phosaline, Ltd.—Resolved October 15: That the company be voluntarily wound up. T. R. Gleaves, Wardwick, Derby, liquidator.

Seven Spas Soap Proprietary Company, Ltd., London, W.—Resolved September 13, confirmed October 16: That the company be voluntarily wound up. H. B. Everett, 3-7, Southampton Street, London, chartered accountant, liquidator.

BANKRUPTCY INFORMATION.

Rowley, Albt. J., late Crown Works, Brentford, paint and varnish manufacturers. 1st and final dividend, 8½d., at O.R.'s, 29, Russell Square, W.C., November 2.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Brough, A., and Co. (Archibald Brough and Geo. Hy. Brough), Macclesfield Road and Standard Dyeworks, Leek, silk dyers. September 29. Debts by A. Brough, who continues. (October 26.)

Universal Dye Works (Herbert Moore and Thos. Wm. Bare), Coombe Street, Coventry, dyers. October 13. Debts by H. Moore. (October 23.)

COUNTY COURTS JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Devon Cleansers, Ltd., 1, Guildhall Chambers, Exeter; cleansing-powder manufacturers; £18. 16s. 6d. September 27.

Fenwick Luke, 111, Grace Street, Newcastle-on-Tyne; enamel manufacturer; £10. 14s. 6d. September 19.

Phosaline, Ltd., 4, Richmond Road, Derby; manufacturing chemists; £11. 1s. 4d. September 28.

Remington J. Stewart, The Homestead, Grange-o-Sands; analytical chemist; £22. 13s. October 1.

Stansfield, J. L., 26, Burnley Road, Bacup; chemical manufacturer; £21. 14s. 2d. September 26.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 22 to 27 (inclusive).

Analysis of Coal. Alexander, R. 26,866.
Dyes. Baddiley, J.; British Dyestuffs Corporation, Ltd.; and Tatum, W. W. 26,485, 26,724, and 26,725.
Treating Waste Water of Chemical Factories. Benoit, A. L. 26,761.
Devulcanising Caoutchouc. Benson, M. 26,313.
Dyestuffs for Wool. Bloxam, A. G. (*Akt.-Ges. für Anilin-Fabrikation*). 26,476.
Plating Metal with Chromium and Nickel. Cam, F. 26,949.
Ink. Came R. R. 26,472.
Roasting Ores. Compagnie des Métaux Overpelt-Lommel Soc. Anon. 26,872.
Separating Liquids of Different Specific Gravities. Comyn, B. D. 26,508
Dyeing. Escaich, A.; and Worms, J.P. 26,353.
Hydroxylated Aliphatic Arsinic Acids. Etablissements Poulenc Frères; and Oechslin, C. 26,617 and 26,618.
Pump for Bitumen, Tar, Etc. Harding, S.M.; and Lockley, W. H. 26,668.
Production of Compressed Gas by Electrolysis. Hausmeister, P. 26,388.
Phosphoric Acid from Phosphates. Henkel, F. 26,557.
Neutral Sulphate of Ammonia. Henshaw, S.; Stonier, S.; and Talk o' th' Hill Colliery Co., Ltd. 26,526.
Settling or Precipitation Tanks. Hunter, S. 26,948.
Coking Retort Ovens. Koppers Co. 26,623.
Hampers for Acid Carboys. Leigh, R. 26,680.
Diacyl Derivatives of Diphenylisatine. Morton, A. Home-. (*Hoffmann-La Roche and Co., Akt.-Ges.*). 26,703.
Rotary Driers. Nicholson, T. 26,917.
Cements. Patrouilleau, L. G. 26,578.
Explosives. A. C. Scott. 26,938.
Utilisation of Waste Lime from Chemical Works. Smith, E. 26,899.
Derivatives of Naphthaquinone. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis; Lantz, R.; and Wahl, A. 26,612.
Formol. Soc. des Etablissements Barbet. 26,749.
Low-temperature Gravity Retorts. Struben, A. M. A. 26,753.
Recovery of Nitrogen from Molasses. Syndicat d'Etudes Chimiques. 26,700.
Conversion of heavy Hydro-carbons. Synthol, Ltd. 26,554.
Recovery of Oxalates. Wade, H. (*Fraymouth and Bhopal Produce Trust, Ltd.*). 26,736.
Centrifugal Separators. C. S. Watson. 26,342.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1*s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.*

1922.

Colloidal Dispersions. Hinchley, J. W.; and Plauson's (Parent Co.), Ltd. 10,567. **205,220**
Condensation Products of the Anthraquinone Series. Bloxam, A. G. (*Soc. of Chemical Industry in Basle*). 13,571. **205,525**
Mixing, Emulsifying, and Like Machines. Seaman, C. J.; and Brinjes and Goodwin, Ltd. 19,412. **205,548**
Aluminium Chloride and Alumina. Mond, A. L. (*Chemische Fabrik Griesheim-Elektron*). 19,700. **205,563**
Calcium-carbide Cakes. Them, H.; and Carbic, Ltd. 20,060. **205,589**
Cleansing Compositions. Golding, H. D.; and United Alkali Co., Ltd. 20,730. **205,599**
Enzymes. Ward Baking Co. 26,751. **186,924**
Mixing the Ingredients in the Manufacture of Soap. Burrows, E. A. 27,539. **205,672**
Reverberatory Furnace. Sklenar, W. F.; and British Reverberatory Furnaces, Ltd. 30,649 **205,715**
Dioxyperylene. Pereira, H. 31,257. **191,363**
Gas Analysis. Simmance, J. F.; and Wood, F. 31,450 **205,723**
Unsymmetrical C.C-dialkylbarbituric Acids. Layraud, E. 32,647. **191,068**

1923.

Highly Chlorinated Hydro-aromatic Products containing Nitrogen. Durand et Huguenin Soc. Anon. 4,965. **193,843**
Anhydrides of Fatty Acids of Low Molecular Weight. Consortium für Elektrochemische Industrie-Ges. 7,009. **194,719**
New Dyestuffs of Indigo Tint. Soc. of Chemical Industry in Basle. 11,431. **199,360**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

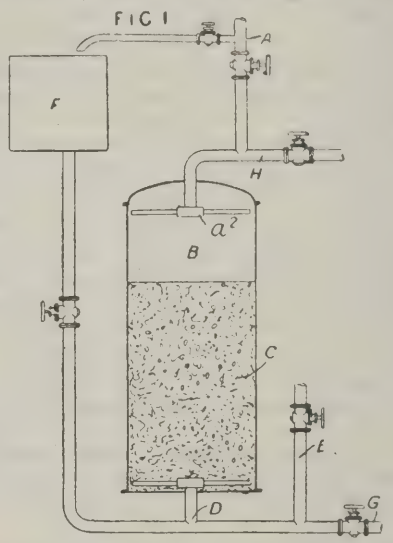
New Indigoid Dyestuffs. Farbenfabriken vorm. F. Bayer and Co. 19,837. **205,790**
Rotary Kilns. Fasting, J. S. 24,037. **205,795**
Alcohol. Klein, Dr. E. 26,014. **205,813**
Cleaning Sand Filters of Large Surface. Sivade, A. 26,131. **205,818**
Germicidal and Fungicidal Products. Koholyt Akt.-Ges. 26,349. **205,827**
Bacteria for Producing the Indigo-vat. Farbwerke vorm. Meister, Lucius, and Brüning. 26,475. **205,834**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Water-Softening. T. P. Hilditch, Grappenhall, Cheshire; and H. J. Wheaton, and J. Crosfield and Sons, Ltd., Warrington, Lancashire. British Patent **203,497**, of 1922.

In a process for regenerating base-exchanging compounds used for softening water, the regenerating solution is divided into, and employed in, portions, the preliminary portion or portions being solution which has been partly exhausted in a previous regeneration, and the final portion consisting of fresh unused solution, which after use is carried off and employed as the first portion in a subsequent regeneration. Fig. 1 shows one form of apparatus for carrying out the process, the water to be softened being admitted from the pipe A and distributor a_2 to the vessel B, and being discharged from the pipes D, E after passage through the

FIG 1



base-exchanging compound C. When regeneration becomes necessary, partially exhausted salt solution contained in the tank F is passed upwardly through the mass C, displacing water to waste through the pipe H. A fresh salt solution is now prepared in the tank F and is run into the vessel B, displacing the first portion to waste. Finally the partially exhausted solution is forced back to the tank F for re-use, by the pressure of untreated water, and the mass C is washed until water flowing to waste through the pipe G is free of salt, when the apparatus is again ready for softening purposes. Two tanks F, one for partially exhausted solution, and one for fresh salt solution, may be employed, and when the solution is to be further subdivided, additional tanks F may be provided. Specifications 4188/13, 120,293, and 120,294 are referred to.

Fluxes. T. Yamanouchi, Tokyo. British Patent **203,397**, of 1922.

Fluxes for use in galvanising sheet iron comprise ammonium chloride to which is added 2-3 per cent. of a mixture of strontium or strontium compounds, sulphur and carbonates or sulphur compounds or sulphur and sulphur compounds, chlorides, and bismuth or bismuth compounds. The following proportions by weight are used: strontium or its compounds 70-125, sulphur 60-125, sulphur compounds or carbonates 10-20, chlorides 5, bismuth or its compounds 20-30. In one example the mixture consists of the following parts by weight: strontium chloride 100, sodium sulphide 10, sodium chloride 5, and bismuth sulphide 20.

Titanium Oxide and Sulphate. C. Weizmann and J. Blumenfeld, London. British Patent **203,352**, of 1922.

To obtain titanium compounds free from iron, an ore such as ilmenite is heated to 150-180° C. with sulphuric acid of 70-90 per cent. strength. The solid product is leached with a limited quantity of water in presence of a reducing agent, preferably spongy iron, most of the iron sulphate being left in the solid form. The water is added little by little at a temperature not above 50° C. The reduction is completed when a brown-violet colouration shows the presence of

titanous salts. The solution is then treated to hydrolyse the titanium sulphate in any known way, and the first washings of the precipitated hydroxide are effected with water acidulated with sulphuric acid and containing a titanous salt so as to avoid any oxidation of ferrous salts which would injure the colour of the product. The precipitate is calcined under oxidising conditions, for instance by blowing air through the container or through the material during calcination, or, according to the Provisional Specification, by calcining in the presence of sulphuric acid, the object being to prevent any reduction owing to organic matter that might be present. The ferrous sulphate left with the undissolved residue of the ore is recovered by solution and crystallisation, and may be treated to recover the sulphuric acid. According to the Provisional Specification the solution of titanium sulphate is protected from oxidation during hydrolysis, by means of a film of oil, vaseline or the like.

Purifying Mineral Oils. H. M. Ridge and W. R. Hodgkinson, London. British Patent **203,354**, of 1922.

Oils, etc., are desulphurised or otherwise purified by bringing the liquid or vapour into intimate contact with material consisting of, carrying, or containing both one or more of the metals copper, zinc, cadmium, or iron, and one or more of an oxide, halide or oxyhalide of the metal or metals. In an example, 12lb. of copper turnings or filings are heated in air until partially coated with oxide or oxides, and then agitated with 100lb. of shale oil of high sulphur content. The oil is separated by filtration. In a second example, oil is filtered through a hot mixture of copper, copper oxides, and cuprous chloride obtained by heating granulated copper oxide with 10 per cent. of salammoniac and 5 per cent. of a paraffin lubricating oil. Pumice, bauxite, or similar carrier may be coated, impregnated, or mixed with the purifying agent. The Provisional Specifications also state that materials of a porous nature, such as manganese dioxide, magnesium carbonate or silicate, iron oxide or silicate, and coarse copper oxide can be used as carriers for copper or an oxide of copper, and that copper can be used in conjunction with its sub-chloride, sub-bromide, or sub-iodide.

Mineral Sodium Carbonate. R. H. D. Blattner, London. (L. Grouchkine, Alexandria.) British Patent, **203,271**, of 1923.

Pure soda ash, caustic-soda lye, and carbonic acid suitable for liquefaction are produced from mineral sodium carbonate such as natron or trona. The mineral is heated with a metallic oxide such as ferric oxide adapted to remove carbon dioxide, and the carbon dioxide evolved is led into a concentrated solution of another portion of the mineral. The bicarbonate which is precipitated is dried by waste heat, and calcined to give soda ash and carbon dioxide. Metallic oxide for reuse and caustic-soda lye are obtained by lixiviation of the mass resulting from the heat treatment.

Reducing Organic Compounds. D. G. Murdoch, Beckton, London; and W. L. Galbraith, Gas Light and Coke Company, Westminster. British Patent, **203,059**, of 1922.

The reduction of water-insoluble organic compounds such as nitro- and azo-derivatives by means of an amalgam of an alkali or like metal is effected in the presence of an aqueous reagent to react with the amalgam, and a stable water miscible solvent for the organic compound which will separate from the aqueous caustic alkaline solution produced; suitable solvents are water-soluble cyclic bases containing nitrogen in the ring, such as pyridine (including commercial pyridine bases) and piperidine; quinoline is, however, unsuitable. The reduction may be carried out by agitating the amalgam with the other reaction components or by passing the latter as a thin film or layer over the surface of the amalgam, which may also be in motion; it may be controlled by varying the amount of water in the mixture or by using dilute alcohol in place of water or by varying the temperature; the reaction may also be expedited by adding more water, or separating off some of the aqueous alkaline liquor and adding more water, during the reaction. When the reduction products are insoluble in alkali the latter may be readily recovered, the reaction being conveniently carried out in conjunction with one of the known processes for the electrolytic production of halogen and caustic alkali from alkali halide in a mercury cathode cell. If the alkali metal of the amalgam is not completely utilised, the latter may be passed through an ordinary water chamber before returning to the cell. Two suitable forms of apparatus are described. (For illustration, see the *Chemical Trade Journal and Chemical Engineer*, September 7, 1923, p. 288.) Examples are given, using pyridine as the water-miscible solvent, of the reduction of (1) *o*-nitroanisole to azo-anisole and anisidine in the apparatus of Fig. 1; (2) azo-anisole to hydrazo-anisole and anisidine, and nitrobenzene to hydrazobenzene and azobenzene, together with a little aniline, in the apparatus shown in Fig. 2. Specifications 3,099/96 and 200,167 are referred to.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

White Lead. G. F. Lloyd, Brighton, Victoria; F. B. Clapp and F. H. Campbell, both in Melbourne; all in Australia. British Patent, **203,301**. Convention date, August 30, 1922.

Basic lead acetate is prepared by treating litharge with acetic acid with or without sodium acetate or with an acetate such as sodium acetate and dilute sulphuric acid, the strength of the acetic acid being from 4½ to 60 per cent. and the proportions from 16 to 22 absolute acetic acid per 100 parts of litharge, the product containing from 10 to 73 per cent. of water at a temperature not exceeding 60° C. The basic acetate solution prepared as above is treated with a mixture of sodium or potassium or ammonium carbonate and bicarbonate, the carbonate being wholly in solution and the bicarbonate preferably partly in suspension, partly in solution, and partly added dry after the addition of the dissolved and suspended carbonates, and the operation being effected in the case of ammonium carbonates under a slight pressure of carbonic acid. The proportion of the carbonates used is from one-fifth to two-fifths parts of the mixed carbonates to one part of litharge contained in the basic acetate, and the proportion of bicarbonate to carbonate employed may be 60 to 75 parts bicarbonate to 40 to 25 parts carbonate. The white lead precipitate is separated, and washed with water or with normal or basic lead acetate in dilute solution for the purpose of removing any alkali carbonates adsorbed in the precipitate, and finally washed with water. Specifications 223/76, 9122/87, 6633/91, 13886/96, and 9638/12 are referred to.

White Lead. M. Rascher and R. Plaueln, Offenbach-on Main, Germany. British Patent **203,340**. Convention date, September 2, 1922.

White lead is produced by precipitating basic lead acetate solution in the presence of metallic lead, carbon, and moist compressed air, by means of carbonic acid. An apparatus shown comprises a cylindrical chamber having an internal concentric perforated cylinder. In the space between the walls is placed a mixture of lead and carbon. The solution of basic lead acetate is agitated by a stirrer, which, however, is not essential. Compressed moist air and carbonic acid are injected through pipes. The separated white lead is washed and dried at 90° C., or may be ground with oil while wet.

PUBLICATIONS RECEIVED.

X-Ray Spectrography. — Pamphlet from Adam Hilger, Ltd., 75A, Camden Road, London, N.W. 1. The general outlines of X-ray spectrography are fully described, and the method of using Dr. Müller's X-ray spectrograph (made and marketed by the firm) is given in detail.

Die Methoden der Organischen Chemie (Weyl's Methoden). —Edited by Professor Dr. J. Houben, Berlin. Third Volume; 1,117 pages. 1923: Leipzig: Verlag Georg Thieme (no price stated).

The Chemistry of Paints, Pigments, and Varnishes.—By J. Gauld Bearn, D.Sc., A.I.C., F.C.S. (chief chemist to Messrs. Walter Carson and Sons). 1923: London: Ernest Benn, Ltd., 8, Bouverie Street, E.C. 4; price 30s. net.

Modern Smithy Equipment.—A new publication (No. D.F. 1,134) entitled, "Forge Plants and Forges," by the Sturtevant Engineering Company, Ltd., 149, Queen Victoria Street, London, E.C. 4. Copies may be obtained by interested readers on request to the firm.

Quarterly Markct Report. — Barter Trading Corporation, Ltd., London, W.C.

Current Technical Books.—Catalogue. Scott, Greenwood and Son, London, E.C.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Conditions in this market are about the same, with prices showing but very little difference, and business still slow and limited in volume. Surprise has been expressed that prices have not advanced here like they have in the pharmaceutical section, but it must be borne in mind that in this market the majority of the products are made here and are also obtainable from sources outside Germany, whereas many of the fine chemicals are only obtainable from Germany. **Acetic Acid,** 80% technical, £46.; 80% pure, £47. 10s. to £48.; 98% glacial, £60. in casks and £72. in glass demijohns, ex wharf London; dealers' prices are about the same, with business rather on the slow side. **Acetone,** British Government specification, about £124. per ton, in drums; the spot position keeps very steady at about this level; business quiet. **Alum,** lump, £10. to £10. 5s. per ton, in casks; dealers continue to offer Continental material at about these figures, with the demand small. **Arsenic,** Cornish white powdered, about £65. to £66. per ton, f.o.b. London; inquiry from America has been good, and reliable opinion favours much higher prices in the near future. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; dealers continue to quote at about this figure, but there is no great demand at present. **Bleaching Powder,** 35—37%, £10. to £10. 5s. per ton; the spot demand remains quiet, with dealers' prices unchanged. **Barium Chloride,** 98—100%, about £14. 15s. to £15. per ton; prices seem very steady at these rates, and may show an advance before long. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P., crystals, about 1s. 4d. per lb., less 5%; the spot position remains dull and weak. **Cream of Tartar,** 99—100%, about 85s. per cwt.; dealers are offering at about this figure, and some business has been done; the market is steady. **Epsom Salts,** commercial, crystals, £4. 10s. to £4. 15s. per ton, in bags; prices are being well maintained here, despite the lack of business. **Formaldehyde,** 40% volume, about £62. to £63. per ton; business remains slow, with plenty of offers on the market; prices are varying. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; there is little doing here so far as merchants are concerned. **Lead Acetate,** brown, about £41. 10s. to £42.; white, £42. to £43. per ton; supplies seem very limited, and fresh imports must be at higher levels. **Litharge,** imported, about £35. 10s. per ton; dealers are quoting at about this figure, with business slow. **Lithopone,** 30% Continental red seal, about £22. 10s. to £23. per ton; prices on spot are fully maintained, and may advance in view of the position on the Continent. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; spot supplies are offering, but there is only a limited demand; prices are steady. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at about these rates. **Oxalic Acid,** 5¾d. to 6d. per lb.; this article remains in very small request, and prices are none too steady. **Carbonate of Potash,** 90—92%, about £26.; 96—98%, about £27. 10s. per ton; sales on spot seem very few, and prices, although they have been on the decline lately, are still unsteady. **Chlorate of Potash,** crystals and granular, 2¾d. to 3d. per lb.; dealers continue to quote at these figures, with inquiry small. **Caustic Potash,** 88—92% solid, about £31. per ton; the spot position seems rather unsteady, with offers varying, one or two being under the figure quoted. **Permanganate of Potash,** commercial quality, about 9d. per lb.; at the rate quoted this market is rather easy, and the little business passing is generally on a slightly easier basis. **Prussiate of Potash,** yellow, about 10½d. per lb.; a further slight reduction in dealers' prices is recorded, with business still dragging. **Sulphate of Potash,** £11. per ton, ex ship; the market price shows no change on the week. **Mercury,** about £10. and upwards per bottle of 75—76lb., net; there has been an improvement in demand, and prices are much steadier. **Red Lead,** imported, about £35. 10s. per ton; imported material is offered by dealers at about this figure. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £43.; fine white crystals, £25. to £26. per ton; dealers holding stocks of imported material continue to quote at these figures, but business is still slow and small. **Saltcake,** home trade, about £4. 10s. per ton; export quotations are slightly dearer; material offering is limited. **Acetate of Soda,** about £24. 15s. per ton, on spot; dealers' offers are at this level, with business quiet. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers continue to quote at these prices, with the demand slow. British makers' prices to home consumers on contract are unchanged at 70—72%, £17. 17s. 6d., and 76—77% £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers' prices, to home trade only, are level at this rate, packages free, carriage paid to destination. **Bichromate of Soda,** home trade, 4½d. per lb.; British makers' prices are maintained at this old level; their prices for export are slightly dearer. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; prices quoted by British makers are unchanged. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in free bags, carriage paid to destination; this price is quoted by British makers for home trade only; dealers are offering ex stores and wharf at competitive rates. **Hyposulphite of Soda,** pea crystals, £14. 10s. per ton, in 1cwt. kegs; commercial quality, about £10. per ton, in casks; prices are very steady as far as dealers are concerned, and may advance. **Nitrate of Soda,** 96%, £13. 5s. per ton; the position shows no change, with the market quite steady. **Nitrite of Soda,** 100%, about £26. per ton; a slight reduction in price is recorded here. **Prussiate of Soda,** about 5½d. per lb.; dealers offering British material are quoting steadily at this level, but do not seem to be doing any good business. **Sodium Sulphide,** 60—62%, solid, about £14.; ditto, broken, about £15. per ton; dealers are finding hardly any inquiry, but continue to quote at unchanged prices. **Tin Crystals,** about 1s. 3d. per lb.; a reduction in price is recorded here. **Tartaric Acid,** B.P., crystals, about 1s. 1½d. per lb., less 5%; spot supplies are available, and at the price quoted the market is still very weak. **White Lead,** imported, about £42. per ton; imported material is offered by dealers in the region of this figure, with not much business doing. **Zinc Oxide,** B.P., £52. 10s.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers continue to quote at these prices.

Pharmaceutical Chemicals. — Many items in this market show further considerable advances in spot values. Business has been very active in these materials, and supplies are in some instances now difficult to locate. Offers from Germany are now very limited and at exceedingly high prices. Under these conditions, it seems that an acute shortage is to be experienced, and that abnormally high prices will rule. **Acetanilid,** crystals and powder, 2s. 3d. to 2s. 6d. per lb.; there has been plenty of inquiry for the limited stocks available; prices show a further advance. **Acetyl-Salicylic Acid,** B.P., 3s. 6d. to 3s. 9d. per lb.; the few parcels offering on spot have been eagerly sought after, and sold at high prices; fresh imports are doubtful, and any arrivals must be at or above the rates quoted here. **Benzoic Acid,** about 3s. 3d. per lb, nominal; it is estimated that any imports could not be sold below this level. **Diethylbarbituric Acid,** B.P. (barbi-

tone), about 18s. to 19s. per lb.; dealers are quoting at about these levels, but there is no great demand. **Salicylic Acid,** B.P., 2s. 4d. to 2s. 6d. per lb.; there has been plenty of business here, and it may now be difficult to obtain spot supplies at the lower rate quoted. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; spot offers are still made by some dealers at these prices; demand slow. **Amidopyrin,** about 15s. per lb.; dealers' prices are at about this rate, with not much business on the market. **Ammonium Bromide,** B.P., 8d. to 8¼d. per lb.; this market continues to improve, and further advances in spot values are looked for. **Benzonaphthol,** about 5s. per lb.; this market remains dull, with quoted values unchanged. **Betanaphthol,** resublimed, 2s. per lb.; although there has been but little doing here, prices are firmer. **Benzaldehyde 03,** about 3s. per lb.; the spot quotation is unchanged, with the market dull. **Calcium Lactate,** 1s. 10d. to 2s. per lb.; spot offers are made at these prices, with the market hardening. **Chloral Hydrate,** duty paid, 4s. 3d. to 4s. 4d. per lb.; there seems to be very little available on spot, and prices are very firm, and may advance. **Creosote,** B.P., about 2s. 6d. per lb.; dealers continue to offer spot supplies at this unchanged rate; business quiet. **Creosote Carbonate,** nominal; this material is not quoted on spot; it appears that supplies are not available. **Guaiacol Carbonate,** about 13s. to 13s. 6d. per lb.; a further advance in spot prices is recorded, with the market active and holding very firm. **Hexamine,** 4s. 3d. per lb.; spot offers are firm at this advanced price, and there is a distinct tendency to further movement to higher rates. **Hydroquinone,** 4s. 6d. per lb.; there has been eager inquiry for any spot lots available at the old prices of about 3s. 6d. per lb., but offers at this level are now off the market, and the higher price is now general. **Methyl Salicylate,** about 2s. 10d. to 3s. per lb.; this market shows further arvances in spot prices, and it is doubtful if any supplies are still offering at the lower rate quoted. **Methyl Sulphonal,** about 25s. per lb.; last week the quoted rate was about 15s. 6d. per lb., but the few lots offering were quickly snapped up, and, owing to the big jumps in Continental offerings, fresh imports cannot be offered much below the figure quoted. **Paraformaldehyde,** about 3s. 9d. per lb.; spot holders continue to quote at about this figure, with not much inquiry on the market. **Paraldehyde,** about 1s. 6d. per lb.; the firmer tone in this market reported last week is fully maintained. **Phenacetin,** 6s. 9d. to 7s. 6d. per lb.; offers on spot are very irregular, and are varying to the extent given; a fair volume of inquiry has been dealt with; the tendency seems to be for a movement to the higher rate quoted. **Phenazone,** 8s. 6d. per lb.; there is very little offering on spot below this figure, and a further advance in spot values is not unlikely. **Phenolphthalein,** about 8s. per lb.; this is about the price that would be asked for any fresh imports; spot supplies are difficult to locate. **Potassium Bromide,** B.P., crystals and granulated, about 7½d. per lb.; a further improvement in the spot position is recorded, with a good volume of business on the market. **Potassium Permanganate,** B.P., 9½d. per lb.; this seems to be about the cheapest offer now being made on spot; supplies here seem limited. **Potassium Sulphoguaiacolate,** nominal; dealers are not quoting; fresh imports are doubtful for the time being. **Resorcin,** about 6s. per lb.; the spot market is firmer, with plenty of inquiry for stocks available. **Salol,** about 4s. per lb.; at the advanced rate quoted last week, this item stands firm on spot, and may go still dearer. **Sodium Benzoate,** 2s. 9d. per lb.; it is estimated that this would be about the price for fresh importations on the present Continental quotation. **Sodium Bromide,** B.P., crystals and granular, about 8d. per lb.; there is very little available on spot below this figure, and the tone of the market is healthy, and may advance further. **Sodium Diethylbarbiturate,** 18s. to 18s. 6d. per lb.; dealers are quoting at about these figures, with not much doing at present. **Sodium Salicylate,** B.P., crystals, fully 3s.; powder, fully 2s. 10d. per lb.; sales on spot have been brisk during the week, with the tone of the market good; Continental offerings are restricted and dear. **Sulphonal,** about 25s. per lb.; an advance of 10s. per lb. is recorded here, and the question of further supplies from the Continent is a doubtful matter. **Terpin Hydrate,** about 1s. 9d. per lb.; spot supplies continue to be offered by dealers at this unchanged level. **Thymol,** nominal; not being quoted, but prices would be a good deal dearer than the last quotation at about 15s. per lb.

Coal-tar Products, Intermediates, Etc.—Business remains on the slow and small side in these products, and prices, although showing no material change, are in many cases unsteady, and tend to decline. **Aniline Salt,** about 9½d. per lb., casks free; prices are firmer here, and British makers' prices are somewhat dearer. **Aniline Oil,** 9d. to 9½d. per lb., drums free; prices are fully maintained at these levels, and tend to advance. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; the market seems steady, but has again been quiet. **Benzol,** about 1s. 3½d. to 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; prices quoted are about the same, with business small. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; business is still lacking in volume; prices quoted are about the same. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; the demand from dealers remains small; their quotations are unchanged. **Naphtha,** about 1s. 2d. per gallon; this market at the recently reduced price remains dull, and is still rather unsteady. **Solvent Naphtha,** 90/160, about 1s. 3d. per gallon, drums extra; at the figure given the position is weak, and any business would be generally on a lower level. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; prices as quoted are weak, with the market dull. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; this market keeps steady, but has again been quiet. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; quoted prices are maintained on a steady market. **Creosote Oil,** about 9¼d. per gallon, f.o.b.; the position is fairly steady, but business is far from good. **Carbolic Acid,** crystals, about 1s. 1½d. per lb.; some limited business has been done, but there is a want of confidence in this article. **Naphthalene,** about £19. per ton; the lower prices quoted here have not brought any improvement in demand; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; tablets and candles, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; dealers continue to quote at this figure, with business quiet. **Pyridine,** fully 22s. per gallon; the spot position is exceedingly firm at this level, and tends to go still higher. **Hexamethylene,** 3s. 9d. per gallon; this is about the lowest price quoted by dealers for spot supplies. **Pure Methyl Alcohol,** about £90. per ton, in drums, ex wharf London; dealers are finding fair business, and their prices are being well maintained. **Pitch,** about 140s. per ton, f.o.b. East Coast; the position is quite satisfactory, with prices firm and tending to go higher; inquiry is good.

ITALIAN CHEMICAL MARKET.

Genoa, Oct. 31.

Quotations during October were as follows, prices being per 100kilos. at Milan, unless otherwise stated:— **Caustic Soda,** 70—72%, Italian, 180 lire; American, 76—78%, 200 lire; English, 185 lire; French, 175 lire. **Carbonate of Soda,** 98—100%, Italian, 85 lire (Genoa); English, 86 lire (Genoa); American, 86 lire (Genoa); demand is good. **Soda Crystals,** steady at 40 lire. **Alum,** crystals, fell from 87 to 85 lire; in smaller request. **Bicarbonate of Soda,** powder, kegs, fell from 180 to 175 lire (Genoa). **Bichromate of Soda,** 445 lire (Genoa). **Bichromate of Potash,** crystals, 590 lire. **Borax Crystals,** 99%, in kegs, fell from 400 to 380 lire. **Carbonate of Ammonia,** lump, 430 lire; powder, 370 lire; in fair request. **Carbonate of Magnesia,** pure, 430 lire; in steady demand. **Chlorate of Potash,** crystals, in strong demand at 310 lire. **Acetone,** pure, 98—99%, rose from 1,250 to 1,300 lire. **Glacial Acetic Acid,** 99%, in fair request at 1,200 lire. **Boric Acid,** crystals, in fair demand at 800 lire. **Lactic Acid,** 80%, in fair request at 300 lire. **Bisulphite of Soda,** crystals, 360 lire. **Formaldehyde,** 40%, rose from 725 to 750 lire; in better demand. **Phosphate of Soda,** steady at 160 lire. **Hyposulphite of Soda,** crystals, 130 lire. **Metabisulphite of Potash,** steady at 400 lire. **Nitrite of Soda,** 96—98%, rose from 295 to 300 lire. **Permanganate of Potash,** crystals, good demand at 800 lire. **Sulphate of Alumina,** crystals, 18%, rose from 100 to 110 lire; in good call. **Sulphate of Zinc,** in little request at 180 lire. **Citric Acid,** crystals, in fair demand at 1,900 lire. **Sulphate of Iron,** slow at 50 lire. **Hydrofluoric Acid,** 50%, in fair demand at 600 lire. **Oxalic Acid,** crystals, in very good demand, rose from 610 to 660 lire. **Tartaric Acid,** crystals, 1,350 lire. **Chloride of Ammonia,** lump, 98—100%, in little demand at 600 lire (Milan); powder, 95—96%, in good call, rose from 280 to 315 lire (Genoa). **Chloride of Calcium,** 75—80%, fell from 70 to 65 lire. **Bleaching Powder,** French, 110-115%, 90 lire; electrolytic, 100 lire. **Cream of Tartar,** 98—99%, powder, well treated at 930 lire. **Yellow Prussiate of Potash,** crystals, in fair call at 2,000 lire. **Yellow Prussiate of Soda,** crystals, at 1,400 lire. **Silicate of Soda,** crystals, 85 lire; in good call. **Silicate of Soda,** Italian, 38—45%, 65 lire; English, 140° Tw., 100 lire. **Sulphate of Soda,** crystals, 43 to 45 lire; very

good demand; powder, 65 lire. **Sulphate of Magnesia**, crystals, 48 lire; in little request. **Chloride of Magnesia**, solid, remained at 70 lire; in fair demand. **Hydrochloric Acid**, 20 –21° Bé., fell from 25 to 15 lire. **Sulphuric Acid**, 50° Bé., fell from 20 to 19 lire; 66° Bé., remained at 45 lire. **Nitric Acid**, 36° Bé., remained at 155 lire; 42° Bé., remained at 190 lire. **Benzaldehyde**, remained at 3,500 lire. **Tannic Acid**, 80%, remained at 2,000 lire. **Aluminium Acetate**, quiet at 162 lire. **Lead Acetate**, brown, 560 lire; white, 575 lire. **Betanaphthol**, in better demand at 2,800 lire. **Barium Peroxide**, remained at 1,000 lire. **Sodium Peroxide**, in fair request at 1,800 lire. **Red Prussiate of Potash**, not much doing at 3,150 lire. **Caustic Potash**, 88—92%, 380 lire. **Tartar Emetic**, powder, 1,200 lire. **Mineral Superphosphate** remained at 27 lire. **Bone Superphosphate**, in good demand at 52 lire. **Basic Slag**, 16—18%, in little call at 34 lire. **Nitrate of Soda**, 15—16%, in little call at 136 lire. **Nitrate of Ammonia**, in good demand, rose from 115 to 125 lire. **Nitrate of Lime**, 12—13%, in fair request at 110 lire. **Sulphate of Ammonia**, 20—21%, quotations fell from 170 to 165 lire through smaller demand. **Sulphate of Copper**, 98—99%, Italian, rose from 225 to 228 lire; foreign rose from 226 to 230 lire. **Chloride of Potash**, quiet at 75 lire. **Sulphate of Potash**, little business at 85 lire. **Calcium Cyanamide**, 15—16%, in little call at 98 lire. **Sulphur**, refined, in blocks, rose from 53 to 54 lire (Catania, Sicily), 70 lire (Milan). **Sulphur**, sublimed, rose from 70 to 71 lire (Catania, Sicily), 87 lire (Genoa). **Crude Tartar** fell from 280 to 273 lire.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £61. 5s. to £61. 7s. 6d., cash; £61. 15s. to £61. 17s. 6d., three months; electrolytic, £64. 10s. to £65. **Tin**: Standard, £216. to £216. 5s., cash; £215. 15s. to £216., three months; Straits, £216. 15s.; English, £216. 15s. **Lead**, soft foreign, £29. 15s., prompt; English, £32.; chemical sheet, 37s. 6d. per cwt. for 2-ton lots, delivered. **Spelter**, prompt, £32. 12s. 6d.; hard, £27. 10s. **Antimony**, English regulus, 99%, £35. 5s. to £35. 10s.; special brands, £41. 10s. to £42. **Aluminium**, 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel**, £130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 15s. to £10. **Bismuth**, 10s. **Platinum**, £26. 10s. per oz.; scrap, £24. 10s. **Wolfram**, spot, 12s. to 12s. 3d. per unit, c.i.f. U.K. or Continent. The demand for **Zinc Dust** has increased, and the higher grades are in short supply; there is no Australian offering, all supplies having been cleared; prices as a whole are unchanged, with a firm tendency: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand for heavy chemicals continues fairly steady both on home and export account, but business is only on the small side for spot and near requirements. Values all round still rule in buyers' favour, with one or two exceptions. Quotations for alkali products are fairly well maintained at recent rates, and there are no changes to record. **Bleaching Powder**, softwood casks, remains quiet at £11. 5s., on rails makers' works. **Glauber's Salts** are easy at 70s. per ton, carriage paid. **Chlorate of Potash**, lower at 2¾d. per lb.; **Soda** at 2¾d. **Bichromates** are unaltered. Roasted **Saltcake** weak at £4. 10s., carriage paid, but there is only small inquiry. Imported crude **Sulphur**, easier at £5. 5s. on rails. There is no improvement to report in **Copper Sulphate**, and quotations remain nominal at £25. to £25. 10s., f.o.b. **Phosphate of Soda** remains steady at £14. per ton. **Hyposulphite of Soda**, commercial, £9. 10s.; and concentrated **Sulphide**, £14. per ton, carriage paid. **Nitrite of Soda**, firm at £26. 10s., ex store. White powdered **Arsenic** is again higher on the week, and Cornish make firmly held at £68., carriage paid, with supplies scarce. Yellow **Prussiate of Potash**, lower at 10½d. per lb.; **Soda**, firmer at 5¾d. **Carbonate** and **Caustic Potash** are unchanged at recent rates. **Acetic Acid** and **Acetate of Soda** are moving off fairly well, but quotations are easy. **Acetone**, quiet at £124. Miscible **Wood Naphtha**, 6s. per gallon, carriage paid. **Lead Salts** continue firm: White **Acetate** £42., brown £45.; and **Lead Nitrate**, £43., carriage paid. **Litharge**, British, is dearer at £45. per ton. **Barium Chloride**, steady at £14. 10s. per ton. There is a fair inquiry for **Tin**, **Zinc**, and **Ammonia Salts**, and values are maintained. **Oxalic Acid**, quiet at 5¾d. per lb. Green **Copperas** is in fair request, but price unchanged. **Permanganate of Potash**, B.P. quality, 9½d. per lb., carriage paid.

SWANSEA MARKET REPORT. Wednesday.

There was fair activity in **Tinplates**, and business was done on the firm basis of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets** met with a steady demand on the basis of £19. 2s. 6d. per ton. **Copper** evinced a better tone at £60. 12s. 6d. per ton cash, and £61. 2s. 6d. three months. **Tin** quotations were irregular, and some buying took place at £208. 2s. 6d. per ton cash; three months, £207. 2s. 6d. **Lead**, firm at £29. 17s. 6d. per ton prompt, and £28. 7s. 6d. three months; English, £32. 10s. **Spelter**, very firm at £33. 2s. 6d. per ton prompt, and £32. 17s. 6d. forward. **Zinc Sheets** in fair demand at £39. 2s. 6d. per ton, f.o.r. at makers' works. **Sulphate of Copper**, slow at £25. 17s. 6d. per ton, in casks, less 5%, f.o.b. **Sulphate of Ammonia**, rather quiet at £14. 15s. per ton, delivered. **Nitrate of Soda** quiet, but steady at £13. 12s. 6d. per ton. **Bone Meal** rather slow, with Indian, prompt, £9. 2s. 6d. per ton. **Rape Oil** very quiet, with prompt refined at £2. 6s. 3d. per cwt. **Cod Oil** steady; Newfoundland, prompt, £2. 5s. 3d.; and English, £1. 15s. 6d. per cwt., net, in barrels. **Coconut Oil**, very steady, with Ceylon at £2. 4s. 3d. per cwt., ex ship. **Linseed Oil** quiet, but steady at £2. 5s. 3d. per cwt. for raw, and £2. 7s. 3d. boiled, net, in barrels. **Cottonseed Oil** in fair demand, with common edible at £2. 2s. 9d., and deodorised £2. 5s. 9d. per cwt., net. **Castor Oil** firm, with limited demand at £2. 18s. 6d., down to £2. 12s. 6d. per cwt., net, in barrels. **Palm Oil** in fair demand, with prices firm; Lagos, £36. 15s. 6d.; softs, £35. 17s. 6d.; mediums, £36. 7s. 6d.; and hards, £36. 12s. 6d. per ton. **Olive Oil** quiet at £65. 17s. 6d. per ton for Spanish, ex ship. **Turpentine** firm, with American, prompt, at £3. 14s. 3d. per cwt. **Oxalic Acid** quiet at 6¼d. per lb. put on rails. **Arsenic** very quiet, with white powdered at £60. 12s. 6d. per ton. **Copperas** in better call at £2. 2s. 6d. per ton, delivered London or equal. **Pitch** rather easier at £6. 17s. 6d. per ton, delivered docks. **Benzol** maintained good demand at 1s. 4½d. per gallon, f.o.r. **Creosote** in strong demand at 8¾d. per gallon. **Sulphuric Acid** in good demand at late quotations. **Coal** had a steadier tendency; best Admiralty smokeless £1. 7s. 6d., seconds £1. 6s.; ordinaries, £1. 5s. 6d.; Monmouthshire black vein, £1. 6s. 6d., all per ton, f.o.b. **Anthracite** in active demand, and well booked forward; best large £2. 6s., seconds £1. 15s.; Paris and French nuts, £2. 17s. 6d. per ton, f.o.b. **Cokes** very steady, with export £2. 2s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, in trucks at ovens. **Patent Fuel** prices firm from £1. 9s. to £1. 12s.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Inquiries for the heavier chemicals for use in the home trade continue to be made steadily and on a very fair scale. **Bleaching Powder** has moved steadily on home-trade account, and has been shipped more largely to overseas ports; it is £11. 5s. per ton for spot; for contracts special prices are quoted, according to requirements. **Chloride of Calcium** has again been quiet, and is £5. 12s 6d. per ton. **Caustic Soda** has been rather more in demand for home-trade uses, and has been shipped freely on export account; it is £19. 7s. 6d. per ton for spot of 76%, special terms being quoted for export lots, according to requirements. **Bicarbonate of Soda** has been in good request on U.A. account, and has had a fairly active shipment for foreign ports; it is £10. 10s. per ton, carriage paid, to users in the home trade. **Soda Crystals** continue to sell with some freedom for use in the United Kingdom; they are £5. 5s. per ton to home-trade buyers; business in the export branch has been quiet. **Nitrate of Soda** has had a moderate inquiry, and is £13. 5s. to £13. 10s. per ton. **Borax** has been in very fair request; commercial grades are—crystals £25. per ton, powdered £26.; higher grades—crystals £29. per ton, powdered £30. per ton, and superfine £31. per ton, in 2cwt. bags, carriage paid in the U.K. **Saltcake** has had a somewhat better inquiry; it is £4. 10s. to £5. per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has been in very fair demand, and is 4¾d. per lb., c.i.f. to stated ports. **Ammonia Alkali** has had a rather free sale on home-trade account, and has had a fairly brisk shipment; it is £7. 10s. per ton, f.o.r. at works, for spot; for contracts special prices

are being quoted, according to requirements; for export, £8. per ton is quoted as a normal price, varying according to destination. **Hyposulphite of Soda** continues in fair demand; it is £10. per ton in 2cwt. bags for commercial, and £15. to £15. 10s. per ton for photographic. **Sulphide of Soda** has been very quiet; it is £14. 10s. to £15. per ton for solid, and £8. 15s. to £9. per ton for crystals. **Chlorate of Soda** has been but little in request, and is 3d. per lb. **Phosphate of Soda** has been inactive, and is £15. to £15. 10s. per ton. **Prussiate of Soda** has had a limited inquiry, and is 6d. per lb. **Yellow Prussiate of Potash** has had a rather slow sale, and is 11½d. to 1/- per lb. **Red Prussiate** has been but little called for, and is 3s. per lb. **Carbonate of Potash** has sold more readily, and is £25. to £30. per ton. **Nitrate of Potash** has been steadily called for, and is £29. to £30. per ton. **Chlorate of Potash** has been more in request, and is 3½d. to 4d. per lb. **Caustic Potash** continues to meet with a very fair inquiry, and is £29. to £30. per ton. **Permanganate of Potash** has had a steady sale, and is 9d. to 9½d. per lb. **Bichromate of Potash** has sold rather more freely, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in quietly steady demand; first quality is £60., and second quality £57. per ton. **Sulphate of Ammonia** has had a moderate inquiry on home-trade account, but has had a heavy shipment to overseas ports; neutral of 25¾% is £14. 15s. per ton, and ordinary of 25¼% £13. 12s. per ton for November, for the home trade. **Carbonate of Ammonia** has had a fairly free sale, and is 4d. per lb. **Muriate of Ammonia** has been in slightly better request, and is £32. per ton. **Magnesia** has been steadily called for; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been rather more inquired for; prices are £11. per ton for use in the U.K., and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been in moderate demand, and is £8. to £11. per ton, according to quality. **Sulphur** has had a steady and very fair inquiry; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s. per ton, and American £5. 10s. per ton. **Tartaric Acid** continues quiet, and is 1s. 1d. to 1s. 1½d. per lb. **Cream of Tartar** has had a fairly free sale, and is £4. 10s. per cwt. **Boric Acid** has been steadily called for; commercial is £48. per ton, and powdered £51. per ton; B.P. grades are £54. to £60. per ton. **Citric Acid** has again moved but slowly, and the price has shown an easing tendency; it is 1s. 5½d. per lb. **Oxalic Acid** has been quiet, and is 6d. per lb. **White Acetate of Lead** has been in moderate demand; it is £42. to £42. 10s. per ton. **Sulphate of Copper** has had a limited inquiry for use in the U.K., and has been quiet in the export branch; it is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been more in demand; white powdered is £63. to £65. per ton; supplies of Cornish have become very light.

WEST OF SCOTLAND CHEMICALS. Wednesday.

The steady day-to-day demand for chemicals on home-trade account continues at previous levels, but export inquiry is still limited. The position is quiet, however, improvement depending upon a revival in the chemical-consuming industries. Prices are about the same, with some shading in certain lines. Sulphate of copper is inclined to be easier. Quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, unchanged at £67. per ton on spot; an improving market. **Barium Chloride,** £14. 10s. per ton; at this price the market remains steady. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, makers' prices; demand rather poor. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities competing strongly. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted at slightly below this figure. **Citric Acid,** 1s. 6d. per lb., less 5%; little business about at last week's quotation. **Copper Sulphate,** £26. 15s. per ton, less 5%, at Liverpool; a rather neglected market, with price reduced. **Cream of Tartar,** £4. 2s. 6d. per cwt. for 99% at Glasgow; quotation shaded, and inquiry small. **Lead Acetate,** white, £41. 10s. per ton on spot; brown, more inquiry at £44. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. 1d. per lb.; at this reduced price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £60. and £57. per ton respectively; crystals £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 11s. 6d. per cwt., net; a better market, with quotation unaltered. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate,** £9. 10s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid,** 1s. 1½d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending November 3.

AMMONIA (ANHYDROUS)—
Rouen, 54 cylds.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 34 cks.

BARYTES—
Antwerp, 20 bgs.
Hamburg, 24 cks.

BORATE OF LIME—
Los Angeles, 4,735 bgs.

CASEIN—
Rouen, 50 bgs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 314 pkgs.

GELATINE—
Hamburg, 9 cs.

GLUE—
Antwerp, 90 bls.

MANGANESE—
Hamburg, 9 cs.

OXIDE (*otherwise undescribed*)—
Malaga, 4 brls.

POTASSIUM SALTS (*otherwise undescribed*)—
Antwerp, 800 bgs.

RED LEAD—
Genoa, 48 cks.

SALT—
Hamburg, 3,390 bgs., 100 t.

SOAP—
Norfolk (Va.), 975 brls.

SODIUM ACETATE—
Rouen, 50 bgs.

TALLOW—
Wellington, 63 cks.

TANNING MATERIALS—
Chestnut Extract
Leghorn, 100 brls.

TURPENTINE—
Gothenburg, 2 cs.

WHITE LEAD—
Antwerp, 11 brls.
Hamburg, 38 cks.

GOOLE.

Week ending November 3.

DEXTRINE—
Amsterdam, 150 bgs.

GLUE AND SIZE—
Antwerp, 40 bgs.
Boulogne, 5 cks.

LITHOPONE—
Antwerp, 8 cks.
Rotterdam, 20 cks.

RED LEAD—
Copenhagen, 1 ck.

SULPHUR—
Antwerp, 33 cs.

WHITE LEAD—
Antwerp, 12 brls., 87 pkgs.

GRANGEMOUTH.

Week ending November 3.

ALUMINIUM SULPHATE—
Rotterdam, 585 bgs.

BONE PHOSPHATE—
Rotterdam, 704 bgs.

CALCIUM CARBIDE—
Christiania and Drammen, 1,700 drms.

CREAM OF TARTAR—
Rotterdam, 30 cks.

GLYCERINE—
Rotterdam, 7 pkgs.

GUANO—
Faroe Islands, 629 bgs.

LITHOPONE—
Rotterdam, 40 cks.

MANGANESE DIOXIDE—
Rotterdam, 10 cks.

TALLOW—
Christiania & Drammen, 60 brls.

ZINC OXIDE—
Rotterdam, 50 cks.

GRIMSBY.

Week ending November 3.

ACETIC ACID—
Rotterdam, 5 cks.

CALCIUM CARBIDE—
Rotterdam, 1,400 drms.

IRON OXIDE—
Antwerp, 1 ck.

KAINIT—
Antwerp, 101 t.

PHOSPHATE OF LIME—
Antwerp, 2,000 bgs.

HULL.

Week ending November 3.

BORIC ACID—
Dunkirk, 25 t. 1 c.

CALCIUM CARBIDE—
Amsterdam, 65 t.
Christiania, 90 t.
Rotterdam, 10 t.
Trondhjem, 25 t.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 2 t. 10 c.; Christiania, 11 c.; Copenhagen, 25 galls.; Gothenburg, 1 t.; Ghent, 5 t. 8 c.; Hamburg, 10 c.; Malaga, 3 t. 15 c.

CRYOLITE—
Copenhagen, 20 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Amsterdam, 240 lb.
Rotterdam, 3,041 lb.

DYESTUFFS (NATURAL)—
Logwood
New York, 22 t. 13 c.

FERRO CHROME—
Trondhjem, 6 t.

FERRO SILICON—
Bremen, 43 t.; Christiania, 9 t.; Gothenburg, 10 t.

FERTILISERS (*otherwise undes.*)—
Christiania, 10 t. 12 c.

KAINIT—
Antwerp, 160 t.

POTASSIUM CARBONATE—
Bremen, 10 t.

ROSIN—
Christiania, 2 c.
Gothenburg, 4 t. 6 c.

STEARINE—
Antwerp, 4 c.

TALLOW—
Copenhagen, 19 t.
Christiania, 5 t.

TANNING MATERIALS—
Myrabolans
Bombay, 300 t.
Unspecified
Rotterdam, 9 t. 5 c.

TAR (WOOD)—
Helsingfors, 3 t. 11 c.
Kotka, 1 t. 16 c.

TURPENTINE—
Bordeaux, 8 t. 6 c.

LEITH.

Week ending November 3.

ACETIC ACID—
Amsterdam, 17 drms.
Rotterdam, 5 cks.

AMMONIUM SULPHATE—
Dunkirk, 45 cks.

CALCIUM CARBIDE—
Rotterdam, 714 drms.

CASEIN—
Dunkirk, 60 bgs.

CREAM OF TARTAR—
Amsterdam, 18 cks.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 4 brls.
Unspecified
Rotterdam, 4 brls.

GLUE—
Antwerp, 2 bgs.
Dunkirk, 20 bgs.

LITHARGE—
Amsterdam, 54 cks.

LITHOPONE—
Amsterdam, 60 cks.
Rotterdam, 40 cks.

FERTILISER (POTASH)—
Antwerp, 200 t., 1,000 bgs.

SOAP—
Copenhagen, 3 cs.
Dunkirk, 51 cks.

SODA CRYSTALS—
Antwerp, 100 bgs.

SODIUM NITRATE—
Mejillones, 16,983 bgs.

TAR (*otherwise undescribed*)—
Danzig, 50 brls.

ULTRAMARINE—
Dunkirk, 10 cks.

WHITE LEAD—
Dunkirk, 34 brls.

ZINC OXIDE—
Antwerp, 40 brls.
Rotterdam, 5 cks.

LIVERPOOL.

Week ending November 3.

ALBUMEN—
China, 146 cs.

ALUMINIUM SULPHATE—
U.S.A., 50 sks.

ANTIMONY—
Japan, £15.

ARSENIC—
Australia, 14 cks.
Portugal, 44 cks.

BARIUM CHLORIDE—
Belgium, 100 drms.

BEESWAX—
Egypt, 67 bgs.

BONE BLACK—
U.S.A., 100 bgs.

BONE PHOSPHATE—
Belgium, 500 bgs.

BORAX—
U.S.A., 1,500 bgs.

CALCIUM CARBIDE—
Norway, 2,100 drms.
Yugo-Slavia, 420 drms.

CARBON BISULPHIDE—
Germany, 83 drms., 42 kgs.

CARBON BLACK—
U.S.A., 300 cs.

CARNAUBA WAX—
Brazil, 172 bgs.

CAUSTIC POTASH—
Germany, 22 drms.

COAL TAR PRODUCTS—
Unspecified
Italy, 4 cks.

DYESTUFFS (NATURAL)—
Cutch
Straits, 300 bxs., 100 cs.
Logwood
U.S.A., 37 cks.

FERRO SILICON—
Egypt, 5 t.
Norway, 49 t., 168 brls.

KIESELGUHR—
U.S.A., 684 bgs.

LEAD ACETATE—
Germany, 34 cks.

LITHOPONE—
Holland, 140 cks.

MAGNESIA (CALCINED)—
Holland, 100 bgs.

MAGNESITE—
Germany, 73 t.

MANGANESE—
Greece, 400 t.; India, 2,166 t.; Japan, 10 t. 7 c.

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 4 cks.

NAPHTHA (WOOD)—
Germany, 12 drms.

OCHRE—
Belgium, 22 cks.; India, 100 cks.; U.S.A., 100 bgs.

PARAFFIN SCALE—
U.S.A., 1,384 brls.

PITCH (*otherwise undescribed*)—
U.S.A., 600 brls.

POTASSIUM CARBONATE—
Germany, 18 brls.

POTASSIUM CHLORATE—
Sweden, 10 t.

RED LEAD—
Germany, 13 cks.
Italy, 33 cks.

ROSIN—
U.S.A., 8,370 brls., 200 cks.

SALAMMONIAC—
Germany, 13 cks.

SALT—
Germany, 15 t.

SALTPETRE—
Holland, 10 kgs., 20 kcs.

TALLOW—
Argentine, 273 cks.
N.Z., 40 cks.

TANNING MATERIALS—
Chestnut
Italy, 159 cks.
Gambier
China, 255 cs.; F. M. S., 170 cs.; Straits, 425 cs.
Myrabolans
India, 1,700 bgs., 6,732 pkts.
Quebracho
Argentine, 1,456 bgs.
Wattle
South Africa, 1,094 bgs.

TAR (WOOD)—
Sweden, 50 brls.

TAR (*otherwise undescribed*)—
Archangel, 100 brls.

TURPENTINE—
Sweden, 15 drms.
U.S.A., 250 brls., 150 cks.

ULTRAMARINE—
Belgium, 10 cks.

WHITE LEAD—
Belgium, 20 kgs.; Germany, 33 cks.; Holland, 9 brls., 5 drms.

ZINC ASHES—
India, 6 t. 10 c.

ZINC DUST—
U.S.A., 40 t.

ZINC OXIDE—
Holland, 10 cks.
U.S.A., 250 brls.

LONDON.

OFFICIAL AMENDMENTS.

In return for week ending September 8, 1923—

DYESTUFFS (NATURAL)—
Annatto
U.S.A., 10 pkgs. Leach

should read—

DYESTUFFS (NATURAL)—
Annatto
B.W.I., 10 pkgs. Leach

In return for week ending September 15, 1923—

GLUE—
France, £1,120. Van Oppen

should read—

GLUE—
France, £475. Van Oppen

GELATINE—
France, £1,069. Van Oppen

In return for week ending September 22, 1923—

AMMONIA (ANHYDROUS)—
U.S.A., £1,699. Morris

should read—

AMMONIA (ANHYDROUS)—
U.S.A., £955. Morris

In return for week ending October 20—

DYESTUFFS (ARTIFICIAL)
Unspecified
Italy, £124. Roberts Brining

should read—

Italy. £85. Roberts, Brinning

Week ending November 3.

ACETIC ACID—
Belgium, 26 pkgs. Reitmayer, Calburn & Kindersley
France, 26

ACETONE—
Italy, 9 t. 1 c. A. A. Brett
Jugo-Slavia, 14 R. Moore
,, 34 17
Poland, 5 Chance & Hunt

ACIDS (*otherwise undescribed*)—
Czecho-Slovakia, 23 drms.

ALBUMEN—
Argentine Republic, £95. Swift
,, £200. Felton & Crepin
China, £847. W. M. Smith
,, £5,174.
Belgium, £350. Baxter, Hoare

ALUMINIUM SULPHATE—
France, 400 pkgs. R. Moore
,, 500 pkgs. Greeff
Germany, 3,916 Ohlenschlager

ARGOLS—
France, 1,395 pkgs.
Italy, 262

ARSENIC—
N.S.W., 3 t. T. Cartmel

BARIUM SULPHATE (BLANC FIXE)—
Germany, 26 cks. J. Bailey

BARYTES—
Germany, 190 cks. Pallister, Luck
,, 62 W. Harrison
,, 99 Taylor & Cox
Belgium, 483 bgs. Felton & Crepin

BEESWAX—
Egypt, 34 pkgs.
French W. Africa, 3 bgs. T. W. Bowyer

BUTYL ALCOHOL—*
——— £1,391.

CALCIUM CARBIDE—
Norway, 85 t.
S. C. S. State, 160 t. J. & R. Grant

CARBON BLACK—
U.S.A., 250 cs. Beck & Pollitzer
,, 355 Anchor Chem.
,, 41 H. W. Peabody

CASEIN—
Argentine Rep., £2,618.
France, £450.
,, £95. W. Hamsher
,, £142. J. Nathan
,, £2,300. Guesdon
Germany, £29. A. Wander
N.Z., £178. J. Nathan

CAUSTIC POTASH—
Sweden, 20 pkgs. J. B. Ballantyne
,, 20 F. W. Berk

CHEMICALS (*otherwise undescribed*)
France, £27. Skilbeck
,, £58. Weigel Leygonie
,, £482. Burton Baker
Germany, £21. E. Friedlander
,, £61.
,, £45. W. Cannell
U.S.A., £62. Martins
,, £20. H. C. Hackney

* Entered under the Safeguarding of Industries Act.

CHEMICALS (*otherwise undescribed*)
Holland, £400. W. H. Muller
,, £11. J. B. Ballantyne
,, £17. Harrison, Clark
,, £65. Union Oil and Cake

CHEMICALS (*otherwise undes.*)—*
——— £1,014.

DEXTRINE—
Germany, 9 t. 5 c.
Holland, 12

DYESTUFFS (ARTIFICIAL)
Alizarine
Germany, 4 pkgs.
Switzerland. 6
Unspecified
Brit. India, £135.
,, £55. Morgan & Young
Germany, £791.
,, 5 kgs. Stott & Hotopf
Switzerland, 2 kgs.

DYESTUFFS (NATURAL)—
Annatto
Denmark, 1 ck. Ray
,, 3 pkgs.
Cutch
Burmah, 300 pkgs. Leach
Logwood
B.W.I., 5 pkgs.
,, 618 pkgs. Perkins & Homer
Madder
Holland, 2 pkgs. Skilbeck

FERTILISERS (*otherwise undes.*)—
Sweden, 25 t. Hollingshurst

FULLER'S EARTH—
Holland, 2 t.
U.S.A., 69 t. Jurgens

GELATINE—
Belgium, £1,605. Duche
France, £250. Symons
Germany, £64. Crowe
,, £73. Williams & Geils
,, £12. W. A. J. Tilleray
,, £22.
Switzerl'd, £308. Europ. & Gen. Exp.

GLUE—
Belgium, £25.
,, £316. O. Murray
France, £693. Symons
,, £255. A. J. Malicet
,, £65. Dashwood & Partners
,, £41. Stancourt & Muir
,, £13. Crowe
,, £65. A. J. Malicet
Holland, £324. P. Ingenlath
Italy, £18. O. Murray
Java, £154.
S.C.S. State £224. Stancourt & Muir

GLYCERINE—
Holland, £109.

HEXAMINE—*
——— £254.

IRON OXIDE—
Spain, 20 brls. E. Declaine
,, 46 W. J. Fenner & H. B. Alder
,, 40 Lavington
,, 300 bgs. Taylor & Cox

ISINGLASS—
Belgium, 1 cs.
Japan, 29 bls. R. Warner
Venezuela, 55 bls.

KIESELGUHR—
Sweden, 1 t. 18 c.
Algeria, 20 Taylor, Miller

LITHIUM CARBONATE—*
——— £185.

LITHOPONE—
Belgium, 41 cks. Taylor & Cox
Germany, 40 Bush, Beach, & Gent.
Holland, 200 F. T. H. Nye

MAGNESITE—
Brit. India, £11. Paul & Preston
Holland, £185. Ray
,, £30.

METHYL ETHYL KETONE—
Germany, £536. Chance & Hunt

MINERAL COLOURS (*otherwise undescribed*)—
France, 1 cs.,
,, 1 pkg.
Italy, 24 brls. Pilchers
U.S.A., 20 cks. Leech Neal

OCHRE—
France, 66 cks. W. Harrison
U.S.A., 28 brls. J. Johnson

PARAFFIN WAX—
Burmah, 50 t. Asiatic Petr.
Poland, 4 19 c. A. Garnham
,, 55
U.S.A., 127 Anglo-Amer. Oil

PLUMBAGO—
Ceylon, 42 brls. E. S. Smith
Italy, 51 cks. W. Wallace
Japan, 1,500
M'd'gascar, 11,758 bgs. Morgan Crucible

POTASSIUM BROMIDE—*
——— £142.

POTASSIUM CHLORATE—
Germany, 100 pkgs.

POTASSIUM NITRATE—
Belgium, { 20 bgs. Com.
{ 60 cks. Com. Du Nord

PRUSSIAN BLUE—
Holland, 2 cks.
Saar, 7 H. Keller
,, 10 Stephens

RED LEAD—
Belgium, 21 cks. T. & W. Farmiloe
,, 8

ROSIN—
France, 50 cks. Rosin & Turps. Imp.
,, 118 Langley Smith
Norway, 27 J. Spurling
Portugal, 109 W. R. Green
,, 36
U.S.A., 600 brls. Rosin & Turp. Imp.
,, 300 Fairclough, Dodd & Jones
,, 500 Langley Smith
,, 500 H. Hill
,, 800

SALAMMONIAC—
Germany, 8 pkgs. A. Connell
,, 13 C. H. Haigh

SALTS (*otherwise undescribed*)—
Germany, 28 t. Gas Light & Coke

SALTPETRE—
France, £2,500. Nobel Industries
Germany, £134. Burton Baker

SHELLAC—
Brit. India, 9 t. 1 c. Litchfield & Saundy
,, 2 8 J. W. Cook

SOAP—
Austria, £122. N. Austreng
Canada, £4,410. Gerhard & Hey
Denmark, £198.
,, £72. H. Honeychurch
Egypt, £4. E. A. Kimpton
France, £136. F. Cook
,, £28. Gourmet
,, £17. Stockwell
,, £11. Hernu Peru
,, £8. Symons
,, £33.
,, £52. C. E. Wood
,, £35. E. A. Kimpton
,, £8. Mory
,, £37. Weigel, Leygonie
Holland, £60.
Germany, £41.
,, £26. C. W. Hartrodt
,, £11. Europ. & Gen Exp.
Victoria, £1,800. L. F. Smith

SOAP—
Italy, £300. Wilders & Walker
,, £55. W. Jones, Dooly
U.S.A., £5.
,, £871. Knight & Morris
,, £2,355. Gerhard & Hey
,, £23. Armour

SODA CRYSTALS—
Belgium, 5 t. P. Winn

SODIUM NITRATE—
Chile, 500 t. Mitrovich

SODIUM PHOSPHATE—
Belgium, 5 t.

SODIUM SALTS (*otherwise undes.*)
Germany, 10 t. 3 c. Scheuer

STEARINE—
Belgium, 7 bgs. J. B. Ballantyne
N.S.W., 160 cks. Anning & Cobb

SULPHUR—
Italy, £36. Poth Hille

TALLOW—
Argentine Republic, 49 t. 7 c. Harris
,, 30 H. C. Everett
,, 10 A. Garnham
,, 30 brls. A. W. Page
Brazil, 27 10 A. C. E. Garnham
N.S.W., 8
N.Z., 40 1 Weber, Smith & Hoare
,, 151 3
,, 5 H. Hill

TANNING MATERIALS—
Gambier
Brit. India, 170 pkgs. Wills
Myrabolans
Brit. India, 393 pkgs. J. W. Cook
Sumac
Italy, 1,100 pkgs. Fisher King
,, 50 R. & J. Park
Valonia
A. Turkey, 10 t. Perkins & Homer
,, 10
Belgium, 2 J. & H. Whittall
France, 3
Unspecified
Germany, 70 pkgs.

TAR (*otherwise undescribed*)—
France, 55 cks. J. Calder
Holland, 56 brls. H. Knight
Poland, 300

TARTARIC ACID—
Germany, 20 pkgs. Monk & Mills

TURPENTINE—
U.S.A., 500 brls. Goodlake & Nutter
,, 3,300
,, 6,125 Faircolugh, Dodd & Jones
,, 100 Langley Smith

ULTRAMARINE—
Germany, 7 cks.

WAX (*otherwise undescribed*)—
France, £23. Van Oppen
Germany, £34. L. S. Meyer
,, £29. M. Emanuel

WHITE LEAD—
Belgium, 53 cks. F. & W. Farmiloe
,, 8 brls. Dexters
Holland, 27 Chance & Hunt
U.S.A., 110 Greeff

ZINC OXIDE—
Belgium, 100 brls. M. Ashby
,, 34 cks.
Holland, 50 F. T. H. Nye
U.S.A., 250 brls. M. Ashby

MANCHESTER.

Week ending November 3.

ACETIC ACID—
Hamburg, 80 crbys.; Montreal, 608 brls.; New York, 614 brls.; Rotterdam, 78 cks.

ALBUMEN—
Antwerp, 29 cs.

ANTIMONY SALT—
Hamburg, 13 cs.

BARIUM CHLORIDE—
Hamburg, 28 cks.

CALCIUM CARBIDE—
Rotterdam, 600 drms.

CARBORUNDUM—
Montreal, 385 bgs.

CAUSTIC POTASH—
Hamburg, 279 drms.

COAL TAR PRODUCTS—
Thiocarbanilid
New York, 8 brls.

CREAM OF TARTAR
Amsterdam, 4 cks.
Hamburg, 1 cks.

DEXTRINE—
Amsterdam, 50 bgs.
Norfolk, 1,760 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 10 brls., 584 cks.
Unspecified
Antwerp, 2 cks.
Dunkirk, 9 bls.
New York, 10 kgs.
Rotterdam, 12 brls., 763 cks.

DYESTUFFS (NATURAL)—
Indigo
Rotterdam, 59 cks.
Logwood
New York, 23 cks.

FERRO SILICON—
Gothenburg, 44 brls.

FORMALDEHYDE—
Philadelphia, 260 brls.

FORMIC ACID—
Hamburg, 352 crbys.

GLUCOSE—
New York, 20 brls.

HYPOPHOSPHITES (*otherwise undescribed*)—
New York, 84 cs.

LACTIC ACID—
Rotterdam, 25 cks.

LEAD ACETATE—
Hamburg, 27 brls.

LITHOPONE—
Amsterdam, 29 cps.
Rotterdam, 300 cks.

MAGNESIUM CHLORIDE—
Hamburg, 498 cks.

MAGNESIUM SULPHATE—
Rotterdam, 1,000 bgs.

OXALIC ACID—
Rotterdam, 6 cks.

PARAFFIN WAX—
Baltimore, 214 bgs.
Philadelphia, 330 brls.

PHOSPHORUS—
Montreal, 188 drms.

POTASSIUM PERMANGANATE—
Hamburg, 100 drms.

ROSIN—
Rotterdam, 10 cks.

SALT—
Amsterdam, 350 cs.
Hamburg, 200 bgs.

SALTPETRE—
Amsterdam, 100 bgs.
Rotterdam, 10 kgs.

SILICO MANGANESE—
Gothenburg, 4 brls.

SODIUM CYANIDE—
New York, 32 drms.

SODIUM NITRITE—
Rotterdam, 29 cks.

SODIUM PHOSPHATE
Hamburg, 82 cks.

STEARINE—
Antwerp, 13 bgs.

SULPHUR—
New Orleans, 1,800 t.

TANNIN—
Hamburg, 5 cs.

TARTARIC ACID—
Amsterdam, 50 kgs.

* Entered under the Safeguarding of Industries Act.

WAX (*otherwise undescribed*)—
Philadelphia, 1,298 brls.

WHITE LEAD
Antwerp, 20 drms., 10 cks.

ZINC DUST—
Antwerp, 29 cks.

NEWCASTLE-ON-TYNE

Week ending November 3.

CALCIUM CARBIDE—
Christiania, 205 drms.
Rotterdam, 301 drms.

GLUE—
Antwerp, 2 bls.

SOAP—
Antwerp, 40 cs.

SODA CRYSTALS—
Bergen, 5 kgs.

STEARINE—
Antwerp, 7 bgs.

SULPHUR—
Bremen, 2,100 t.

TAR (WOOD)—
Gothenburg, 50 bls.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending November 3.

CHEMICALS (*otherwise undescribed*)
Adelaide, 35 pkgs.; Barcelona, 30 pkgs.; Fremantle, 91 pkgs.; Genoa, 40 pkgs.; Hamburg, 25 pkgs.; Malta, 2 pkgs.; Marseilles, 16 cks.; Montreal, 12 pkgs.; New York, 113 pkgs.; Pt. Adelaide, 35 pkgs.; Rangoon, 15 pkgs.

COAL TAR PRODUCTS—
Creosote
Boston, 8,040 galls.
Tar
Rangoon, 14 t. 16 c.

DYESTUFFS (NATURAL)—
Unspecified
Boston, 12 t. 8 c.

GLUE—
Montreal, 1 c. 2 qrs.

IODINE—
Montreal, 10 c.

PARAFFIN WAX—
Barcelona, 1 t.; Bilbao, 2 t.; Varna, 5 t.

SOAP—
Montreal, 2 c.
Rangoon, 1 t.

SODIUM BICHROMATE—
Montreal, 3 t. 2 c.

SPERMACETTI WAX—
Hamburg, 19 c.

ZINC ASHES—
Antwerp, 31 t. 8 c.

GRANGEMOUTH.

Week ending November 3.

CHEMICALS (*otherwise undescribed*)
Rouen, 25 cs., 3 cks.

COAL TAR PRODUCTS—
Creosote
Galveston, 2,168 t. 6 c.
Naphtha
Rouen, 47 drms.

MAGNESIA—
Rotterdam, 2 cks.

PARAFFIN WAX—
Rouen, 160 bgs.

POTASSIUM BICHROMATE—
Rouen, 5 cks.

SODIUM BICHROMATE—
Rouen, 31 cks.

HULL.

Week ending October 30.

AMMONIUM SULPHATE—
Rotterdam, 1,000 bgs.

BLEACHING POWDER—
Amsterdam, 65 drms.

CHEMICALS (*otherwise undescribed*)
Aalesund, 15 pkgs.; Adelaide, 12 drms.; Amsterdam, 1 cs.; Antwerp, 8 drms.; Brisbane, 1 cs.; Christiania, 5 cs., 22 pkgs., 75 drms.; Copenhagen, 1 cs., 5 pkgs., 11 cks., 22 drms.; Danzig, 33 cks.; Dunkirk, 2 bxs., 23 cks.; Gothenburg, 2 cs., 2 cks.; Helsingfors, 22 drms.; Hamburg, 21 cks., 75 drms.; Launceston, 2 cs.; Mantyluoto, 76 cks., 50 drms.; Melbourne, 1 cs., 45 kgs., 7 cks., 100 drms.; Newcastle (N.S.W.), 2 drms.; Rouen, 20 bgs., 4 cks., 40 cs.; Rotterdam, 100 cs.; Sydney, 34 brls.; Stavanger, 10 brls., 2 cks.

CHEMICALS (*otherwise undescribed*)
Stockholm, 3 cs., 4 cks., 50 drms.; Trondhjem, 5 kgs.; Wasa, 120 drms.

COAL TAR PRODUCTS—
Pitch
Alexandria, 1 cs.; Amsterdam, 1 cs.; Rouen, 27 cs.
Tar
Rouen, 19 cks., 1 kg.
Stockholm, 2 cs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Sydney, 2 cs.

FERRO ALUMINA—
Christiania, 80 bgs.

GLUE—
Copenhagen, 2 bgs.; Melbourne, 5 cks.; Rouen, 5 cks.

LEAD ASHES—
Antwerp, 25 bgs.

SALT—
Alexandria, 100 cs.; Copenhagen, 36 cs.; Stockholm, 20 cs.

SOAP—
Alexandria, 20 drms.; Christiania 43 cs.; Copenhagen, 1 cs., 3 cks.; Rotterdam, 100 cs.

STEARINE—
Dunkirk, 40 brls.; Wasa, 28 brls.

TALLOW—
Hamburg, 37 cks.

TANNING MATERIALS—
Unspecified
Melbourne, 15 cks.

TURPENTINE—
Alexandria, 40 drms.

LEITH.

Week ending November 3.

AMMONIUM CHLORIDE—
Dunkirk, 28 cks.

BORIC ACID—
Rotterdam, 30 bgs.

COAL TAR PRODUCTS—
Creosote
Rotterdam, 10 drms.

DISINFECTANTS (*otherwise undes.*)
Bordeaux, 6 cks.
Rouen, 25 cks.

GLUE—
Gothenburg, 10 cs.

IODINE—
Dunkirk, 2 cks.

LEAD ASHES—
Antwerp, 23 cks.

PARAFFIN WAX—
Amsterdam, 82 bgs.
Hamburg, 144 bgs.

POTASSIUM BICHROMATE—
Hamburg, 42 cks.

RED LEAD—
Amsterdam, 50 cks.

ROSIN—
Antwerp, 4 brls.

SHEEP DIP—
Amsterdam, 4 drms.

SODIUM BICHROMATE—
Hamburg, 48 cks.

SPENT OXIDE—
Hamburg, 103 t. 13 c.

TURPENTINE—
Amsterdam, 50 drms.

WHITE LEAD—
Amsterdam, 10 kgs.

ZINC ASHES—
Antwerp, 23 cks.

LIVERPOOL.

Week ending November 1.

ACETIC ACID—
St. John's, N.F., 9 c., £26.

ALUM—
Braila, 2 t. 2 c., £37.; Libau, 18 c., £17.; Norrkoping, 20 t. 2 c., £360.

ALUMINIUM SULPHATE—
Buenos Aires, 1 t. 4 c., £11.; Calcutta, 120 t., £1,034.; Wiborg, 50 t., £500.

AMMONIUM ACETATE—
Wellington, 4 c. 2 qrs., £11.

AMMONIUM CARBONATE—
Alexandria, 15 c., £22.; Bilbao, 2 t. 8 c., £61.; Barcelona, 1 t. 18 c., £63.; Cartagena (Spain), 1 t. 19 c., £56.; Copenhagen, 10 c., £27.; Calcutta, 10 c., £17.; Genoa, 1 t. 19 c., £50.; Gothenburg, 1 t. 10 c., £39.; Havre, 1 t., £30.; Havana, 5 t. 12 c., £161.; Madras, 5 c., £32.; Malaga, 10 c., £14.; New York, 5 t., £135.; Odense, 10 c., £15.; Piraeus, 19 c., £26.; Singapore, 5 c., £14.; Shanghai, 2 t. 10 c., £67.; Vejle, 2 t., £54.

AMMONIUM CHLORIDE—
Galatz, 1 t., £31.; Melbourne, 3 t. 9 c., £108.; Newcastle, 10 t., £398.; Patras, 1 t., £31.; Rouen, 20 t. 5 c., £617.; Varna, 2 t., £83.; Volo, 1 t., £36.

AMMONIUM PERCHLORATE—
Trinidad, 5 c., £10.

AMMONIUM SULPHATE—
Dunkirk, 86 t. 14 c., £1,215.; La Pallice, 16 t. 11 c., £232.; Las Palmas, 31 t., £450.; Malaga, 158 t. 3 c., £2,162.; Naples, 30 t. 10 c., £444.; Nantes, 16 t. 1 c., £232.

AMMONIUM SULPHOCYANIDE—
Havre, 10 c., £57.

ANTIFOULING PAINT—
Buenos Aires, 2 t. 18 c., £254.; Bombay, 1 t., £50.; Halifax, 5 t., £549.; Pt. Said, 1 t. 3 c., £84.

ANTIMONY OXIDE—
Oporto, 10 c., £20.

BARIUM CHLORIDE—
East London, 1 t., £16.

BARIUM SULPHATE—
Montreal, 5 t., £42.

BLEACHING POWDER—
Bombay, 51 t. 10 c., £648.; Calcutta, 57 t. 12 c., £692.; Christiania, 20 t. 7 c., £180.; Drammen, 40 t. 1 c., £354.; Havana, 1 t. 19 c., £20.; Monte Video, 5 t. 12 c., £69.; Montreal, 11 t. 1 c., £100.; Singapore, 1 t. 12 c., £45.; Shanghai, 16 t. 2 c., £236.; Valparaiso, 40 t., £490.

BORAX—
Algoa Bay, 10 c., £14.; Alexandretta, 1 t., £26.; Barcelona, 2 t. 19 c., £75.; Cardenas, 1 t., £26.; Cartagena, Col., 4 c., £21.; Kilindini, 1 c., £4.; Madras, 2 t. 10 c., £66.; Piraeus, 6 c., £6.; Shanghai, 17 c., £32.; Sydney, 5 t. 3 c., £130.

BORIC ACID—
Bahia, 1 c., £6.; Barcelona, 1 t., £50.; Cape Town, 1 c., £4.; Calcutta, 1 t., £51.; Kilindini, 1 c. 2 qrs., £9.

CALCIUM CARBIDE—
Punta Arenas, 1 t., £16.

CALCIUM CHLORIDE—
Auckland, 5 t. 2 c., £30.; Brisbane, 9 t. 19 c., £57.; Melbourne, 5 t. 2 c., £29.; Madras, 5 t. 2 c., £24.; Sydney, 30 t. 6 c., £174.; Wellington, 2 t., £15.

CHEMICALS (*otherwise undescribed*)
Auckland, 10 c., £16.; Bilbao, 19 c., £28.; Brisbane, 1 t., £26.; Calcutta, 5 t., £146.; Dunedin, 8 c., £57.; Havre, 11 c., £14.; Kingston, 2 t., £70.; Kobe, 1 t. 2 c., £60.; Melbourne, 2 t., £53.; Montreal, 35 t., £137.; Seville, 4 c., £15.; Stockholm, 1 t. 6 c., £38.; Sydney, 2 t., £53.; Tampico, 1 t., £25.; Vera Cruz, 1 t., £50.

CHLORSULPHONIC ACID—
Switzerland, 4 t. 19 c., £140.

CITRIC ACID—
Auckland, 8 c., £57.; Buenos Aires, 4 t. 18 c., £655.; Bahia, 1 c., £11.; Barcelona, 1 t. 19 c., £314.; Havana, 6 c., £42.; Valparaiso, 2 t. 19 c., £419.

COAL TAR PRODUCTS—
Carbolic Acid
Algoa Bay, 4 c., £16.; Bombay, 2 c., £22.; Calcutta, 2 c., £16.; Dunedin, 9 c., £20.; Genoa, 16 c., £101.; Hamburg, 9 t. 16 c., £1,220.; Kobe, 20 t., £2,529.
Creosote
Hamburg, 9 t. 13 c., £540.; New York, 4 t. 3 c., £169.; Sydney, 5 c., £11.
Dinitrochlorbenzol
Hamburg, 20 t., £1,568.
Orthocresol
Havre, 1 c. 1 qr., £15.
Pitch
Sekondi, 1 t. 10 c., £25.
Pyridine
Hamburg, 1 t. 10 c., £200.
New York, 1 t. 2 c., £125.
Tar
Accra, 16 c., £10.
Lagos, 2 t. 13 c., £29.
Unspecified
Lisbon, 2 t. 19 c., £179.

COBALT OXIDE—
Kobe, 1 t. 11 c., £1,595.

COBALT SULPHATE—
Helsingfors, 8 c., £175.

COPPER SULPHATE—
Auckland, 5 t., £123.; Aden, 10 c., £13.; Beyrout, 1 t. 6 c., £31.; Colombo, 10 c., £12.; Monte Video, 17 t. 4 c., £123.; Tanga, 2 t. 10 c., £63.

CREAM OF TARTAR—
Auckland, 1 t. 10 c., £129.; Antwerp, 2 c., £11.; Brisbane, 1 t. 2 c., £108.; Dunedin, 1 t., £88.; Fremantle, 5 t., £482.

DISINFECTANTS (*otherwise undes.*)
Bombay, 1 t. 15 c., £30.; Bilbao, 1 t. 4 c., £90.; Colon, 8 c., £21.; Calcutta, 2 t. 7 c., £87.; Cape Town, 7 t. 13 c., £127.; East London, 15 t. 5 c., £1,253.; Madras, 11 t. 2 c., £653.; New York, 125 t. 19 c., £4,596.; St. John's, N.F., 6 c., £74.; Wellington, 5 c., £51.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 5 t., £653.
Indigo
Shanghai, 16 t. 16 c., £2,340.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Algoa Bay, 2 c., £16. ; Auckland, 7 c., £113. ; Calcutta, 2 c., £14. ; Dunedin, 11 c., £186. ; Melbourne, 8 c., £100. ; Lyttleton, 3 c., £130. ; Manilla, 1 c., £32. ; Montreal, 6 t. 18 c., £964. ; Naples, 2 c., £39. ; Rio de Janeiro, 2 c., £119. ; Santos, 2 c., £84. ; Shanghai, 9 c., £87.

DYESTUFFS (NATURAL)—
Cutch
Genoa, 3 t. 10 c., £90.
Hematine
Dunedin, 1 t. 4 c., £58.

ESSENTIAL OILS (SYNTHETIC)—
Melbourne, 10 c., £644. ; Rotterdam, 2 qrs., £34. ; Wellington, 1 c., £69.

FERTILISERS (*otherwise undes.*)—
Charleston, Ga., 2,800 t., £6,031. Savannah, 1,050 t. 3 c., £6,675.

GLYCERINE—
Amsterdam, 3 t. 7 c., £254. ; Antwerp, 10 c., £42. ; Cape Town, 1 t., £87. ; Caracas, 9 c., £39. ; Kobe, 59 t. 14 c., £4,332. ; Melbourne, 49 t. 3 c., £3,777. ; Montreal, 10 t. 11 c., £540. ; Rotterdam, 1 t. 19 c., £145.

GUANO—
Savannah, 101 t., £606.

HYDROFLUORIC ACID—
Sydney, 19 c., £44.

IODINE—
Callao, 1 c., £18.

IODOFORM—
Sapele, 9 lb., £11.

IRON CITRATE—
Bombay, 2 c., £31.

LACTIC ACID—
Buenos Aires, 5 t. 7 c., £219. ; Melbourne, 4 t. 2 c., £177. ; Pt. Elizabeth, 9 c., £19.

MAGNESIA—
Wellington, 3 c., £10.

MAGNESIA (CALCINED)—
Melbourne, 5 c., £12.
Valparaiso, 8 c., £52.

MAGNESIUM CARBONATE—
Boston, 50 t., £1,475.

MAGNESIUM SULPHATE—
Bolivia, 2 c., £3. ; Cape Coast, 1 c., £4. ; Callao, 4 c., £4. ; Degama, 2 c., £3. ; East London, 3 qrs., £3. ; Halifax, N.S., 1 t. 1 c., £9. ; Kilindini, 2 qrs., £1. ; Lome, 2 qrs., £2. ; Montreal, 2 t. 4 c., £30. ; Pt. Limon, 2 c., £2. ; Saltpond, 2 c., £6. ; Sierra Leone, 1 c., £2.

MANGANESE OXIDE—
Santos, 11 c., £12.

MANGANESE SULPHATE—
Sydney, 10 c., £21.

NICKEL SULPHATE—
Adelaide, 3 c., £31.
Kobe, 12 c., £27.

PHOSPHORUS (AMORPHOUS)—
Bombay, 9 c., £105. ; Cape Town, 18 c., £160. ; Gothenburg, 5 t., £1,100.

PHOSPHORUS SESQUISULPHIDE
Gothenburg, 8 t. 10 c., £1,613.

PICRIC ACID—
Brisbane, 2 c., £19.

PITCH (*otherwise undescribed*)—
Calcutta, 1 t., £20. ; Cape Town, 1 t., £17. ; Genoa, 20 t. 18 c., £420.

POTASSIUM BICHROMATE—
Galatz, 23 t. 5 c., £1,131.
Rio Grande, 15 c., £49.

POTASSIUM IODIDE—
Sapele, 3 qrs., £92.

POTASSIUM PERMANGANATE—
Sydney, 1 t., £60.

POTASSIUM PRUSSIATE—
Barcelona, 2 t., £206. ; New York, 5 t. 3 c., £493. ; Shanghai, 1 t., £120.

POTASSIUM SILICATE—
Bilbao, 19 c., £17.
Havre, 19 c., £17.

SALAMMONIAC—
Famagusta, 12 c., £33.

SALICYLIC ACID—
Singapore, 1 c., £12.

SALTCAKE—
Gothenburg, 100 t., £466.

SHEEP DIP—
Algoa Bay, 28 t., £1,876. ; Auckland, 17 c., £88. ; Buenos Aires, 53 t. 17 c., £2,072. ; Bahia Blanca, 45 t. 17 c., £1,551. ; Braila, 1 t. 4 c., £99. ; Brisbane, 14 c., £47. ; Bluff Harbour, 1 t. 12 c., £103. ; Dunedin, 3 t. 4 c., £243. ; Durban, 2 t. 4 c., £149. ; Gisborne, 3 c., £44. ; Lyttleton, 2 t. 8 c., £167. ; Mombasa, 8 c., £31. ; Nelson, N.Z., 11 c., £411. ; Napier, 1 t., £128. ; New Plymouth, 1 t. 16 c., £140. ; Oamaru, 1 t. 19 c., £118. ; Puerto Monte, 4 t. 14 c., £250. ; Puerto Deseado, 12 t. 15 c., £525. ; Santa Cruz, 6 t. 16 c., £262. ; Timaru, 11 t. 2 c., £765. ; Wanganui, 28 t. 5 c., £2,146. ; Wellington, 9 t. 10 c., £666.

SULPHURIC ACID—
Rosario, 2 t. 9 c., £80.

TANNING MATERIALS—
Unspecified
Antwerp, 12 t. 3 c., £308. ; Christiania, 2 c., £30. ; Helsingfors, 2 t. 12 c., £44. ; Melbourne, 11 t. 4 c., £359. ; Malmo, 7 t. 12 c., £194. ; Montreal, 6 t. 2 c., £81. ; Mossel Bay, 2 t. 18 c., £94. ; Rotterdam, 13 t. 3 c., £198.

TARTARIC ACID—
Auckland, 1 t. 8 c., £178. ; Adelaide, 6 t. 3 c., £796. ; Melbourne, 1 t., £121.

TIN OXIDE—
Bilbao, 5 c., £65.
Gijon, 1 t., £227.
Naples, 2 c., £26.

VANILLIN—
Havre, 6 c., £515.

WOOD PRESERVATIVE—
Kingston, 14 c., £12.

ZINC CHLORIDE—
Amsterdam, 15 t. 2 c., £211. ; Calcutta, 1 t., £27. ; Colombo, 10 c., £18. ; Gothenburg, 20 t. 8 c., £460.

ZINC OXIDE—
Antwerp, 10 c., £22. ; Havre, 10 c., £200. ; St. John's, N.F., 9 c., £26.

ZINC SULPHATE—
Montreal, 5 t., £52.

Week ending November 3.

ALBUMEN (BLOOD)—
New York, 38 bgs.

BORAX—
Valparaiso, 1 pkg.

CALCIUM CHLORATE—
Brisbane, 55 pkgs.
Buenos Ayres, 150 pkgs.

CAUSTIC SODA—
Abo, 80 drms. ; Adelaide, 50 drms. ; Alexandria, 34 drms. ; Algoa Bay, 247 drms. ; Alexandretta, 20 drms. ; Auckland, 64 drms. ; Bahia Blanca, 8 drms. ; Bangkok, 24 drms. ; Bari, 37 drms. ; Batavia, 30 drms. ; Beyrout, 35 drms. ; Bourgas, 202 drms. ; Buenos Ayres, 678 drms. ; Bremen, 30 drms. ; Calcutta, 120 drms. ; Callao, 100 drms. ; Cape Town, 85 drms. ; Cartagena, 130 drms. ; Cheribon, 25 pkgs. ; Copenhagen, 7 drms. ; Coquimbo, 27 pkgs. ; Delagoa Bay, 825 drms. ; Dunedin, 104 drms. ; East London, 72 drms. ; Fremantle, 81 drms. ; Genoa, 25 pkgs. ; Guayaquil, 60 drms. ; Hamburg, 86 drms. ; Hankow, 155 pkgs. ; Helsingfors, 439 bxs., 90 drms. ; Jaffa, 17 drms. ; Hobart, 6 pkgs. ; Kotka, 230 pkgs. ; Launceston, 56 pkgs., 9 cs. ; La Guayra, 10 pkgs. ; Malmo, 20 drms. ; Madras, 20 drms. ; Montreal, 100 drms.

CAUSTIC SODA
Mossel Bay, 14 cs. ; Oporto, 100 drms. ; Punta Arenas, 10 pkgs. ; Pt. Alegre, 1,225 cs. ; Rio de Janeiro, 74 drms. ; Rotterdam, 255 drms. ; Seychelles, 10 drms. ; Stockholm, 40 drms. ; Sydney, 100 drms. ; Talcahuano, 383 drms. ; Trinidad, 6 drms. ; Valparaiso, 300 drms. ; Varna, 550 drms. ; Vejle, 20 drms. ; Wellington, 25 cs. ; Wiborg, 40 drms.

FERRO MANGANESE—
Adelaide, 3 t. ; Baltimore, 434 t. ; Boston, 50 t. ; Gefle, 135 t. ; New Orleans, 646 t.

GLUE, SIZE, AND GELATINE—
Boston, 660 pkgs. ; Buenos Ayres, 20 bgs ; Calcutta, 20 bgs. ; Copenhagen, 20 pkgs. ; Durban, 10 pkgs. ; East London, 10 pkgs. ; Montreal, 100 bgs. ; New York, 100 bgs. ; Para, 7 brls. ; Seville, 19 bgs. ; Shanghai, 140 pkgs., 99 bgs. ; Singapore, 10 pkgs. ; Teneriffe, 4 bgs.

SALT—
Antwerp, 205 t. ; Barbados, 34 t. 10 c. ; Copenhagen, 25 t. ; Duala, 85 t. ; Gefle, 150 c. ; Helsingborg, 200 t. ; Iddo, 95 t. ; Malta, 11 c. ; New Orleans, 155 t. ; New York, 150 t. ; Odense, 200 t. ; Punta Arenas, 8 c. ; Rangoon, 1,000 t. ; Rudkjobing, 5 t. ; Sapele, 21 t. ; Sekondi, 29 t. ; Sherbro, 299 t. ; Sierra Leone, 111 t.

SOAP—
Accra, 19 bxs. ; Addah, 32 bxs. ; Alexandria, 1,173 pkgs. ; Amsterdam, 125 bxs. ; Amboina, 10 pkgs. ; Antigua, 70 bxs. ; Antofagasta, 837 bxs. ; Alleppy, 25 bxs. ; Bangkok, 535 pkgs. ; Barbados, 787 pkgs. ; Barcelona, 31 cs. ; Batavia, 608 cs. ; Belawan 560 pkgs. ; Belize, 226 cs. ; Bermuda, 220 pkgs. ; Bombay, 3,047 pkgs. ; Bourgas, 41 pkgs. ; Buenos Ayres, 802 pkgs. ; Burutu, 84 cs. ; Callao, 136 bxs. ; Calicut, 102 bxs. ; Calcutta, 505 pkgs. ; Cape Town, 15 bxs. ; Cochin, 181 pkgs. ; Colombo, 1,401 bxs. ; Copenhagen, 250 bxs. ; Cotonou, 20 bxs. ; Curacao, 385 bxs. ; Djambi, 250 pkgs. ; Dunedin, 3 bxs. ; Durban, 190 bxs. ; Fernando, Po., 20 bxs. ; Gibraltar, 15 bxs. ; Gothenburg, 1 pkg. ; Guayaquil, 20 bxs. ; Helsingfors, 250 bxs. ; Hsin Ho Wharf, 10 pkgs. ; Iddo, 67 bxs. ; Iquitos, 679 pkgs. ; Karachi, 245 bxs. ; Kingston, Ja., 625 pkgs. ; Kobe, 100 bxs. ; Lagos, 1,048 bxs. ; Las Palmas, 599 bxs. ; Lho Seumaweh, 25 pkgs. ; Lisbon, 4 pkgs. ; Lyttleton, 10 pkgs. ; Macassar, 525 cs. ; Madras, 48 pkgs. ; Malacca, 210 bxs. ; Malta, 148 pkgs. and 38 t. 10 c. ; Mauritius, 3 cs. ; Menado, 565 cs. ; Meulabah, 25 cs. ; Mollendo, 1 cs. ; Montego Bay, 8 pkgs. ; Monte Video, 11 bxs. ; Monrovia, 26 cs. ; Mukden, 50 cs. ; Padang, 278 pkgs. ; Pt. Elizabeth (for Congo Belge), 25 cs. ; Pasages, 12 cs. ; Pto. Barrios, 21 cs. ; Pt. Harcourt, 3 cs. ; Pt. Louis, 21 cs. ; Pt. Said, 25 cs. ; Pt. Stanley, 14 cs. ; Pt. Maria, 1 cs. ; Pt. Swettenham, 4 cs. ; Punta Arenas, 82 pkgs. ; Quittah, 20 cs. ; Rangoon, 1,372 cs., 1,025 bxs. ; Rotterdam, 121 pkgs. ; Rouen, 50 bxs. ; Sabang, 25 cs. ; Samarang, 425 cs., 6 hhds. ; Sekondi, 13 cs. ; Segli, 50 cs. ; Shanghai, 1,372 cs. ; Sherbro, 4 cs. ; Sierra Leone, 73 cs. ; Santa Cruz La Palma, 3 cs. ; Sourabaya, 1,725 cs. ; Singapore, 2,306 pkgs. ; Sinkel, 25 cs. ; St. Anne's Bay, 1 cs. ; St. John, N.B., 1 ck. ; Symi, 1 cs. ; Tandjong, Balei, 150 bxs. ; Tapatocan, 25 cs. ; Teneriffe, 366 pkgs. ; Tientsin, 3 cs. ; Timaru, 19 bxs. ; Trieste, 26 pkgs. ; Trinidad, 503 pkgs. ; Valparaiso, 12 pkgs. ; Vera Cruz, 5 cs. ; Wellington, 4 cs.

SODA ASH—
Aarhus, 500 pkgs. ; Adelaide, 173 pkgs. ; Abo, 600 pkgs. ; Antonina, 97 pkgs. ; Auckland, 39 pkgs. ; Bahia Blanca, 203 cks. ; Brisbane, 20 pkgs. ; Buenos Ayres, 305 cks. ; Calcutta, 2,000 pkgs. ; Copenhagen, 1,970 pkgs. ; Dunedin, 50 pkgs. ; Fremantle, 173 pkgs. ; Gothenburg, 600 pkgs. ; Helsingfors, 1,150 pkgs. ; Hamburg, 550 pkgs. ; Horsens, 400 pkgs. ; Iggesund, 2,000 pkgs. ; Lyttleton, 40 pkgs. ; Melbourne, 379 bgs. ; Moji, 1,623 bgs. ; Norrkoping, 650 bgs. ; Oporto, 100 bgs. ; Pelotas, 6 cks. ; Rio de Janeiro, 291 pkgs. ; Rio Grande do Sul, 20 cks. ; Santos, 163 cks. ; Sekondi, 4 kgs. ; Shanghai, 1,680 bgs. ; Stockholm, 800 bgs. ; Valparaiso, 248 cks. ; Vigo, 10 cks. ; Zante, 100 bgs.

SODA CRYSTALS—
Alexandria, 20 brls. ; Algoa Bay, 10 cs. ; Buenos Ayres, 1,017 pkgs. ; Cape Town, 50 pkgs. ; Iquique, 65 pkgs. ; Madras, 100 drms. ; Malta, 510 bgs. ; Pt. Elizabeth, 25 bgs.

SODIUM ARSENITE—
Durban, 20 drms.

SODIUM BICARBONATE—
Aarhus, 27 cks. ; Adelaide, 40 pkgs. ; Alexandria, 20 brls. ; Bahia Blanca, 10 brls. ; Bergen, 70 kgs. ; Bombay, 400 brls. ; Brisbane, 64 pkgs. ; Calcutta, 400 pkgs. ; Cape Town, 130 pkgs. ; Catania, 100 pkgs. ; Copenhagen, 66 pkgs. ; Constantinople, 45 pkgs. ; Fremantle, 277 pkgs. ; Galatz, 200 pkgs. ; Genoa, 130 pkgs. ; Gothenburg, 30 cks. ; Iquique, 50 pkgs. ; Melbourne, 690 pkgs. ; Moji, 215 bgs. ; Palermo, 65 kgs. ; Pt. Alegre, 10 pkgs. ; Stockholm, 84 kgs. ; Sydney, 125 pkgs. ; ; Valparaiso, 150 pkgs., 451 kgs. ; Wellington, 50 pkgs.

SODIUM BICHROMATE—
Antwerp, 3 cks.

SODIUM BISULPHITE—
Danzig, 14 pkgs.

SODIUM CHLORATE—
Rotterdam, 21 cks.

SODIUM CYANIDE—
Sekondi, 40 drms.

SODIUM HYDROSULPHITE—
Cartagena, 6 kgs.
Durban, 20 pkgs.

SODIUM PHOSPHATE—
Danzig, 6 pkgs.

SODIUM PRUSSIATE—
Kobe, 200 pkgs.

SODIUM SILICATE—
Acapulco, 300 pkgs. ; Adelaide, 46 pkgs. ; Auckland, 32 pkgs. ; Christiania, 34 cks. ; Gothenburg, 18 cks. ; Hankow, 20 cs. ; Hobart, 6 pkgs. ; Kobe, 19 pkgs. ; La Guayra, 20 pkgs. ; Lyttleton, 32 pkgs. ; Melbourne, 172 bgs. ; Nantes, 6 cks. ; Para, 13 pkgs. ; Piraeus, 16 pkgs. ; Pt. Said, 27 pkgs. ; Shanghai, 266 cks. ; Sydney, 40 cs.

SODIUM SULPHIDE—
Cape Town, 40 drms. ; Dunedin, 23 drms. ; Genoa, 24 drms. ; Gothenburg, 58 brls. ; Lisbon, 40 pkgs. ; Rio de Janeiro, 83 drms.

SODIUM SULPHITE—
Penang, 10 cs.

STEARINE—
Bordeaux, 133 bgs.
Cebu, 2 t.
Copenhagen, 24 bgs.
Manila, 75 bgs.
Shanghai, 250 dbl. bgs.

TALLOW—
Antwerp, 280 cs.
Hamburg, 30 pkgs.
Savanilla, 3 cks.
Shanghai, 14 cks.
Sierra Leone, 10 cs.

LONDON.

OFFICIAL AMENDMENTS.

From return for week ending July 4, Deduct—

CHEMICALS (*otherwise undescribed*)
Timaru, 12 pkgs., £20.

From return for week ending July 11, Deduct—

CHEMICALS (*otherwise undescribed*)
Lyttleton, 40 pkgs., £68.

From return for week ending Aug. 22, Deduct—

COAL TAR PRODUCTS—
Tar
Cape Town, 12 drms., £30.

DISINFECTANTS (*otherwise undes.*)
Cape Town, 20 t. 2 c., £185.

From return for week ending Aug. 29, Deduct—

BORAX—
Rangoon, 10 c., £28.

COAL TAR PRODUCTS—
Creosote
Hamburg, 7 drms., £120.

Week ending October 31.

ACETIC ACID—
Barbados, 3 cs., £8.
Christchurch, 23 cs., £73.
Dunedin, 3 cs., £10.
Newcastle, 3 cs., £11.
Wellington, 6 cs., £21.

ACETONE—
Durban, 8 drms., £44.

ACETYL SALICYLIC ACID—
Buenos Ayres, 1 cs. (pt.), £7.; Calcutta, 3 cs. (pt.), £15.; Montreal, 5 cs. (pt.), £49.; Pt. Dickson, 1 cs. (pt.), £9.; Shanghai, 5 cs. (pt.), £41.

ALUM—
Hong Kong, 1 cs., £8.
Townsville, 2 brls., £25.

ALUMINIUM SULPHATE—
Galatz, 2 cs., £10.

AMMONIA—
Beira, 9 cs., £19.; Bombay, 8 cs., £14.; Buenos Ayres, 4 cs., £10.; Calcutta, 10 cs., £18.; Canton, 2 cs., £7.; Cape Town, 3 cs., £9.; Durban, 37 cs., £75.; East London, 13 cs., £23.; Shanghai, 10 cs., £17.; Trinidad, 8 cs., £14.

AMMONIA (ANHYDROUS)—
Bombay, 2 cylds., £9.
Calcutta2 c ylds., £17.
Kaduna, 6 cylds., £53.
Lisbon, 37 cylds., £120.

AMMONIA CHROME ALUM—
Bombay, 40 kgs., £50.

AMMONIUM CARBONATE—
Adelaide, 5 c., £10.; Antwerp, 2 t. 5 c., £61.; Brussels, 1 t., £24.; Calcutta, 5 c., £17.; Colombo, 2 c., £9.; Durban, 2 c., £7.; Galatz, 2 t., £52.; Hamburg, 9 t. 10 c., £232.; Marseilles, 3 t., £75.; Paris, 1 t., £29.; Piraeus, 10 c., £12.; Rotterdam, 5 t., £130.; Rouen, 8 t. 19 c., £282.; Sao Paulo, 11 c., £18.; Singapore, 11 c., £31.

AMMONIUM CHLORIDE—
Iquique, 1 ck., £12.
Montreal, 23 cks., £212.

AMMONIUM CITRATE—
Montreal, 3 cs., £28.

AMMONIUM PHOSPHATE—
Calcutta, 1 c., £7.

AMMONIUM SULPHATE—
Durban, 20 t. 11 c., £274.; Kobe, 350 t., £5,863.; Las Palmas, 20 t., £340.; Teneriffe, 50 t., £850.

ANTIMONY OXIDE—
Sao Paulo (F.), 10 cks., £65.

ANTIMONY SULPHIDE—
Brussels, 6 cks., £78.
Rouen, 2 cks., £37.
Toronto, 1 ck., £22.

ARSENIC—
Penang, 2 drms., £9.
Sao Paulo, 5 drms., £20.
Valencia, 6 brls., £63.

BARIUM PEROXIDE—
Sydney, 40 drms., £298.

BENZINE—
Durban, 9 drms., £50.

BISMUTH AMMONIUM CITRATE—
Wellington, 3 cs. (pt.), £10.

BISMUTH CARBONATE—
Durban, 2 cs. (pt.), £110.
Sydney, 3 cs. (pt.), £161.

BISMUTH CITRATE—
Sydney, 1 cs. (pt.), £24.

BISMUTH OXIDE—
Sydney, 1 cs. (pt.), £20.

BISMUTH SALICYLATE—
Durban, 1 cs. (pt.), £14.
Sydney, 1 cs. (pt.), £11.

BISMUTH SUBNITRATE—
Durban, 1 cs. (pt.), £15.

BITUMEN—
Antofagasta, 16 drms., £16.
Iquique, 14 drms., £14.
Valparaiso, 20 drms., £20.

BLEACHING POWDER—
Malta, 1 c., £5.

BONE FERTILISER—
Dunkirk, 9 t., £113.

BORAX—
Amsterdam, 2 t. (F.), £51.; Cairns, 15 c., £25.; Copenhagen, 2 t. (F.), £49.; Durban, 8 c., £19.; Rotterdam, 5 t., £130.

BORIC ACID—
Cairns, 5 c., £15.; Calcutta, 5 c., £26.; Callao (F.), 5 c., £15.; Durban, 6 c., £22.; Grenada, 1 c., £7.; Jamaica, 5 c., £45.; Pt. Swettenham, 1 c., £6.; Wellington, 3 c., £8.

CALCIUM CARBIDE—
Monte Video, 7 c., £14.
Mopea, 5 c., £8.
Trinidad (F.), 15 c., £12.

CALCIUM CHLORIDE—
Cape Town, 4 drms., £7.
Iquique, 6 drms., £6.
Perth, 32 pkgs., £33.

CALCIUM SULPHITE—
Cape Town, 4 cks., £8.

CARBON BISULPHIDE—
Delagoa Bay, 42 drms., £85.

CARBON TETRACHLORIDE—
Alexandria, 12 cs., £32.

CAUSTIC SODA—
Durban, 4 c., £7.; Delagoa Bay, 11 c., £24.; Shanghai, 1 c., £7.; Suez, 1 cs. (pt.), £12.; Suva, 2 c., £6.

CHEMICALS (*otherwise undescribed*)
Amoy, 5 cs. (pt.), £8.; Barbados, 20 pkgs. (pt.), £40.; Beira, 6 pkgs., £15.; Bombay, 11 cs. (pt.), £146.; Calcutta, 40 pkgs. (pt.), £254.; Callao, 1 cs., £9.; Cape Town, 9 pkgs. (pt.), £19.; Christchurch, 8 cs., £175.; Christiania, 5 kgs., £6.; Colombo, 6 cs., £18.; Delagoa Bay, 106 pkgs. (pt.), £367.; Demerara, 5 cs. (pt.), £15.; Durban, 29 cs. (pt.), £92.; East London, 5 cs. (pt.), £10.; Fremantle, 20 kgs., £36.; Georgetown, 13 pkgs., £7.; Grenada, 10 pkgs., £7.; Hamburg, 160 pkgs., £387.; Hong Kong, 8 pkgs., £22.; Jaffa, 2 pkgs. (pt.), £8.; Kilindini, 6 cs., £51.; Larnaca, 3 pkgs., £6.; Malta, 8 pkgs., £11.; Melbourne, 29 cs. (pt.), £187.; Montreal, 10 cs. (pt.), £203.; Mossel Bay, 4 cs., £6.; New York, 3 cs. (pt.), £15.; Oporto, 10 pkgs., £32.; Otago, 20 pkgs., £40.; Perth, 2 cs. (pt.), £5.; Pt. Elizabeth, 1 cs. (F.), £8.; Pt. Elizabeth, 9 pkgs., £21.; Pt. Said, 4 cs. (pt.), £18. Rangoon, 3 cs., £26.; Rotterdam, 510 pkgs., £1,251.; Santos, 30 pkgs., £77.; Seville, 50 pkgs, £125.; Seychelles, 6 pkgs., £18.

CHEMICALS (*otherwise undescribed*)
Shanghai, 6 cs. (pt.), £11.; Singapore, 2 cs., £27.; Singapore, 2 cs. (pt.) (F.), £39.; Sydney, 48 pkgs. (pt.), £178.; Toronto, 2 cs. (pt.), £13.; Trinidad, 25 pkgs. (pt.), £38.; Wellington, 17 pkgs., £317.; Woodstock, 3 pkgs. (pt.), £14.

CITRIC ACID—
Abo, 2 c., £15.; Amsterdam, 1 t., £146.; Chinde (F.), 1 c., £9.; Christchurch, 2 c., £14.; Danzig, 1 t. (F.), £183.; Durban, 1 c., £9.; Durban (F.), 2 c., £17.; Fremantle, 2 c., £21.; Kuala Lumpur, 2 c., £16.; Lourenco Marques (F.), 1 c., £11.; Montreal, 7 c., £75.; Penang, 1 c., £8.; Pt. Elizabeth, 1 ck., 2 c., £20.; Pt. Said, 2 t., £300.; Tarragona, 10 c., £73.; Valencia, 10 c., £73.; Wellington, 4 c., £29.

COAL TAR PRODUCTS—
Benzol
Cologne, 15 drms., £160.
Durban, 8 drms., £10.
Carbolic Acid
Durban, 9 pkgs. (pt.), £39.; East London, 4 cs., £17.; Grenada, 1 cs., £9.; Hong Kong, 2 cs., £9.; Jaffa, 1 cs., £5.
Creosote
Cape Town, 2 cks., £11.; Demerara, 5 brls., £41.; Tacoma (bulk), 204,590 galls., £9,005.
Metatoluylenediamine
Rouen, 8 cks., £375.
Mirbane Oil
Singapore, 4 pkgs., £53.
Naphthalene
Genoa, 792 bgs., £508.
Pitch
Antwerp (bulk), 600 t., £4,575.; Brisbane, 23 pkgs., £23.; Calcutta, 30 brls., £46.; Cherbourg (bulk), 450 t., £731.; Dunkirk (bulk), 1,250 t., £8,750.; Durban, 20 kgs., £18.; Rouen (bulk), 980 t., £7,350.; St. Servan (bulk), 530 t., £3,843.
Pyridine
Cape Town, 3 drms., £158.
Durban, 4 drms., £213.
Tar
Alexandria, 100 brls., £210.
Cape Town, 125 drms., £19.
East London, 100 drms., £9.
Xylol
Rotterdam, 6 drms., £90.

COBALT OXIDE—
Italy, 1 cs., £48.
Seville (F.), 3 cs., £185.
Trieste (F.), 13 cks., £815.

COBALT SULPHATE—
Brussels, 5 cks., £75.

COPPER SULPHATE—
Durban, 10 c., £15.
East London, 9 c., £14.

CREAM OF TARTAR—
Alexandria, 2 c., £9.; Beira (F.), 1 c., £7.; Brisbane, 2 t., £169.; Durban (F.), 9 c., £59.; East London (F.), 2 c., £9.; East London, 2 c., £14.; Fremantle, 10 c., £52.; Geraldton, 5 c., £22.; Lyttleton, 10 c., £42.; Melbourne, 5 t., £423.; Montreal, 1 t., £105.; Mossel Bay (F.), 2 c., £13.; Stavanger, 4 c., £17.; Sydney, 4 t., £339.; Wellington, 1 t. 5 c., £106.

DISINFECTANTS (*otherwise undes.*)
Bangkok, 9 c., £30.; Buenos Ayres, 11 t. 16 c., £373.; Calcutta, 2 t. 18 c., £41.; Canton, 1 cs., £6.; Cape Town, 12 t. 11 c., £332.; Christchurch, 3 c., £28.; Cochin, 4 c., £12.; Colombo, 1 t. 17 c., £77.; Hong Kong, 6 c., £48.; Las Palmas, 8 c., £8.; Malta, 2 c., £10.; Montreal, 15 c., £151.; Penang, 1 t. 3 c., £29.; Perth, 2 c., £54.; Pt. Elizabeth, 18 c., £18.; Rangoon, 6 c., £9.; Sydney, 5 c., £25.; Trinidad, 17 c., £49.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 1 kg., £6.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Brisbane, 1 cs., £10.; Hong Kong, 5 cs., £23.; Melbourne, 7 pkgs., £290.; Montreal, 2 cs. (pt.), £15.; New York, 2 cs. (pt.), £25.; Pt. Elizabeth, 3 cs., £63.; Wellington (F.), 2 kgs., £76.

ETHER—
Pt. Elizabeth, 1 cs., £5.
Pt. Swettenham, 2 drms., £28.

ETHYL ACETATE—
Madras, 2 cs., £6.

ETHYL CHLORIDE—
Durban, 1 cs., £28.

FERTILISERS (*otherwise undes.*)—
Barbados, 25 t., £217.; Channel Islands, 61 t. 8 c., £558.; Irish Free State, 10 c., £13.; Yokohama, 5 c., £5.

FORMALDEHYDE—
Grenada, 2 cs., £6.
San Fernando, 8 cs., £24.

GLYCERINE—
Beira, 3 c., £13.; Calcutta, 2 c., £17.; Cape Town, 83 t. 11 c., £4,124.; Comodoro Rivadavia, 2 cs., £8.; Grenada, 1 c., £6.; Hong Kong, 2 c., £11.; Kilindini, 2 c., £12.; Oporto, 11 c., £43.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
Bombay, 2 cs. (pt.), £23.
Montreal, 5 cs. (pt.), £49.
New York, 1 cs. (pt.), £7.

GOLD CHLORIDE—
Rosario, 1 cs. (pt.), £10.

HYDROCHLORIC ACID—
Bangkok, 1 c., £10.; Callao, 3 c., £9.; Colombo, 10 c., £19.; Pt. Swettenham, 3 c., £10.; St. Kitts, 1 t., £23.; St. Lucia, 4 c., £5.; Trinidad, 1 t. 10 c., £33.

HYDROFLUORIC ACID—
Calcutta, 1 cs. (pt.), £30.; Callao, 1 cs. (pt.), £8.; Hong Kong, 2 cs., £16.; Pt. Elizabeth, 1 cs., £10.

HYDROGEN PEROXIDE—
East London, 10 cs., £21.

HYPOPHOSPHITES (*otherwise undescribed*)—
Sydney, 1 cs. (pt.), £8.

HYPOPHOSPHOROUS ACID—
Paris, 1 pkg., £18.

IODIDES (*otherwise undescribed*)—
Amoy, 1 cs. (pt.), £51.; Calcutta, 1 cs., £56.; Penang, 1 cs., £74.; Toronto, 1 cs. (pt.), £17.

IODINE—
Barbados, 1 cs., £7.; Brussels, 1 cs. (F.), £407.; Calcutta, 1 ck. (pt.), £26.; Florence, 1 cs., £103.; Paris (F.), 20 kgs., £1,695.

IODINE (RESUBLIMED)—
Sydney, 1 cs., £121.

IRON AMMONIUM CITRATE—
Durban, 2 cs., £14.
Sydney, 1 cs., £13.
Toronto, 1 cs., £15.

IRON SULPHATE—
Cape Town, 5 kgs., £6.

LACTIC ACID—
Calcutta, 6 cks., £33.

LEAD ACETATE—
Calcutta, 10 kgs., £21.

LEAD ARSENATE—
Pt. Elizabeth, 6 crts., £40.

LEAD PEROXIDE—
Antwerp, 19 cks., £90.

MAGNESIA—
Christchurch, 10 cs., £24.
Dunedin, 10 cs., £24.
Sydney, 10 cs., £24.
Vigo, 14 cks., £33.

MAGNESIUM CARBONATE—
East London, 1 kg., £16.; Lyttleton, 2 cs., £7.; San Fernando, 4 cs., £7.; Sydney, 1 cs., £11.; Wellington, 5 cs., £17.

MAGNESIUM CHLORIDE—
Saigon, 25 cs., £21.

MAGNESIUM CITRATE—
Barcelona, 10 cs., £150.

MAGNESIUM CITRATE—
Demerara, 1 cs., £7.

MAGNESIUM HYDRATE—
Switzerland (F.), 4 cs., £23.

MAGNESIUM SULPHATE—
Basrah, 5 c., £5. ; Beira, 4 c., £5. ; Canton, 10 c., £7. ; Durban, 6 c., £8. ; East London, 12 c., £18. ; Malta, 3 c., £5. ; Sydney, 5 c., £6. ; Trinidad, 1 t., £14. ; Wellington, 10 kgs., 1 t. 1 c., £50. ; Woodstock, 1 t., £11.

MANGANESE HYPOPHOSPHITE—
Melbourne, 1 cs. (pt.), £10.

MERCURY SUBCHLORIDE—
Calcutta, 5 cs. (pt.), £13.
Coconada, 1 cs., £22.

METHYL SALICYLATE—
Durban, 1 cs., £9.
Wellington, 1 cs., £9.

NICKEL SALTS (*otherwise undes.*)—
Sydney, 1 ck., 2 pkgs. (pt.), £18.

NITRIC ACID—
Callao, 2 c., £16.
Colombo, 1 c., £5.

PHOSPHOCITRIC ACID—
Bangkok, 1 c., £8.
Delagoa Bay, 5 c., £28.

PHOSPHORUS—
Kuala Lumpur, 2 cs., £21.

POTASSIUM BICHROMATE—
Kuala Lumpur, 5 kgs., £20.

POTASSIUM BROMIDE—
Durban, 3 cs., £16.
Trinidad, 1 cs., £6.

POTASSIUM CARBONATE—
Rio de Janeiro, 3 cks., £11.

POTASSIUM CITRATE—
Brisbane, 1 cs., £14. ; Durban, 2 cs., £19. ; Melbourne, 2 cs., £23.

POTASSIUM CYANIDE—
Christchurch, 1 cs. (pt.) £17.
Rangoon, 1 cs., £15.

POTASSIUM IODIDE—
Brussels, 6 cs., £81. ; Calcutta, 1 ck. (pt.), £88. ; Durban, 4 cs. (pt.), £182. ; Florence, 2 cs., £129. ; Genoa, 13 cs., £803. ; Naples, 1 cs., £86. ; Pt. Elizabeth, 2 cs., £175. ; Rangoon, 2 cs., £175. ; Rio de Janeiro, 4 cs., £363. ; Trinidad, 1 cs., £88.

POTASSIUM METABISULPHITE
Brisbane, 1 kg., £6.

POTASSIUM PERMANGANATE—
Buenos Ayres, 1 cs. (pt.), £5. ; Durban, 1 cs., £7. ; Melbourne, 5 drms. (F.), £18. ; Wellington, 2 drms. (F.), £9.

POTASSIUM PRUSSIATE—
Kobe, 19 cks.,. £501.
Trinidad, 2 kgs., £8.

POTASSIUM SALTS (*otherwise undescribed*)—
Montreal, 40 cs., £346.
Sydney, 1 cs., £12.
Toronto, 8 cks., £46.

POTASSIUM SULPHATE—
Demerara, 30 pkgs., £37.

PRUSSIAN BLUE—
Amsterdam, 2 cks., £127.

PYROGALLIC ACID—
Melbourne, 1 cs., £12.
Paris (F.), 13 cs., £146.

ROCHELLE SALTS—
Durban, 4 kgs., £9.

SALAMMONIAC—
Auckland, 2 kgs., £6.
Shanghai, 3 cs., £8.

SALICYLATES (*otherwise undes.*)—
Buenos Ayres, 1 cs. (pt.), £5. ; Montreal, 2 cs. (pt.), £17. ; New York, 1 cs. (pt.), £9. ; Shanghai, 1 cs. (pt.), £5.

SALICYLIC ACID—
Adelaide, 2 cs., £26.
Singapore, 1 cs., £13.

SALTPETRE—
Adelaide, 1 t. 3 c., £42. ; Christchurch, 10 c., £20. ; East London, 4 c., £10. ; Townsville, 10 c. (F.), £14. ; Zwolle, 1 t., £42.

SHEEP DIP—
Durban, 3 t. 7 c., £239.
San Fernando, 1 c., £2.

SILVER NITRATE—
Alexandria, 2 cs., £89. ; Danzig, 2 cs., £350. ; Durban, 1 cs., £25. ; Hong Kong, 1 cs., £56. ; Rangoon, 1 cs. (pt.), £6.

SODA CRYSTALS—
Lisbon, 1 t. 5 c., £13.

SODIUM ARSENITE—
Durban, 4 t. 9 c., £308.
Pt. Elizabeth, 2 c., £7.

SODIUM BENZOATE—
Calcutta (F.), 1 c., £11. ; Madras, 9 c., £117. ; Paris, 4 c., £55. ; Sydney, 1 c., £6.

SODIUM BICARBONATE—
Bilbao, 5 c., £19. ; Calcutta, 2 c., £6. ; Delagoa Bay, 7 c., £9. ; Durban, 11 c., £22. ; East London, 4 c., £5. ; Florence, 5 c., £10. ; Piraeus, 5 c., £6. ; Pt. Elizabeth, 4 c., £6. ; Singapore, 10 c., £15. ; Toronto, 5 c., £12.

SODIUM BISULPHITE—
Penang, 2 t. 3 c., £43.

SODIUM CARBONATE—
Shanghai, 1 t. 2 c., £13.

SODIUM CITRATE—
Melbourne, 1 c., £6.
Montreal, 3 t. 13 c., £715.

SODIUM CYANIDE—
Cape Town, 5 cs., £27.

SODIUM HYDROSULPHITE—
Pondicherry, 2 t., £300.

SODIUM HYPOPHOSPHITE—
Boston, 3 t. 12 c., £1,002.
Paris, 1 c., £15.

SODIUM HYPOSULPHITE—
Wellington, 1 t., £14.

SODIUM IODIDE—
Florence, 4 c., £393. ; Genoa, 1 cs., £39. ; Naples, 1 c., £59.

SODIUM PHOSPHATE—
Vloardingen, 1 t. 3 c., £26.

SODIUM SALICYLATE—
Durban, 4 cs., 1 cs. (pt.), £64.
Trinidad, 1 cs., £14.

SODIUM SULPHATE—
Demerara, 20 kgs., £7.

SODIUM SULPHIDE—
Auckland, 10 t., £165.
Lyttleton, 25 t. 3 c., £350.

SODIUM SULPHITE—
Penang, 2 t. 15 c., £68.
Singapore, 7 c., £27.

SODIUM SULPHITE (ANHYDROUS)—
Penang, 13 c., £17.

SODIUM TARTRATE—
Sydney, 10 c., £38.

SPENT OXIDE—
Naarden, 180 t., £386.

SULPHUR—
Colombo (F.), 1 t., £14.

SULPHURIC ACID—
Berbice, 2 t. 10 c., £50. ; Callao, 2 c., £5. ; Penang, 1 c., £10. ; Pt. Swettenham, 2 c., £10. ; Rotterdam, 2 t., £36. ; Sekondi, 1 t. 7 c., £29. ; St. Vincent, 10 c., £10. ; Trinidad, 2 t. 10 c., £50.

SUPERPHOSPHATE—
Channel Islands, 70 t., £196.

TARTARIC ACID—
Brisbane, 1 t. 10 c., £180. ; Calcutta, 11 c., £73. ; Cape Town, 2 c., £11. ; Christchurch, 2 c., £14. ; Durban, 2 c., £15. ; East London, 1 c., £8. ; Fremantle, 2 c., £17. ; Kuala Lumpur, 2 c., £12. ; Melbourne, 11 t., £1,499. ; Montreal, 1 t. 5 c., £173. ; Mossel Bay (F.), 1 c., £9. ; Paris, 2 t., £240. ; Penang, 1 c., £6. ; Pt. Elizabeth (F.), 3 c., £29. ; Sydney, 1 t., £120. ; Toronto, 4 t. 6 c., £600.

TIN OXIDE—
Dunkirk, 10 cks., £227.
Sydney, 1 cs., £59.

ZINC OXIDE—
Aden, 16 kgs., £12. ; Barcelona, 10 cks., £46. ; Calcutta, 5 kgs., £14. ; Copenhagen, 80 cks,. £150. ; Christiania, 4 bgs., £16. ; Kuala Lumpur, 1 ck., £8. ; Madras, 45 kgs., £107. ; Pt. Elizabeth, 2 cks., £5.

Week ending November 3.

ANTIMONY REGULUS—
Sydney, 2 t.

BEESWAX—
Sydney, 1 c.

DEXTRINE—
Suez, 1 t.

FULLER'S EARTH—
Antwerp, 10 t. ; Bordeaux, 5 t. ; New York, 35 t. ; Paris, 6 t. ; Rotterdam, 50 t.

GLUE, SIZE, AND GELATINE—
Barbados, 1 c. ; Brisbane, 2 c. ; Brussels, 1 t. 2 c. ; Calcutta, 7 t. 2 c. ; Channel Islands, 1 c. ; Demerara, 1 c. ; Dunedin, 6 c. ; Durban, 1 c. ; East London, 3 c. ; Fiji Islands, 1 c. ; Kobe, 5 t. ; Karachi, 6 c. ; Melbourne, 1 t. 11 c. ; Montreal, 1 t. ; New York, 1 t. ; Paris, 5 t. ; Pt. Elizabeth, 1 t. 2 c. ; Pt. Swettenham, 1 c. ; Rangoon, 4 c. ; Riga, 3 t. ; Rotterdam, 5 c. ; St. Johns (B.C.), 10 t. ; San Francisco, 10 c. ; Singapore, 1 c. ; Sydney, 1 t. 2 c. ; Tientsin, 9 c. ; Toronto, 17 t. ; Vancouver, 12 t. ; Victoria, 2 c. ; Wanganui, 1 c. ; Wellington, 1 c. ; Yokohama, 5 t.

LEAD ASHES—
Hamburg, 24 t.

MINERAL WAX—
Antwerp, 16 c. ; Gothenburg, 2 t. 10 c. ; Melbourne, 10 t. ; Naples, 1 t.

PARAFFIN WAX—
Durban, 11 c.

PLUMBAGO—
Madras, 10 c. ; Santos, 1 t. 4 c.

QUININE—
Calcutta, 6,419 oz. ; Durban, 312 oz. ; Montreal, 41 oz. ; Perth, 66 oz. ; Piraeus, 4,800 oz. ; Sourabaya, 35 oz. ; Sydney, 2,000 oz. ; Trinidad, 420 oz.

ROSIN—
Pt. Elizabeth, 2 t. 11 c.
Rio de Janeiro, 3 c.

SALT—
Copenhagen, 11 c. ; Cuba, 4 c. ; Durban, 3 t. 3 c. ; Fiji Islands, 15 t. ; Fremantle, 1 t. 9 c. ; Gibraltar, 1 c. ; Hawkes Bay, 20 t. ; Hong Kong, 2 c. ; Jamaica, 1 c. ; Madras, 9 c. ; Paris, 1 c. ; Singapore, 16 c. ; Yokohama, 16 c.

SOAP—
Accra, 13 c. ; Adelaide, 3 c. ; Aden, 2 c. ; Antwerp, 1 c. ; Auckland, 2 c. ; Azores, 2 c. ; Bangkok, 2 t. 7 c. ; Barbados, 1 c. ; Barcelona, 3 c. ; Basrah, 1 c. ; Bathurst, 18 c. ; Beira, 2 c. ; Bombay, 1 t. 19 c. ; Brisbane, 3 c. ; Brussels, 3 c. ; Calcutta, 13 c. ; Dar-es-Salaam, 1 c. ; Delagoa Bay, 1 c. ; Demerara, 1 c. ; Durban, 1 c. ; Hong Kong, 5 c. ; Irish Free State, 6 c. ; Italy, 10 c. ; Jamaica, 1 c. ; Karachi, 8 c. ; Madras, 8 c. ; Malta, 10 c. ; Matadia, 1 c. ; Melbourne, 1 c. ; Monte Video, 4 c. ; New York, 1 t. 8 c. ; Montreal, 6 t. 13 c. ; Napier, 1 c. ; Penang, 4 c. ; Perth, 2 c. ; Pt. Elizabeth, 2 c. ; Punta Arenas, 3 c. ; Rangoon, 9 c. ; St. Lucia, 1 t. ; Sydney, 4 c. ; Tientsin, 1 t. 3 c. ; Toronto, 7 t. 3 c. ; Trinidad, 3 t. ; Vancouver, 4 c. ; Wellington, 5 t. 5 c. ; Winnebah, 2 t. ; Zanzibar, 1 c.

TALLOW—
Genoa, 110 t. 5 c. ; Haifa, 10 c. ; Hamburg, 5 t. 5 c. ; Harlingen, 1 t. 10 c. ; Helsingfors, 6 t. 6 c. ; Marseilles, 25 t. ; Nantes, 24 t. 18 c. ; Naples, 45 t. 3 c. ; Rotterdam, 11 t. 1 c. ; Sekondi, 5 c.

TAR (STOCKHOLM)—
Rockhampton, 200 galls.

WAX (*otherwise undescribed*)—
Melbourne, 10 t. 10 c. ; New York, 1 t. 1 c. ; Osaka, 5 c. ; Sydney, 1 t. 2 c.

WHITE LEAD—
Aden, £52. ; Auckland, £89. ; Batoum, £151. ; Beira, £50. ; Bombay, £26. ; Cape Town, £71. ; Calcutta, £118. ; Channel Islands, £14. ; Delagoa Bay, £9. ; Durban, £13. ; East London, £20. ; Fiji Islands, £43. ; Fremantle, £485. ; Gisborne, £44. ; Hobart, £183. ; Jamaica, £7. ; Karachi, £13. ; Melbourne, £870. ; Pt. Moresby, £14. ; Pt. Elizabeth, £8. ; Penang, £5. ; Shanghai, £26. ; Sydney, £138. ; Trinidad, £109. ; Wellington, £653.

ZINC ASHES—
Antwerp, 5 t.

MANCHESTER.

Week ending November 3.

CARBORUNDUM—
Seine, 14 pkgs.

CAUSTIC SODA—
Abadan, 748 drms.

CHEMICALS (*otherwise undescribed*)
Basle, 12 cks., 12 drms.

CHROME ALUM—
Hamburg, 25 cks.

DISINFECTANTS (*otherwise undes.*)
Gaza, 2 pkgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Australia, 134 kgs., 68 drms.
Rouen, 23 cks., 6 kgs., 1 drm.

DYESTUFFS (NATURAL)—
Logwood
Abadan, 7 cks.

FERRO MANGANESE—
Baltimore, 827 t.
Montreal, 15 t.

GLUE—
Famagusta, 10 bgs.

LEAD ASHES—
Hamburg, 196 bgs.

SALT—
Montreal, 3,920 sks.
Quebec, 3,184 sks.

SOAP—
Abadan, 5 cs. ; Ahwaz, 34 cs. ; Bombay, 32 cs. ; Busrah, 3 cs. ; Cairo, 25 cs. ; Gaza, 2 cs. ; Tunis, 22 cs.

SODIUM BICARBONATE—
Basra, 200 kgs.

NEWCASTLE-ON-TYNE

Week ending November 3.

AMMONIA—
Christiania, 10 kgs.

BLEACHING POWDER—
Christiania, 172 cs.
Gothenburg, 15 cks.

CAUSTIC SODA—
Christiania, 156 drms.
Gothenburg, 55 drms.

CHEMICALS (*otherwise undescribed*)
Bergen, 100 bgs.
Christiania, 1 cs.

GLUE—
Christiania, 40 bgs.

LITHARGE—
Christiania, 4 cks.

RED LEAD—
Bergen, 61 cks.
Christiania, 32 cks., 10 kgs.
Gothenburg, 48 cks.

SALT—
Christiania, 85 cs.

SOAP—
Bergen, 1 c.
Christiania, 3 cs.

N. & S. SHIELDS.

Week ending November 3.

NIL.

PRICES CURRENT.

WEDNESDAY, NOV. 7, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

ACIDS.

		£	s.	d.
Acetic, 40% and 80%	*cwt.	23- / &	46/-	
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	90	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	4
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	1

COAL TAR PRODUCTS.

Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	3
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	6	17	6
Pyridin	gallon	1	2	6
Tar, crude	ton	4	5	0
Tar, refined	barrel	2	2	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3

GENERAL CHEMICALS.

Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	68	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	7	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	81	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	0	0
Formaldehyde, 40%	ton	65	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	2	6
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	42	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	43	0	0
Lime Acetate (brown)	*ton	12	0	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	15	0
Litharge (British)	ton	45	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium, Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	2	1
Naphtha (Wood), Solvent	*gallon	0	6	0
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	0
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	23	0	0
Potassium Chlorate	lb.	0	0	2¾
Potassium Hydrate (Caustic Potash), 88/90%	†ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	†ton	26	0	0
Potassium Hydrate (liquid), 50° Tw.	ton	16	10	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (ref'ned)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8½
Potassium Prussiate (yellow)	lb.	0	0	10½
Potassium Prussiate (red)	lb.	0	2	9
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	30/-	&	57/-
Sodium Acetate	ton	24	5	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2⅝
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11½
Sodium Phosphate	ton	14	0	0
Sodium Prussiate	lb.	0	0	5¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	0	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	0	0
Sulphur (Roll Brimstone)	ton	8	0	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	3½
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0

METALS.

Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	42	0	0
Copper	ton	61	5	0
Lead (Chemical Sheet), delivered	cwt.	1	17	6
Lead (Foreign Pig)	ton	29	15	0
Nickel	ton	130	0	0
Silver	oz.	0	2	8 1/16
Tin, English Ingots	ton	214	0	0
Zinc (Spelter)	ton	33	0	0
Zinc Dust, 90/92%	ton	50	0	0

OILS.

Cottonseed	*ton	42	10	0
Linseed, Raw	*ton	45	10	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	13	0

* *Packages extra or returnable*; otherwise prices usually include packages.

† Makers' prices for home consumption only.

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
The Arsenic Market	571
The State of Trade	572
A Code of Ethics for Chemists	572
The Turning Point	572
Fireproofing and Fire-extinguishing Agents	573
Indigo Shortage in Japan	575
New Colour Intermediates and Bactericides	576
Society of Public Analysts	576
A Study of the Absorption Tower	577
Prevention of Metal Corrosion	578
Sicily as a Chemical Producer	579
Platinum in Modern Industry	581
American Non-ferrous Metallurgy	582
Our Bookshelf	583
Items of Interest	584
Coming Events	585
British Overseas Chemical Trade	585
Imports of Chemicals and Allied Products in October	586
Fertiliser News	587
Gazette News	587
Reports of Companies	588
Legal Intelligence	589
Purification of Oil-contaminated Water	589
Cumberland Coking and By-product Industries	589
South Wales Notes	589
Trade Inquiries	590
Thirty-five Years Ago	590
The Patent List:—	
Applications for British Letters Patent	590
Complete Specifications Accepted	590
Complete Specifications Open to Public Inspection before Acceptance	590
Abstracts of Latest Complete Specifications	591
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	592
New Companies	592
Publications Received	592
Market Reports:	
London "Open Market" Report	592
London Metal Market	594
Manchester Chemical Market	594
Swansea Market Report	594
Liverpool Chemical Market	595
West of Scotland Chemicals	595
Imports of Chemical Products	596
Exports of Chemical Products	598
Prices Current	602

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CURRENT TOPICS.

THE ARSENIC MARKET.

THE arsenic market, which attracted so much attention last spring, is again the scene of interesting developments. In the years prior to 1914 price fluctuations of any magnitude were rare in this market. The production of white arsenic before the war was about 10,000 tons per annum, and the price ranged between £9. and £11. per ton. The disturbing element which has caused arsenic prices to soar, and frantic efforts to be made to increase production, has been, of course, the recognition of the unrivalled insecticidal value of calcium arsenate as a weapon for combatting the boll weevil in the world's cotton-growing areas. During the early part of the year something approaching an arsenic panic developed. American buyers, in their frantic efforts to secure possession of supplies of arsenic, caused the market value of the oxide to rise from about £30 to £75 per ton in a very few weeks. World stocks proved inadequate to meet the demands of the cotton growers, and comprehensive schemes were proposed to produce arsenic in the United States, directly from arsenical ores. Under the stimulus of the increased demand, and in spite of the depression in the copper industry, which normally produces large quantities of arsenic as a by-product, the world's production is now over double the pre-war figure. At the commencement of the present cotton-growing season very considerable stocks of arsenate were held by American dealers, but the boll weevil failed to come up to expectations, and prices of white arsenic fell from a level of about £75. per ton to just over £57. per ton. Within the past three weeks, however, the old enemy of the cotton grower has again resumed his activities; the demand for arsenic is, consequently, approaching its last season's level, and prices are again in the neighbourhood of £70. per ton. These fluctuations are causing considerable concern to dealers throughout the world, and the question whether it is not possible to stabilise the arsenic market is being asked. An American contemporary suggests that this can only be done by the discovery of a new extensive and permanent outlet for arsenic; in other words, that a new use for the product be found. Whilst the varying demand for insecticidal purposes controls the market it is difficult to see how stability in arsenic prices can be attained. It is true some quite new large-scale use for arsenic compounds may ultimately be discovered, but the probabilities are not great.

THE STATE OF TRADE.

On the evidence furnished by the statistics given in the October Board of Trade Returns, trade appears to be improving. The value of imports rose to £99,915,000. during the month, compared with £83,266,000. in September. British exports also increased in value, almost reaching the total for May, previously the highest point in 1923. Including re-exports, the total value of exports reached £82,470,000., against £71,947,000. in the previous month. Imports, it will be noticed, rose more rapidly than exports, thus increasing the "adverse" trade balance. From the standpoint of British industry it is gratifying to see that the chief increase in imports is due to raw materials, the values being £30,879,000. for October, compared with £23,579,000. for September. Added to this is the fact that exports of British manufactures rose from £48,937,000 in September to £53,882,000. in the following month, of which increase iron and steel manufactures and cotton manufactures each accounted for over £1,000,000. In chemicals a larger volume of trade is recorded, exports expanding from £2,342,000. to £2,573,000., and imports from £1,024,000. to £1,246,000. Turning to the trade figures for the ten months ending October 31, due allowance must be made for the change in the status of Ireland, while the scale of values is also a factor which affects comparison with last year, though not to the same extent as in the previous years. As compared with the corresponding period of last year, there is a total expansion to note in the value of imports of £74,000,000., and in exports of £54,000,000. Even when all allowance is made, however, it is not a good point that so much of the increase in imports for the 10 months should have been connected with foodstuffs and manufactured articles, and that out of the total expansion in exports so large a proportion should have been under the head of raw materials.

A CODE OF ETHICS FOR CHEMISTS.

It may be remembered that during the present year an American Institute of Chemistry, modelled closely on the lines of the British Institute, came into being. This body has already secured a membership which, both as regards numbers and the enthusiasm of the individual members, makes its eventual growth to a very powerful organisation practically assured. Chemists on this side of the Atlantic—who, of course, wish the new Institute every success—are, naturally, greatly interested in its activities. A matter that at the present moment is occupying the minds of the members of the American Institute is the advisability and practicability of drawing up a wide code of ethics to regulate the conduct of professional chemists. The idea of a code of ethics is not new in America. Seven years ago the American Chemical Society drew up such a code, consisting of twelve clauses, but after full discussion by the Council the proposal was abandoned. Again, the American Gas Products Association—an organisation mainly concerned with the marketing of compressed gases—has recently adopted a code of ethics as standards of correct practice in the conduct of the business of its members. This latter code, consisting of seven articles, divided into sixty-two clauses, is a veritable encyclopædia of the moral and civic virtues. We do not know what will happen if a member fails to live up to any clause, but of this we are quite confident—that if only one half of the good resolutions are given general effect, the age of the Millenium in the business world will be very near. We might just cite one clause as an example: "We shall be accurate in our printed or oral word, whether they be in letter, advertising, part of a sales talk, or in general conversation with customers or others. Accuracy is not only the absence of actual misstatement, but also the absence of any facts which will prevent the hearer or reader making a correct deduction." The American Institute of Chemistry is, however, apparently to be satisfied with a code consisting of fifty clauses only, under the four divisions of the chemist's relation to the public, to clients and employers, to employees, and to other chemists, respectively. The various clauses, which range from general injunctions, such as "The chemist should participate in clean politics, and should strive to be a force to assist in the cleansing of politics," to exact rules of etiquette, such as "He should not seek or solicit a position occupied by another chemist," are, however, quite as comprehensive in scope as those of the Gas Products Association referred to above. We do not wish it to be inferred for one moment that we are in any way deprecating the value of the ideals that the Institute places before its members, but we do think it somewhat futile to draw up a long list of moral injunctions, the majority of which cannot, by any stretch of the imagination, be enforced by the Institute. A simple code of professional etiquette, that can be enforced, would seem to be of far more immediate practical value.

THE TURNING POINT.

The utmost credit must be extended to the Premier for his courage in submitting the vital question of protection for our industries to the decision of the country at such an early date. A general election must cause a certain amount of dislocation in the business of the trading community, but we are convinced that Mr. Baldwin has acted wisely in not postponing his appeal to the country until next year. The decision of the electorate on December 6 next may prove to be the most fateful one in the industrial history of the country. If, as we hope and believe, a strong Conservative Government is returned to power, relief for our struggling industries will be immediately forthcoming. We made clear our own attitude on these all-important matters some weeks ago. We are convinced that a modification in our fiscal policy must be made if our unemployment problem is to be solved and large numbers of our manufacturers to be saved from ruin. This modification can only consist in a general but systematically compiled tariff on imports, with a preferential treatment for our Empire co-partners.

FIREPROOFING AND FIRE-EXTINGUISHING AGENTS.

A SUMMARY OF MODERN DEVELOPMENTS.

By "Investigator."

THE principles underlying the protective action of fireproofing agents or "antipyrenes"—first recognised by Gay Lussac—are firstly, the dilution of the combustible vapours, so as to render them practically non-inflammable; and secondly, the formation of an indestructible surface-coating. Little difficulty is experienced in effectively fireproofing such materials as unexposed timber, but the case is very different with fabrics which have to withstand laundering. A case in point, which has been the subject of close study, is the proofing of flannelette. Here the protection afforded must not only withstand the rigours of the wash-board, but the proofed fabric must not be tendered nor exercise any injurious action on the skin.

As was stated at the recent Aeronautical Congress, a pressing problem, and one beset with many difficulties, which is now receiving attention, is the fireproofing of the doped fabric structures composing the wings of aeroplanes. For a successful solution, the proofing would require to be not only highly efficacious and able to withstand weathering without deterioration, but it must also not tender unduly the linen fabric nor "weight" it appreciably.

In the field of fire-extinction, much attention is being paid to the use of foam-producing compositions, particularly in the case of oil-fires. Oil refineries are now equipped with large installations based on this principle, an equipment, the need for which will be realised, when it is stated that, during the decade 1908—1918, nearly 13 million barrels of oil were destroyed by oil-fires in the United States alone. Out of a total of 500 of these conflagrations, more than 300 were caused by lightning. Carbon tetrachloride is now extensively used for extinguishing oil and electrical fires, but according to a recent American Governmental report, its haphazard use, particularly in confined spaces, is attended with some danger owing to the toxic nature of its decomposition products.

The Use of Ammonium Compounds.

Ammonium phosphate $(NH_4)_2HPO_4$, is endowed with both the desiderata of an efficient fireproofing agent, it readily liberates ammonia, a gas of low inflammability, and leaves a fusible residue of metaphosphoric acid. Its high solubility, however, precludes its successful use in materials which have to withstand laundering and weathering. Combustible materials coated with the phosphate, char in contact with a flame and glow only with great difficulty. For this reason, matches are impregnated with it to produce non-glowing match-ends. In order to proof wood, ammonium phosphate may be used in conjunction with boric acid, a solution, suitable for treating wood by immersion, containing 100 grammes of the former and 10 grammes of the latter per litre. It is claimed that wood, so impregnated, can be worked like the untreated material without detriment to the tools, and that it will not injure paint, varnish, nails or screws.

In the manufacturing of fire-resistant varnishes, the addition of 5 per cent. of ammonium phosphate is recommended, as this proportion will not render the film opaque. Owing to its solubility, however, higher proportions are readily dissolved out on exposure. For the prevention of smouldering, vegetable fibres, such as kapok, may be impregnated with 2 per cent. solutions of ammonium phosphate or borate, or with a 6 per cent. solution of microcosmic salt (*Brit. Pat.*, 130,662, of 1919). On heating, the latter fuses and evolves ammonia leaving a coating of fire-resistant sodium metaphosphate.

Ammonium phosphate $(NH_4)_2HPO_4$, is endowed with both proofing solutions, but owing to its property of sublimation from heated materials, fusible non-volatile substances, such as borax and boric acid, are usually added to assist its protective action. For instance, Gleichmar's solution consists of 133 grammes of ammonium chloride, 33 grammes of borax, and 17 grammes of salt per litre. The tendency of this solution to deteriorate fabrics, through its acid properties, cannot easily be countered by the presence of alkaline compounds, owing to the decomposition of the chloride set up by the latter. For proofing fabrics, a mixture of ammonium chloride, ammonium phosphate and alum, in the proportions 2 : 1 : 1, has been suggested, dilute acetic acid being added to avoid attack on the dye (*Brit. Pat.*, 113,162, of 1917). Such a mixture, consisting as it does, of three acid substances, would almost certainly tender the fabric. Ammonium bromide is claimed to be a more effective protection from ignition than the chloride (*Ger. Pat.*, 355,107, of 1918).

Ammonium sulphate is seldom used alone because of its acid reaction. On this account, the Hall Lumber Company combines its use with that of an alkaline-reacting salt such as trisodium phosphate (*U.S. Pat.*, 1,080,966, of 1913). Borax may also be used in conjunction with the sulphate.

Compounds of Boric Acid.

Owing to the facility with which metallic borates fuse to form glass-like sealing films, stable under heat, these compounds find extensive use in fireproofing media. A notable example is zinc borate, a substance which has received close attention at the hands of the United States Government research departments. Thus, together with the corresponding lead compound, its use in fire-resistant paints has been covered by patents, which have been dedicated to the public. (*U.S. Pats.*, 1,265,549, of 1918 and 1,216,729, of 1917). For fireproofing fibrous material with lead borate, the material is first saturated with a solution of a borate, dried, and the insoluble lead compound precipitated by treatment with a soluble lead salt. Impregnation with zinc borate by a similar process is recommended by the U.S. Forest Products Laboratory as being particularly suitable for imparting incombustibility to roofing shingles. In this case, the shingles are impregnated with borax, dried until the moisture content does not exceed 10 per cent. Then follows the injection of zinc chloride, when the insoluble borate remains in the pores.

Complex borates, which should have the advantage of lower melting-points than the simpler constituent compounds, have also found application. Thus, for fireproofing aircraft linen, the double zinc-sodium borate, prepared by mixing boiling solutions of zinc-ammonium sulphate and borax, has been suggested (*Brit. Pat.*, 120,421, of 1917). The material is applied in a gelatin medium containing borax and ammonium chloride. A similar medium is that of Flatters, who proposes, for this purpose, a complex composition consisting substantially of magnesium and sodium borates suspended in a colloidal mixture of soap, glycerol, glue, and gelatin (*Brit. Pat.*, 120,465, of 1918).

In many fireproofing compositions, boric acid is added to the borax both to enhance the fusibility and to neutralise the alkalinity of the borax. A mixture of borax, trisodium phosphate and potassium carbonate has been suggested for the dual purpose of fireproofing and fire-extinguishing. On account of their solubility, however, the use of the alkali borates is much restricted.

Fireproofing with Water Glass.

On account of its glass-like nature and stability at high temperatures, water glass enters into the composition of many fireproofing media. Wood may be painted with water glass alone, or with a hot mixture of sodium silicate, glue and Spanish white (chalk). For textiles, silica may be deposited by after-treatment with dilute hydrochloric acid, followed by washing and heating, but this treatment imparts harshness to the fabric. A rubber emulsion, containing water glass, borax and a metal powder, has been suggested for water-proofing and fire-proofing fine fabrics such as lace (*Brit. Pat.*, 160,627, of 1920).

The adhesive properties of sodium silicate are turned to advantage both in coating materials with solid fireproofing compositions and in the formation of fireproof masses containing steel wool, silicate cotton (slag wool) or asbestos. Thus a fireproof coating for wood is made by treating solid sodium silicate (350 parts), and asbestos powder (350 parts) with boiling water (1,000 parts); or the wood is first treated with a mixture of equal parts of magnesium silicate, sodium phosphate and borax, and subsequently finished with water glass (*French Pat.*, 472,172, of 1914).

Resort is frequently had to treatment with calcium compounds in order to impart water-resistance. Thus, a cement, for converting sheets of paper into fireproof pasteboard, consists of potash water glass (5-10 per cent. free alkali) mixed with chalk (*Ger. Pat.*, 298,129, of 1916). Fireproof masses may be made by moulding a mixture of slag wool, filler and water glass, followed by treatment with a solution of calcium chloride, while the structural material "Uralite" is made by spraying asbestos with a mixture of water glass and sodium bicarbonate.

Magnesium Compounds.

Magnesium ammonium phosphate, which decomposes on heating into magnesium pyrophosphate and ammonia, has been patented by the Du Pont Company of America for reducing the inflammability of cellulose-ester and oil-varnish films. In the latter case, the boiled linseed oil is incorporated with about one-third its weight of the phosphate (*U.S. Pat.*, 1,316,881, of 1919).

For fireproofing and preserving wood, the material may be impregnated with a solution of the double ammonium magnesium sulphate or with cuprammonium sulphate. In order to lower the melting-point of the magnesium sulphate, sodium or potassium sulphates may be added, preferably in quantity to form the eutectic mixture—that is, the mixture with the lowest melting-point (*Ger. Pat.*, 306,600, of 1914).

Calcium sulphate or barium carbonate may be deposited in the body of the wood, the former by impregnation with ferrous sulphate followed by treatment with calcium chloride, the latter by treatment with a solution of barium sulphide and subsequent injection of gaseous carbon dioxide (*U.S. Pat.*, 1,346,287, of 1920).

Compounds of Zinc and Aluminium.

In addition to the borate of zinc, described above, the chloride is used to impart fire-resistance as well as immunity from destructive organisms, to wood. To counteract acidity, the chloride may be dissolved in ammonia and the excess neutralised with boric or phosphoric acid. Zincate solutions (2 per cent. zinc), stabilised by the addition of ammonium salts, have also been proposed, while the American Pyrene Company have patented a mixture of zinc phosphate and an ammoniacal solution of zinc chloride (*U.S. Pats.*, 1,318,524, of 1919, and 1,261,736, of 1918).

Alum has been used for fireproofing textiles, in combination with lime, or with the sulphates of ammonium, sodium or potassium. In order to impregnate fabrics with adherent hydrated alumina, they are soaked in a solution of sodium aluminate (Sp. Gr. 1.13), treated with carbon dioxide at 105° C. under a slight pressure, then washed and dried; or the aluminate may be decomposed by treatment with sodium bicarbonate. Another method is to moisten the alum-impregnated material with bicarbonate, and then to treat with steam or with carbon dioxide at 100° C.

To reduce the inflammability of paper, a paste of sodium aluminium carbonate may be incorporated with the pulp (*Brit. Pat.*, 23,421, of 1914). With a view to suppressing the tendency of such proofed materials to smoulder at the edges, they may be treated with a colloidal solution of sulphur, prepared from sulphuretted hydrogen and sulphurous acid. Solutions of sulphur in volatile organic solvents are also applicable (*Brit. Pat.*, 130,743, of 1918). According to W. H. Perkin, rubberised fabrics, as used for tyres, may be rendered non-inflammable by the addition of hydrated alumina alone or mixed with asbestos (*Brit. Pat.*, 125,622, of 1916).

A complex composition consisting of manganous chloride (33), orthophosphoric acid (20), magnesium carbonate (12), boric acid (10), ammonium chloride (25), and water (1,000 parts), will fireproof wood when this is boiled for 8 hours with the medium.

Use of Tin and Antimony Compounds.

The highly combustible nature of certain fabrics like flannelette and muslin, led to an exhaustive study of the problem of reducing their inflammability. This work culminated in the process due to W. H. Perkin, patented in 1902, according to which the fabric is impregnated with hydrated stannic oxide. Described briefly, the fabric is soaked in a solution of sodium stannate, $Na_2SnO_3.3H_2O$, ("preparing salt"), of specific gravity 1.225 at 15° C., squeezed and passed over drying drums. A solution of ammonium sulphate (Sp. Gr. 1.075) is then applied and the resulting sodium sulphate removed by washing. Material treated in this way has its dyeing properties unaltered, and is without deleterious action on the skin. With tin at £200 per ton, the cost of fireproofing "Nonflam" flannelette works out at about one penny per yard, according to the inventor's statement (8th Inter. Congr. App. Chem., New York, 1912). In a modification of this process, after impregnation with sodium stannate, the fabric is treated with a titanium-salt solution, followed by fixing with sodium silicate.

A drawback in the use of oxides is their tendency to act as combustion catalysts by surface action and thus to promote glowing, in presence of combustible vapour. Such an effect is especially noticeable where the fabric is painted, varnished or doped, and may, under favourable circumstances, lead to the ignition of any gaseous decomposition products.

Within the last few years numerous patents have been granted to Arent, to cover the use of antimony and bismuth trichlorides for fireproofing. These chlorides will dissolve in many organic solvents such as carbon tetrachloride, carbon bisulphide, amyl acetate or benzol and are hydrolysed by water to form insoluble basic compounds. They can also be incorporated with organic wood-preserving and waterproofing materials.

A suitable medium for both reducing the inflammability of and creosoting timber, consists of a solution of antimony trichloride dissolved in creosote (2lb. $SbCl_3$ per gallon). Tar and asphalts may be incorporated with about one-fifth their weight of the chloride. (*Brit. Pat.*, 146,099, of 1920). A fire-resisting varnish is composed of a drying oil and a solution of antimony chloride in one of the volatile solvents already mentioned. To fireproof fabrics, they are treated with a solution of the trichloride in carbon bisulphide or carbon tetrachloride, the solvent evaporated, and the chloride hydrolysed by exposure to steam or water. Waterproofing agents, such as rubber, may also be added to the antimony solution (*Brit. Pat.*, 132,813, of 1919) In the preparation of non-flaming plastic masses from cellulose derivatives, such as the nitrate, the material may be dissolved in amyl acetate containing antimony chloride (*Brit. Pat.*, 138,641, of 1920).

Compounds of Tungsten and Zirconium.

Sodium tungstate is much used both by itself and in conjunction with other fire-retarding compounds. In some experiments on its protective action recorded by Sibley (*J. Ind. Eng. Chem.*, No. 8, 1921), impregnation of cotton fabrics with a three per cent. solution was found to be equally as efficacious as treatment with a more concentrated solution. For the protection of tulle, muslin and other delicate fabrics, impregnation with a solution containing 10 grammes tungstate, 125 grammes ammonium phosphate and 7 grammes boric acid per litre, has been proposed. This solution is added to the finishing medium (gum, starch or dextrin), in the proportion 1:4. Ammonium chloride, ammonium sulphate, and aluminium acetate may also be combined with sodium tungstate. A medium, particularly recommended for artificial silk, can be prepared by diluting a mixture of the following solutions: 100 parts aluminium acetate (Sp. Gr. 1.13), 10 parts acetic acid (Sp. Gr. 1.06), and 200 parts sodium tungstate (Sp. Gr. 1.40). Water-resistance can be imparted by using an excess of the acetate (*Brit. Pat.*, 175,746, of 1920).

According to Mond (*Brit. Pat.*, 4,457, of 1915), zirconium hydroxide may be applied to fabrics as a hydrogel, prepared by steeping in a solution of the aceto-nitrate containing magnesium sulphate, draining, heating to 65° C., and finally washing. One litre of the steeping medium should contain 200 grammes magnesium sulphate and 20 grammes of the aceto-nitrate, prepared by evaporating zirconium nitrate with acetic acid. To enhance the fire-retarding effect, the treated fabric may be allowed to absorb phosphoric acid. Another method is to impregnate the material with a solution of precipitated zirconium phosphate in concentrated oxalic acid.

Organic Fireproofing Agents.

As is to be expected, the principal members in this group are highly chlorinated or brominated substances, depending for their effect, on the evolution of non-inflammable vapours. One such composition consists of brominated coal tar, dissolved in pitch. Bromination is effected by treating the tar with half its weight of bromine, after which the product is dissolved in 20 parts of pitch and the mixture applied to the wood in the molten condition (*U.S. Pat.*, 1,194,558, of 1916). The chloro-naphthalenes have also been applied in reducing the inflammability of asphalt. According to another specification, fibrous material is impregnated with the sodium salt of a polychlorophenol or chloro-acid and the free phenol or acid then precipitated. These compounds decompose below 400° C. and may be used in conjunction with an inorganic fireproofing agent. Solutions of the sodium salts may also be utilised for putting out fires (*U.S. Pats.*, 1,085,783-4, of 1914).

Solutions of algin, or alginic acid have been suggested for fireproofing inflammable aircraft materials. This is a nitrogenous product obtained from certain species of seaweed, by extraction with sodium carbonate, precipitation with acid

and final purification by dialysis (*U.S. Pat.*, 1,321,708, of 1919).

Methods of Application and Testing.

In the fireproofing of wood, the methods of impregnation are closely similar to those used in applying wood preservatives.* The pressures applied will depend on the structure of the wood, as an excessive pressure will tend to crush the cells. Too high a temperature during drying may lead to brittleness. In order to assist penetration, an initial vacuum may be applied, followed by injection under about 170lb. pressure. In the application of water glass and its subsequent precipitation with hydrochloric acid, salt is left in the wood. To obviate this, it has been proposed to utilise pure silicic acid, prepared and impregnated by electro-osmotic methods (*Brit. Pat.*, 101,205, of 1917).

Many fibres, such as kapok, have cuticles which are penetrated with difficulty by soluble salts. To facilitate penetration in such cases, the material may be treated with alcohol or other volatile solvent, or with a dilute solution of hydrofluoric acid (2 parts of the commercial acid in 100 parts of water). Coating with metal by electro-deposition is suggested as a method of fireproofing aircraft linen without loss of tensile strength (*Brit. Pat.*, 149,745, of 1919).

For most practical purposes, the direct method of testing the efficacy of a fireproofing treatment—that is by applying a flame—should be sufficient. In certain cases, notably for aircraft fireproofing, some method of testing the comparative protective action is necessary. Very little information is available, however, with regard to the inflammability of fireproofed fabrics, although some results of comparative tests with unproofed materials have been made public (Aeronautical Advisory Committee Report, No. 573, of 1918). The three methods used for determining the ease of ignition of doped fabrics were as follow: An approximate ignition temperature determination by heating in a metal tube; determination of the size of celluloid cube necessary to cause ignition together with the rate of burning of the fabric; and determination of the proportion of alcohol in a carbon-tetrachloride-alcohol mixture, burning on a cylinder of plaster of Paris, necessary to ignite the fabric.

The Tendering Action of Fireproofing Agents.

Although fireproofing generally tends to weaken the fabric, the published quantitative information is very meagre. Sibley has determined the tensile strength of tyre duck fabrics after treatment, on a small scale, with seven different fireproofing media (*J. Ind. Eng. Chem.*, No. 8, 1921). Pieces of the fabric (1 inch by 6 inches) were boiled for 15 minutes in the solutions, then lightly wrung out, and allowed to dry in the air for 3 days so that they had the same water-content, all the experiments, as well as the control, being carried out simultaneously. The highest and lowest results (of three tests) for each medium are given below, the figures representing the breaking strength in lbs. per inch.

Treatment.	Heavy Fabric (36oz./sq. yd.).	Light Fabric (18½oz./sq. yd.).
Control (boiled 15 minutes in distilled water)	302 .. 286	212 .. 180
Boiled with saturated aluminium sulphate, $Al_2(SO_4)_3\ 18H_2O$, dried at 80° C., then treated with saturated sodium carbonate	—	—
Ammonium chloride 40, borax 10, salt 5, and water 300 parts	200 .. 184	185 .. 170
Borax 35, glucose 18, water 300 parts	164 .. 150	154 .. 144
Sodium-tungstate solution, 3½ per cent. $Na_2WO_4\ 2H_2O$	264 .. 222	210 .. 188
Borax 45, $MgSO_4$ 22½, water 300 parts	220 .. 200	178 .. 155
Control	333 .. 304	229 .. 212
NH_4Cl 15, $Na_2B_4O_7$ 3, H_3BO_3 6, water 300 parts	209 .. 200	215 .. 184
Sodium-tungstate solution, 15 per cent. $Na_2WO_4\ 2H_2O$	292 .. 238	230 .. 200

The sodium-tungstate solutions had the least weakening effect, while tests were impossible with the fabrics treated with aluminium sulphate followed by sodium carbonate, owing to their extremely deteriorated condition.

Tenacious Foam-forming Mixtures.

According to the investigations of the U.S. Bureau of Mines (Bulletin, No. 170), the most practicable method of dealing with oil-tank fires is to spread, on the surface of the oil, a thick, tenacious, foam, consisting of tough bubbles inflated with carbon dioxide. Such a foam is usually obtained by mixing a sodium-bicarbonate solution, containing a froth-stabiliser, with an acid salt. A highly-recommended mixture comprises a pair of liquids of the following composition:—

A. Aluminium sulphate 10, sulphuric acid (Sp. Gr. 1.71 at 15° C.) ½, water 100 parts.

B. Sodium bicarbonate 7½, ground glue 1¼, arsenious oxide 1/52, water 100 parts.

The proprietary extinguisher "Foamite" has a closely similar composition. Other stabilisers may replace glue, as for example, liquorice-root extract, saponins, soap bark, the phlobaphenes and sodium silicate. The cost of such an installation is estimated to be about 3 cents per barrel-capacity of the tanks protected. To increase the efficiency of the ordinary bicarbonate-acid extincteur, foam-forming compounds may be added to the alkali solution and carbon tetrachloride may be added to sulphuric acid of similar density.

Many carbonate and bicarbonate solutions containing water-soluble organic compounds have been patented. A few such mixtures are sodium bicarbonate with sodium lactate, potassium citrate or a phosphoprotein, potassium carbonate with glycerin or sodium lactate, and ammonium carbonate with glycerin (*U.S. Pats.*, 1,278,714-6, of 1918, 1,375,779, of 1921 and 1,306,707-9, of 1919). A very effective mixture consists of sodium sulphite and ammonium chloride in molecular proportions.

Carbon Tetrachloride as Fire-extinguishing Liquid.

Owing to the formation of a heavy, non-inflammable, vapour blanket in contact with a heated surface, carbon tetrachloride is extensively used for putting out small fires. When applied to electric-arc and similar fires, there is no danger of electric shock, but its general use in the absence of efficient ventilation is not without risk. Recent investigations by the American Bureau of Mines (Technical Paper, No. 248), have shown that toxic quantities of phosgene ($COCl_2$), chlorine and hydrochloric-acid gas result from its decomposition, in contact with heated iron or with a fire. In some experiments made by passing the tetrachloride mixed with air through a heated quartz tube at 600°-800° C., one-half was decomposed into toxic products. The addition of turpentine reduced the amount of free chlorine, but was without appreciable effect on the proportion of phosgene.

According to Henning (*J. Soc. Chem. Ind.*, No. 10, 1922), methyl bromide (B.P. 4.5° C.), does not give rise to dangerous decomposition products and would, moreover, be self-propelling and also very resistant to cold (freezing-point -84° C.). A host of mixtures of carbon tetrachloride with small quantities of other organic liquids have been recently patented, chiefly in America. In the majority of cases the object of these additions is to lower the freezing-point and saturated or chlorinated hydrocarbons, aromatic esters, aniline, acetophenone, anisol and propionic acid are some of the compounds recommended for this purpose. Inorganic fire-resisting materials have also been incorporated with chlor-hydrocarbons, while a recent specification proposes to combine the use of the latter with materials based on the "Foamite" principle (*Brit. Pat.*, 201,379, of 1922).

* See *Chemical Trade Journal and Chemical Engineer*, Oct. 5, 1923, page 391.

INDIGO SHORTAGE IN JAPAN.

CESSATION OF GERMAN DELIVERIES.

MORE than a thousand barrels of German indigo blue were lost in Tokio and Yokohama during the earthquake, states a Tokio correspondent of the *Oil, Paint, and Drug Reporter*. The shipment of German indigo, which was already irregular during all the first half of this year, had practically ceased in August. The Daido Indigo Corporation, which is an association of Japanese dye merchants acting as agent for German producers, gave notice just before the earthquake to its sub-agents, therefore, that when its stock in hand was exhausted it would have to wind up its affairs. The losses caused by the recent catastrophe, however, accentuated the Corporation's difficulties. This closing of German dye manufacturers' business in Japan, it is feared, will cause a great shortage in indigo blue in the season of larger consumption which will soon set in. In Osaka and Kobe merchants are trying to deal with the situation, and it is expected that the importation of indigo in the remaining part of the year will be considerable.

NEW COLOUR INTERMEDIATES AND BACTERICIDES.

CHEMICAL RESEARCH AT BIRMINGHAM UNIVERSITY.

SEVERAL interesting technical contributions relating to research work in the Chemistry Department of the University of Birmingham were made at the first meeting of the session of the Birmingham and Midland Section of the Society of Chemical Industry on Tuesday, November 6. The papers were by Professor Morgan, head of the Chemistry Department, in conjunction with colleagues and students. In the absence of Dr. E. B. Maxted (chairman), Dr. Parker presided, and announced that on December 15 a dinner would be held by the Midland Section of the Society of Chemical Industry in conjunction with the Institute of Chemistry at the Queen's Hotel, Birmingham.

The Amino-Acetophenones as Colour Intermediates.

In this paper by Professor G. T. Morgan and J. E. Moss, it was stated that at low temperatures nitration of acetophenone led to meta-nitro-acetophenone as the preponderant product, *ortho*-nitro-acetophenone being present as a by-product, the proportion of the latter increasing with rise of temperature. Even at the highest temperatures at which nitration occurs smoothly, however, meta-substitution predominates, although, owing to oxidation, a portion of the product now appears as meta-nitro-benzoic acid.

The two nitro-acetophenones when reduced gave the corresponding amino derivatives which were tested as dye-producing intermediates. When diazotised and coupled with β-naphthol-sulphonic acids the amino-acetophenones furnished monoazo dyes. Mordanting tests showed that azo dyes from ortho-amino-acetophenone did not behave as adjective colouring matters towards chromic and copper salts in spite of the contiguity of the carbonyl group to the hydroxy radicle. When, however, the acetyi group is replaced by carboxyl as in anthranilic acid, well-marked mordanting effects are obtained.

The negative result obtained with acetophenone-azo-β-naphthol dyes as regards mordanting throws considerable doubt on the validity of the hydrozy-azo constitution of these colouring matters, and affords support to the view that azo-β-naphthol dyes are really hydrazones of β-naphthoquinone-sulphonic acids. Moreover, this hypothesis furnishes a ready explanation of the mordanting effects obtained with the anthranilic acid azo dyes, which contain a lake-forming carboxyl radicle in close proximity to quinonoid oxygen.

Some Bactericidal Organo-Tellurium Derivatives.

In a paper entitled "Bactericidal Action of the Tellurium Derivatives of Aliphatic β-Diketones," by Professor G. T. Morgan, E. A. Cooper, and A. W. Burtt, it was stated that the tellurium β-diketones described in the preceding papers have been examined on micro-organisms with the following results:—

1. Tellurium dipropionyl-methane is the most active of the series, being bactericidal as regards *Bacillus Typhosus* in concentrations of the order of one in 40 millions.

2. The bactericidal power of these tellurium derivatives increases with the ascent in the homologous series of β-diketones.

3. Position isomerism plays an important part in determining bactericidal power, the orientation of alkyl groups affecting considerably the activity of the tellurium compound.

4. These tellurium compounds lose their strong bactericidal action in the presence of serum, but they retain their inhibitory power. Their germicidal action is, however, maintained in urine.

5. These compounds, and especially tellurium dipropionyl-methane and tellurium 3-methylpropionyl-acetone, offer promise of application as disinfectants in treatment of infective conditions of the urinary organs.

Condensation of Tellurium Tetrachloride with Diketones.

In a second paper entitled "The Interaction of Tellurium Tetrachloride and the Higher β-Diketones; Parts I., II., and III.," the authors, Professor G. T. Morgan, H. D. K. Drew, R. W. Thomason, and E. Holmes, said that although in the great majority of instances the metallic and metalloïdal derivatives of acetylacetone contain the organic group in the form of a univalent radicle, nevertheless in combination with selenium and tellurium the above-mentioned β-diketone furnishes bivalent radicles. The dichloro-tellurium derivative containing a bivalent radicle is readily reduced to tellurium acetylacetone, a bright yellow substance soluble in water and having outstanding germicidal properties.

On account of its singular chemical constitution and because of the bactericidal powers of tellurium acetylacetone, the condensation with tellurium tetrachloride has been extended to the homologues of acetylacetone. β-diketones containing normal branched chains give rise to dichloro-tellurium derivatives of the bivalent organic radicles. β-diketones containing alkyl substituents in the methylene group also yield these comparatively stable dichlorotellurium derivatives readily reducible to the active tellurium β-diketones. With branched chain β-diketones the tellurium tetrachloride condensation takes a different course, and the unstable tellurium derivatives contain only univalent radicles. The complex ketones diacetylacetone and dimethyl-dihydroresorcinol give rise to oxonium tellurichlorides. Ethyl acetoacetate gives rise only to an unstable tellurium derivative of a univalent radicle.

These experiments conducted over a wide range of β-diketones have thrown light on the chemical behaviour of these reactive substances, and have furnished a new group of tellurium derivatives having pronounced bactericidal and physiological action.

SOCIETY OF PUBLIC ANALYSTS.

AT the ordinary meeting held on Wednesday, November 7, Mr. P. A. Ellis Richards in the chair, a certificate was read for the first time in favour of R. C. Frederick and H. T. S. Britton. Certificates were read for the second time in favour of L. E. Campbell, J. T. Hannen, C. L. Hinton, D. W. Kent-Jones, T. W. A. Shaw, W. Hall Simmons, K. E. N. Williams, and P. N. Williams.

The Gold-Beater's Skin Test for Tannins.

In a paper on this subject by Phyllis H. Price, B.Sc., the author pointed out that as tanning consists in the fixation of the tannins by animal fibre, a reliable tannin test must demonstrate this specific property. Such a test was described from Dr. Nierenstein's laboratory by Miss E. Atkinson and Miss E. O. Hazleton (*Biochem. Journ.*, 1922, 16, 516). The method consists of the fixing of the tannin on gold-beater's skin, and consequently not stained. The author has further chloride, non-tannins not being fixed on the gold-beater's skin, and consequently not stained. The author has further developed the test and finds that it is possible to detect 0.00005 gramme of gallotannin in 1 c.c. of solution with the use of either ferrous sulphate, ferrous chloride, or amyl-nitrite fumes in place of ferric chloride. It was also noticed that on decolourisation with dilute hydrochloric acid, skins previously treated with pyrogallol tannins are completely decolourised, whereas those treated with catechol tannins have a reddish stain left on them. This is suggested as a test for phlobaphenes.

Determination of Nitrogen in Coal.

W. Donovan, M.Sc., in a paper on this subject, confirms the work of Fieldner and Taylor, Terres, Fleischer, and others who observed that the Dumas process as described in the report of the Research Committee of the Institute of Gas Engineers, and the Kjeldahl process, both gave low results, the former owing to incomplete combustion, the latter by loss of gaseous nitrogen. He points out that the Dumas process makes no provision for the complete removal of hydrocarbons. Concordant results are, however, obtained with the Dumas process (hydrocarbons having been completely removed) by the addition of a constant (0.2 per cent.) to the Kjeldahl figure, using mercury as a catalyst.

Colourimetric Estimation of Lead.

In a paper on "The Estimation of Lead in Potable Waters and in Urine," by John C. Thresh, M.D., D.Sc., F.I.C., it was stated that in estimating traces of lead in coloured moorland waters the influence of the colour is not always removed by making the standards with the same water diluted with distilled water. The presence of even one part of copper in 100 millions reduces the depth of the tint given by lead, and iron in solution also interferes with the colourimetric estimation of lead, and accounts for most of the discrepancies obtained with moorland waters. It is essential that the standard should have the same acidity and contain the same acid as the water or urine under examination. A sensitive method of testing for lead in urine was described.

A STUDY OF THE ABSORPTION TOWER.*

EFFECTS OF THE GAS VELOCITY.

By M. B. Donald and C. W. Tyson.†

IN the "sulphite" pulp industry, wood chips are cooked in a digester with sulphite liquor which consists of calcium and magnesium bisulphites together with free sulphurous acid, the best liquor being that which contains the most free acid.

In one system for preparing this liquor, milk of lime is converted into bisulphites in a plate absorption tower and then the additional SO_2 is added in a tile tower. It was with the object of determining the factors concerning the design of these towers that this research was carried out, and also to bring out, if possible, the factors underlying the general phenomenon of absorption of gases by liquids on a plant scale.

Previous Theoretical Work.

The first attempt to reduce industrial gas absorption to a quantitative basis was by Hurter (*J.S.C.I.*, Vol. 4, p. 639, and Vol. 6, p. 707), who, in 1885, showed that it depended mainly on the surface of contact between the liquid and the gas and divided the cases into three types:—

(1) The gas, divided into small bubbles, passes through a column of liquid.

(2) The liquid, divided into fine drops, falls through a column of gas.

(3) Solids, with extensive surfaces and interstices, are covered with the liquid, the gas filling the interstices.

In 1893 he put forward the idea (*J.S.C.I.*, Vol. 12, pp. 227, and 989) of rating absorption towers on the amount of contact surface which is available per unit volume of the gas for one second. This is independent of the form of the apparatus, and measures the amount of time which it allows for any molecule for traversing unit distance for the purpose of approaching the absorbing surface. The equation for counter-current transfer of material has been developed by W. K. Lewis (*J. Ind. Eng. Chem.*, Vol. 8, p. 825), and in its simplified form is as follows:—

$$\frac{W}{\theta} = \text{"ka"}\ V\ (\Delta p)_{ave},$$

where

$\frac{W}{\theta}$ = weight of substance transferred per minute.

A = area of "wetted" surface exposed to the gas.

k = proportionality constant.

$(\Delta p)_{ave}$ = average effective pressure tending to drive the gas into solution.

Since in most cases, such as spray chambers, for instance, it is difficult to measure the value of A accurately, the following equation is the more general form:—

$$\frac{W}{\theta} = \text{"ka"}\ V\ (\Delta p)_{ave},$$

where

V = volume of tower.

a = area of "wetted" surface per unit volume of tower.

On the assumption that the carrier gas has only a small percentage of absorbable gas, and that this follow Henry's law over the range dealt with, the average driving pressure can be shown to be the logarithmic mean of the driving pressure at the top and bottom of the tower.

F. G. Donnan (*J.S.C.I.*, Vol. 39, p. 236 T) in a similar theoretical discussion points out further assumptions made in deriving these equations, and claims that the absorption efficiency depends on:—1. High interfacial area. 2. High relative motion of gas and liquor within limits. 3. High degree of turbulent motion. 4. Sufficient rate of flooding to secure maximum drip effect.

As regards the expression $(\Delta p)_{ave}$, Partington and Parker (1919) and Thomas (*J.S.C.I.*, Vol. 41, p. 34 T) assume that the rate of absorption is proportional to the concentration of unabsorbed gas in the gas phase, and also that equilibrium is attained. In 1920 Donnan and Masson (*loc. cit.*) deduced that the rate of absorption was proportional to a concentration potential—*i.e.*, the difference in concentration of the gas in the solvent and its concentration in the inert carrier.

The view held by W. K. Lewis and his co-workers is that the potential should be a pressure one—*i.e.*, the difference between the partial pressure of the gas in the inert carrier gas and its partial pressure over the solvent. In the case of gases obeying Henry's law, such as oxygen and nitrogen in water, these two forms are identical, but in the case of sulphur dioxide dissolving in water both forms cannot be right.

W. G. Whitman and J. L. Keats (*J. Ind. Eng. Chem.*, Vol. 14, p. 186), from data on air conditioning apparatus, show that the effect of air velocity is small if air carries particles of water along with it, so that the relative velocity of the air with regard to the water is practically zero. Due to the fact that humidifaction and dehumidifaction of air gave different values for "ka," they brought forward the two-film theory, in which they recognised the existence of both a gas and a liquid film at the interfacial surface, each of which exerted a separate effect on the diffusion of the gas or vapour. Recent work has shown that by using solutions of glycerine and water the absorption is inversely proportional to the viscosity of the liquid.

F. Exner showed in 1876 that the rate of diffusion of a gas through a liquid film in still air is proportional to $\beta/\sqrt{d}$, where β = absorption coefficient of the gas and d = density of the gas.

Objects of the Present Investigation.

Gases, such as hydrochloric acid, which form maximum boiling-point mixtures, and consequently give fogs, require special treatment, and will not be considered: also cases in which a chemical reaction takes place, such as carbon dioxide in sodium-carbonate solution. The effect of velocity of the gas on the rate of absorption of the gas depends upon its degree of agitation, and hence would give better results for turbulent flow than for viscous or straight line flow.

Van Arsdel (*Chem. and Met. Eng.*, Vol. 29, p. 66 (1923)) suggests that the rate of absorption is only dependent on the velocity of the gas up to a certain critical "flow ratio" (*i.e.*, volume gas/volume liquid) and above that critical value on the velocity of the liquid. The amount of liquid used in these experiments was such as to ensure the flow ratio being below the critical value. Also from heat transfer experiments it appears that the effect of a gas impinging on a surface, such as a metal tube in an air heater, is about three times as great as when the gas flows parallel to it.

The value of the proportionality constant "k" therefore depends on the absorption coefficient, the density of the gas, and, also, some function of the relative velocity between the gas and the liquid. The following experimental data were determined in order to discover some facts concerning the effect of gas velocity.

Experimental Details.

A tower (made entirely of lead with flanged top and bottom which could be bolted down when the tower had been packed) was set up. The internal diameter of the tower was 8in., and the height from the bottom to the water inlet was 30in.

The SO_2 concentration of inlet and exit gases was determined by an Orsat, and the exit liquor concentration by titration with standard iodine in potassium iodide.

The vapour pressure of SO_2 over solutions of sulphurous acid was determined from the data given by T. H. Sims, and the partial pressure of the SO_2 in the gas from the barometric pressure and its concentrations, as determined in the Orsat. The dry SO_2 gas containing about 8 per cent. SO_2 was tapped off the main gas line where it was under pressure and measured by a $\frac{3}{4}$in. orifice in a 2in. pipe. The static pressure and temperature were measured after the orifice. The gas was then passed through a $\frac{1}{4}$in. lead coil in a barrel of water so that it could be brought to a constant temperature. The temperature, pressure, and analysis were taken about a foot from the inlet into the tower.

The water rate was kept constant at 45 c.c./min. when the ring spray was used, and increased to 85 c.c./min. when the spiral spray. It was fed into a 50-litre bottle from the city water supply at the same rate at which it flowed from the spray. The total head of water above the spray was 10ft. 6in., and the amount sprayed was controlled by adjusting a screw clamp near the tower.

Efficiency of Ring and Spiral Sprays.

The ring was of 6oz. $\frac{1}{4}$in. soft lead tubing, made so that the end of the tube was burnt on to the inlet pipe and thus formed a complete circle. The spray was pierced with small holes so that the water was sprayed horizontally against the walls of the tower. The rate was adjusted so that the

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* Paper (slightly abridged) read before the Institution of Chemical Engineers on Wednesday, Nov. 14. The original paper contains five diagrams.

† Work done in partial fulfilment of the requirements for the degree of M.Sc. in Chemical Engineering Practice at the Massachusetts Institute of Technology.

walls had a continuous stream of water flowing down them, and it was found that by spraying the water on to a strip of paper instead of the bare lead a much better distribution was obtained. The wetted surface in this case was 5.23 sq. ft., and the free volume in the tower was 0.873 cub. ft.

A graph was plotted showing the values "ka" obtained by varying the velocity and temperature. The velocity was expressed relative to the tower, as it was almost impossible to get more than a rough estimation of the velocity of the gas *relative* to the liquor. The graphs both at 60° F. and 100° F. were straight lines.

The effect of varying the temperature and keeping the gas velocity constant was also graphically plotted. If the value of "ka" is corrected according to Exner's results it gives almost a horizontal line. As SO_2 does not follow Henry's law exactly at low partial pressures, the values for the absorption coefficient were taken for a partial pressure of 60mm. mercury when making the correction.

In order to decrease the effective area of the tower and thus give a greater relative velocity between the gas and liquid, a closed cylinder 27in. high and 6in. diameter, provided with four 2in. legs, was lowered into the tower and secured so that it was exactly in the centre. The slope of the linear graph obtained is very much less than that for those of lower velocities. This indicates that increase in velocity of the gas increases the rate of solution up to a point where one obtains a maximum effect.

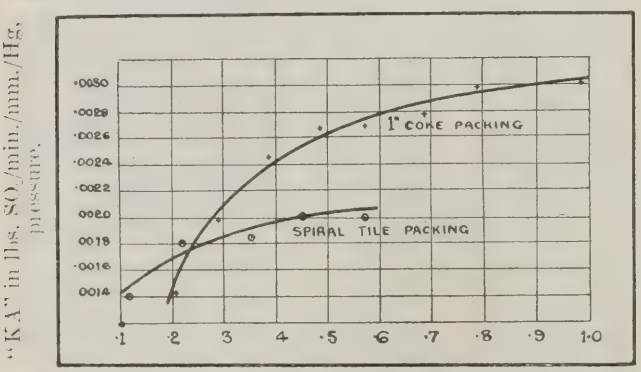
The ring spray was now replaced by a similar piece of lead pipe made into a spiral with the inside end joined on to the inlet pipe, as before, in order to ensure a fairly uniform delivery through all the holes. These holes were drilled facing downwards, and were 0.039in. diameter, about ¼in. apart, and 158 in all. This gave a wetted surface of approximately 3.62 sq. ft., and a free volume of 0.873 cub. ft.

Although the wetted surface by the spray method is smaller than that obtained by allowing the water to flow down the sides of the tower, yet it gave a very much better coefficient. This is probably due to the fact that the gas produces a greater effect by impinging on a surface instead of merely brushing past it.

Spiral Tiles and Coke Packing.

The spiral tiles used were 3in. spiral brick tiles, and the tower was packed with eight layers of four tiles each, staggered so that the gas could not go up through them. Three lead discs, 3in. diameter, were used as baffles at various points in the centre of the tower, which space would otherwise have been an unrestricted channel for the gas. When the tiles were taken out they were found to be wet all over, indicating efficient distribution by the spiral spray. The wetted area in this case was 14.2 sq. ft. and the free volume in the tower 0.546 cub. ft.

The tower was now filled for 26in. with 21lb. of 1in. diameter coke which had been previously used in towers for drying the sulphur dioxide and was fairly carefully graded. The coke was well washed with water and left in an atmosphere of SO_2 overnight before the runs were made. This gave a wetted area of 39.6 sq. ft. and a free volume of 0.329 cub. ft.



Velocity of Gas Relative to the Tower in Feet Per Second.

The results for the spiral tiles and the coke are shown in the accompanying diagram, the velocity of the gas relative to the tower being determined from the ratio of "free" volume to total volume. The curves obtained confirm some previous results by M. S. Salomon and W. S. Brackett, who worked on a similar tower filled with 3in. tiles, and with a concentration of SO_2 in the gas about 18 per cent., and showed that the velocity of the gas produced a maximum effect at about 12ft. per second.

Conclusions.

The effect of velocity of a gas giving a maximum value when impinging on a surface appears to be analogous to the operation of a sling psychrometer where, in order to get the wet bulb temperature of the air, the rate of evaporation of water from the wet bulb is kept constant by rotating the thermometer through the air above a certain definite speed.

It is also shown by the fact that the rate of solution of a salt in water is affected only by the velocity of the solution past it up to a maximum value, after which increased stirring produces no effect. Further experiments on the effect of gas velocity are required before it can be expressed as a mathematical function in the absorption-tower equation. They would probably take the form of varying the concentration of the absorbable gas, and also by substituting another gas, such as ammonia, etc., for the sulphur dioxide.

THE PREVENTION OF METAL CORROSION.

RIVAL PROCESSES TO PAINTING.

ON interesting lecture on "Corrosion" was given by Dr. U. R. Evans, of Cambridge, to the Oil and Colour Chemists Association on Thursday, November 8. Dr. Evans spoke not so much about corrosion from the point of view of the use of protective paints as from the point of view of other methods for preventing corrosion which, in a way, might have the effect of producing rivals to the use of protective paints. At the same time, he pointed out the disadvantages of some of these rival methods.

Plated Surfaces Must Be Covered Completely.

Whatever means was adopted for covering up a surface for this purpose, said Dr. Evans, it was most important that it should be completely covered, and the problem was to cover the inaccessible crannies and cracks. Generally speaking, it was more satisfactory to have a covering surface like a paint which was viscous at the time of application and gradually dried, than it was to use another metal in the form of a plating, for example, which solidified immediately after application. Another point in favour of paint was that even if a small portion of the surface was not actually covered, it was possible that no harm would result from corrosion, because supposing the part not covered was a "cranny" or slight crevice, the paint had actually covered the cathode and so prevented the formation of an electrical couple. On the other hand, if the covering material were nickel, the position of affairs would be far worse than if the nickel was not there at all, because the nickel itself would cause corrosion, and an electrical couple would be set up. It was for this reason that, for some purposes, it seemed to him a little doubtful whether the use of covering metals is quite as beneficial as is sometimes thought.

Corrosion of the Protecting Metal.

Another point against metallic coating to prevent corrosion was that the coatings themselves were by no means incorrodible. He (Dr. Evans) had exposed a large number of metals to atmospheres containing considerable amounts of such substances as hydrogen chloride, sulphur dioxide and ammonia, and in the presence of these gases, which occurred in industrial areas, the metals were attacked very quickly. In the presence of damp air only, the amount of corrosion was very slight indeed—almost negligible, in fact—but in the presence of these other substances, the rate of attack was very rapid. Of the different types of polluting agent in regard to metals, he had found that hydrogen chloride was the most fatal to zinc and aluminium, ammonia was the most fatal to copper and copper alloys, and sulphur dioxide was the most fatal to iron and nickel.

Electrical Conductivity of a Paint Film.

Regarding the types of covering with which paint chemists were most concerned, Dr. Evans said it seemed to him that mechanical rather than chemical considerations were of first importance. The first functions of a pigment are as a support for the vehicle, but there was no doubt that in many cases the pigment had a very specific action on the course of the corrosion. It had been shown, for instance, that

carbonaceous pigments tended rather to promote rusting, whereas certain basic and also chromate pigments tended to keep the iron passive, and to stop the corrosion of iron and steel. The action of the carbonaceous pigments was probably due to their setting up electro-chemical action where they came in contact with the iron. While he did not suggest that the electrical conductivity of the paint film is an absolute index of its value from the point of view of corrosion, yet he thought the determination of the conductivity would always be of interest, because if the conductivity were found to be very low, it would show, at any rate, that the film was continuous and that there was not much likelihood of electro-chemical action being set up.

Corrosion-resisting Alloys.

Another method of dealing with corrosion, which was a rival to painting, was the use of the new corrosion-resisting alloys which are supposed in many cases to need no paint. These could be divided into two classes—first, those metals which had low heats of oxidation, such as gold, silver, platinum, etc., which were too expensive to be considered for industrial purposes; and secondly, those metals which had high heats of oxidation, such as aluminium, tantalum, and many of the alloys containing chromium, of which stainless steel is only one. A great deal of research was going on in this connection, and, said Dr. Evans, we are likely to have much more reliable materials of this nature than have hitherto been provided. At the same time, he did not anticipate that these materials would compete very seriously with protective paints, and at any rate there would always be a wide field for the application of the latter.

In the course of a short discussion, the President (Dr. J. Newton Friend), speaking of the possibility of the pigment being electro-chemically active, said it must be remembered that, broadly speaking, there are two classes of pigment, the inert pigment and the fairly-soluble pigment, such as chromates and carbonates. So far as the former were concerned, if they were mixed with linseed oil they had an absorbed layer which tended to prevent any electro-chemical action, but in the case of other pigments, if the pigment dissolved in water then it could pass through the linseed oil film in the form of solution and so attack the iron. Worse than that was that a pigment dissolving became smaller and left mechanical holes in the linseed oil film, and thus the pigment tended to promote corrosion in two ways. He had found that whilst the addition of 5 per cent. of beeswax or paraffin wax was an advantage in the case of materials exposed to the air, it was not an advantage in the case of steel which was submerged.

SICILY AS A CHEMICAL PRODUCER.

THE ISLAND'S CONTRIBUTION TO THE WORLD'S REQUIREMENTS.

IT is well-known that the island of Sicily is one of the world's largest producers of essential oils of the citrus fruit. Messina is the chief mart for this industry, and there has been established in this town a well equipped analytical and consulting chemical laboratory, directed and staffed by English chemists. So many diverse samples pass through this laboratory that the chemists have gained unique experience of Sicilian products. We are indebted to two of the chemists of the Messina laboratory for the following general account of the Sicilian chemical industry.

Essential Oils of the Citrus Fruits.

It is estimated that at present there are about eight million lemon trees in the island, each tree, during an average season, producing about 800 lemons. The trees blossom in February, and during the maturing of the fruits during the long hot summer, it is necessary to use very elaborate means of irrigation, which in itself is quite an industry, and calls for power in all forms, from oxen and donkeys, to wind and electricity. The fruit ripens about November, and harvest extends over three months, according to the situation of the plantation. The same general remarks apply to the other citrus trees, such as sweet and bitter orange trees, tangerine trees, and bergamot trees in Calabria, except that all these ripen rather earlier, with a shorter harvest period. All these fruits are cultivated for export as such, and also for the production of the oil from the rinds and the acid from the juice. Bergamots, however, are cultivated solely for oil and acid, as the fruit itself is not edible. For export, great care is taken that only the best and soundest fruits are shipped. The rejected fruits are used for local consumption, and oil production.

It is estimated that at the present time half the total fruit production is exported as such, and the remainder converted into oil, and citric acid. During the last three years, Messina alone has exported an average of 1,320,000 English pounds net, of various oils. The U.S.A. are the largest importers, taking about 40 per cent. of this quantity, with England next with 25 per cent.

The different products prepared from the various citrus trees are:

Lemon oil, sold in practically every country of the world for use as a cheap and pleasant flavour in confectionery, and for the preparation of soft drinks.

Lemon juice, supplied to the various Governments for use in the navies as an antiscorbutic, also to various cordial makers.

Orange oil, sold for same purpose as lemon oil. It also appears in several pharmacopeias as a flavouring and tonic.

Mandarine oil, used in perfumery and for flavouring.

Concentrated lemon juice, used in several dyeing operations.

Citrate of lime, for manufacturing citric acid.

The Two Extraction Processes.

There are two general methods for the extraction of the oil from the skins of the various fruit. These are: (1) the sponge process; and (2) the machine process. Both processes aim at rupturing the oil sacs in the skins of the fruit and so liberating the oil. The oldest and most efficient method, although very costly, is that of the sponge. In this process, the fruit is chopped in halves, and from each half, the fruit or pulp is removed by means of a special spoon. Each half skin is then taken and pressed against a damp sponge of special fine texture. The oil sacs are broken, and the oil ejected on to the sponge where it is absorbed. The work is done by young men, and a good workman can press about 600 half skins per hour with a yield of about three fluid ounces of oil. If the fruits are ripe and the skins softer, as many as 1,000 halves can be pressed per hour with an average yield of five fluid ounces.

When one considers that the average production of lemon oil alone is about 800,000 English pounds, the extent of the industry can be appreciated if only in consideration of the stupendous number of lemons worked.

In the machine process, the whole fruits are put into a machine, where by a rotary or jigging motion they are passed over a kind of grater, thus rupturing the cells. Only a little oil is produced this way, and the product is by far inferior to that produced by the sponge method. Most of the citrus oils consist of terpenes, with other constituents present in small proportions, but which lend the various oils their characteristic odours and flavours.

Valuation of the Products.

Lemon oil contains from 3 to 5.50 per cent. oxygenated products, chiefly the aldehyde citral, and the remainder are terpenes. The citral content serves as a valuation of the oil, high citral oil being much more in demand than a low one. The B.P. has fixed 4 per cent. citral as a standard, but the citral contents vary greatly according to the district of production. The N. coast plantations produce a very poor oil, whilst a N.E. coast oil is invariably high in citral. Again, the citral varies according to the season, and a great amount of experimental work has yet to be done to decide which are the determining factors to account for the great differences.

In the case of orange and mandarine oils the flavouring matter is methyl anthranilate, and the valuation usually depends on the optical rotation before and after distillation of the oil. By this method it is easy to detect an admixture of 5 per cent. lemon oil—which, being much cheaper, is the common adulterant.

Lemons are pressed at all stages of maturity, as even when a lemon is ripe, the skin is sufficiently tough to withstand the pressure of the sponges without breaking. With oranges and mandarines, however, the case is different, as the skins of the ripe fruits break and no oil is obtained. These fruits must be pressed when green.

Concentration of the Oils a Modern Development.

All the oils are exported in tinned-iron, or tinned-copper containers, sealed under solder seals to exclude air. The oils are apt to oxidise very quickly when in contact with air and light, with the production of carvone and its allied bodies. As the oils present rather a large bulk for exportation, the business of concentrating the various oils has been developed lately. This is accomplished by distilling off the terpenes in high vacuum at low temperature. By this means the oils remaining in the stills contain all the main flavouring matters. A fairly good concentrated lemon oil contains upwards of 50 per cent. citral, and this concentrated oil is finding increasing favour in the mineral water business owing to its complete solubility in low-grade alcohol. Orange oil is concentrated down to about 5 per cent. of its original bulk, and is used for mineral waters, cordials, etc. Bergamot oil is reduced to about half its bulk, and is used in perfumery.

Calcium Citrate and Citric Acid.

In each extraction process there remains the pulp. In case of lemons this pulp is pressed, and the juice worked up to produce calcium citrate. In the other cases, such as oranges, this pulp is usually thrown away as, since the fruit is pressed when green, the juice contains gummy matter, and only small proportions of citric acid, which it does not pay to extract. The juice from the presses is run into large wooden tanks or coppers and brought to boiling-point, either by direct heat or steam coils. A juice so pressed gives about 6oz. to the gallon of citric acid, and some producers concentrate this in copper containers when it becomes dark brown and then contains 60-70oz. to the gallon. Milk of lime is added until the liquor is nearly neutral, the temperature being maintained as near boiling as possible. The approaching end-point is seen in the darkening of the juice due to formation of calcium pectate. The reaction is completed by adding a slight excess of calcium carbonate. The whole procedure is essentially crude and primitive, the average Sicilian maker usually working as taught by his father years ago. Very few, indeed, make use of the help of such simple tests as litmus or other test papers.

The calcium citrate settles out during the neutralisation and is then collected, pressed, and dried on iron trays in hot rooms. When dry it is a sandy coloured product, in lumps that are easily powdered. An average analysis shows that the final product contains 63 per cent. citric acid as calcium citrate, about 3 per cent. calcium carbonate, the rest consisting of fibrous pieces of lemon skin, etc.

The whole of calcium citrate produced must be sold to the Italian Government, who hold a monopoly of it,* and fix the price every November. The Italian Government themselves are therefore the only exporters of the product. The chief buying countries are the U.S.A., France, England, and Germany. We might add here that Sicily has the largest citric acid factory in the world located at Palermo, and we can say that the product is a very fine one indeed.

The Tartaric Products Industry.

The next great Sicilian industry is the wine industry, with its by-products of tartaric acid materials. Sicilian wines are amongst the strongest produced, as in a normal year it is possible to get wines of 14-15 per cent. alcohol by volume. A good percentage of these wines find their way to France, where they are used to strengthen weaker wines. In 1920 Sicily produced about 150 million gallons of wine, this being about eleven per cent. of the total Italian production for that year.

The wine lees deposited from the wine during and after fermentation is a valuable source of tartaric acid. The first solid that separates is the lees, which on analysis show 28-32 per cent. potassium bitartrate and 8-14 per cent. of calcium tartrate. After fermentation is completed and the wine settled clear from the lees, it is decanted into barrels and stored in cool cellars, to season it. During this seasoning process, which might extend over several years, argols, an impure bitartrate of potassium, separate out in a crystalline form.

These two products are practically our only source of tartaric acid, and are bought and sold on their content of potassium and calcium tartrates. The whole of this trade and industry is thus entirely controlled by analysts' reports and certificates. The crude material is bought for the manufacture of pure potassium bitartrate and tartaric acid, and is usually bought by citric acid manufacturers as the plants used for both acids are practically identical.

The Sulphur Industry.

Of course, the richest mineral deposits in Sicily are those of sulphur. This industry gives employment to about 100,000 men. The deposits are located in the centre of the island in the districts of Caltanisett and Girgenti, dry, arid, bare zones. The sulphur is found mixed with calcium sulphate and carbonate, and the actual amount of available sulphur in the rock worked varies from 15 to 40 per cent.

The method of extraction is by the calcarone or Gill kiln process, in which the sulphur rock is ignited, and the heat of combustion melts the sulphur from the surrounding pieces of rock. The average working losses are about 15 per cent. of the total sulphur. The Texas Gulf (Frasch) process has been tried on a small scale, but it has been found that when Sicilian rock is treated with super-heated water, the whole mass fuses without any actual separation of sulphur. Some attempts have also been made to use the flotation process, but with little success.

The average production of sulphur during the last few years has been round about 220,000 tons. Large quantities are used in Italy as a dressing for vines in conjunction with lime and copper sulphate. The present stock of refined sulphur in the island is about 275,000 tons, but now that Sicily has a working agreement with the Texas sulphur people, it is expected that all this will be sold in the course of a year, and that the production for 1924 will be augmented to 300,000 tons.

Liquorice Extract and Its Adulteration.

Amongst the minor industries that call for chemical attention is that of liquorice-extract manufacture. This industry is located chiefly in Catania and Palermo. The root of *Glycyrrhiza glabra* is extracted with boiling water, and the resulting extract evaporated down to the required consistency. An average analysis of the dried root is:—Water, 11.40 per cent.; soluble, 29.50 per cent.; and insoluble, 59.10 per cent. An average percentage analysis of the extract is:—Water, 12-18 per cent.; soluble in water, 55-70 per cent.; sugars, 10-12 per cent.; starches and gums, 20-30 per cent.; glycyrrhizine, 9-12 per cent.; and ash, or mineral matter, 6-8 per cent.

The very nature of the extract makes it an attractive proposition for the adulterator, and we know that such things as Indian figs, or prickly pears, carob beans, or locust beans, and different starches are boiled with the root to put up the extract. During the last few months another root has been employed in the boiling. This root is called locally Masticogni, and is of same family as liquorice, but is coarser and bigger. It has recently been reported from Sardinia that five people have been fatally poisoned by eating the root.

We were very fortunate in finding means of detecting the presence of this root very early. We found that a liquorice extract containing this root showed small crystals under the microscope, and these crystals were shaped like the compass needle—long, acicular, having the middle much broader than the ends.

The Indian fig extract can be detected by the presence of calcium-oxalate crystals, and the locust bean extract is detected by an excess of sugars. The different starches are detected by their granular formation. With a fair experience and an intelligible interpretation of analytical data, the chemist gets a fair idea as to the actual purity and composition of the juice. The juice is usually marketed in blocks of 7lb. or 2cwt., hence the trade name of block juice. A fair quantity is sent out in the form of sticks, but not so much as the block form. The general use for the blocks is for a certain class of beer, for manufacturing of sweetmeats, and for the manufacture of a certain class of smoking and chewing tobacco.

Crystal Structure of Beryllium Acetate.—In a paper which Sir William Bragg and Professor G. T. Morgan delivered to the Royal Society last night (Thursday, November 15), the authors stated that basic beryllium acetate has been shown by X-ray analysis to be a highly co-ordinated compound. The molecule is a perfect tetrahedron, having an oxygen at the centre, a beryllium atom at each corner, and an acetyl group associated with each edge. The crystalline structure is the same as that of diamond. The propionate forms a monoclinic crystal with a symmetry much less than that of the acetate.

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* See also the *Chemical Trade Journal and Chemical Engineer*, Oct. 5, 1923, p. 397.

PLATINUM IN MODERN INDUSTRY.

THE CARE OF LABORATORY APPARATUS.

SOME interesting data on platinum are given in a booklet of Baker and Company, Inc., platinum refiners and workers of Newark, New Jersey. The first reference in European literature to the metal subsequently given the name of platinum is in the book of Julius Scaliger, *Exercitationes Exotericae de Subtilitate*, published about 1600, in which he speaks of an infusible metal found in the mines of Mexico and Darien (Panama). The metal is first mentioned by name in Don Antonio de Ulloa's account of his travels to South America with a French astronomical mission, printed about 1748. The Spanish gave it the name "platina del Pinto," or "little silver of the river Pinto." It appears that the aborigines of the region had become fairly skilled in the manufacture of simple platinum ornaments, for many have been found in ancient graves, some even composed of a double layer of gold and platinum.

Discovery and Early Work on Platinum.

To the early Spanish gold seekers, platinum was a nuisance, and soon became a danger, for on account of its great density it could be used to counterfeit gold by covering it with a thin layer of the precious yellow metal. For this reason the Spanish Government took all possible precautions to prevent its exportation. The Spaniards did, however, make ornaments, etc., out of platinum, and a small amount was taken to England in 1742 by Charles Wood, who probably obtained it in Jamaica. The properties of the new metal were described before the London Royal Society in 1751 by Sir William Watson and Dr. William Brownrigg. This excited great interest, and gave rise to much study of the properties of platinum by all scientists who were able to obtain specimens. Scheffer presented a fairly full discussion to the Stockholm Royal Academy, and in 1755 Dr. William Lewis, before the London Royal Society, described in detail the occurrence of the ore, its solution and purification, the properties of the pure metal, and even of a few of its alloys.

The desirability of platinum dishes for chemical analysis was early recognised. The next important historical step was the manufacture of malleable platinum ingots by hammering white hot platinum sponge in a metal or clay mould. This seems to have been done independently by Knight of England and Chabaneau in France. Up till then platinum had been fused with a more volatile metal, such as arsenic or bismuth, which was subsequently driven off by baking or cupellation.

About 1819, heavy white metal grains of platinum were noticed with the washings from the gold mines in the Ural Mountains, and three years later rich deposits were found. In 1828 Russia began coining platinum money, but this was discontinued in 1845 because of the fluctuations in the value of platinum.

The modern method of melting platinum with the oxy-hydrogen flame was introduced by Dr. Robert Hare of Philadelphia, the inventor of the blowpipe itself, in the first decade of the last century, and in 1859 Debray and Deville in France introduced the use of a hollowed lime crucible and cover for the fusion of platinum.

Occurrence and Nature of Platiniferous Minerals.

Contrary to popular impression, platinum and its associated metals are widely distributed, although thus far they have been found in paying quantities in but few localities. Alluvial deposits have provided nearly all the platinum in use, though in a few localities it has been reported as found in quartz veins. Over ninety per cent. of the world's platinum has come from the Ural Mountains. Next to Russia, Colombia in South America is the biggest source. Owing to the dislocation in the Russian industry since 1917 Colombia has been the world's greatest producer (see the *Chemical Trade Journal and Chemical Engineer*, July 20, 1923, page 70). Traces of platinum, more or less promising have been found in California, Oregon, Alaska, Tasmania, Dutch East Indies, and Papua.

Crude platinum is usually found in the form of rounded or flattened grains or "sand," occasionally in irregular lumps of the size of peas; large nuggets are very rare—the largest as yet found weighing twenty-one pounds. The ore has a metallic lustre and is distinguished by its steel-grey colour, shining light grey streak when rubbed on a hard white surface, high specific gravity (16 to 19), malleability, infusibility in the hottest blast furnaces, and insolubility in any single acid.

Platinum ore is a complex body consisting of the metal in combination with varying proportions of the other members of the platinum group, such as iridium, rhodium, palladium, ruthenium and osmium, together with from four to twenty per cent. of iron. In alluvial deposits the ore is generally associated with iridosmine (a native alloy of iridium and osmium possessing a degree of hardness superior to that of hard-tempered steel), magnetic iron sand, chromite, garnet, epidote, and often with zircon, serpentine, ilmenite, peridot, quartz, diamond and chrysolite. In Russia the platinum-bearing sand is found at depths of between six and forty feet, the "reef" averaging less than a foot in depth, resting directly on serpentine bed-rock.

Total World Production.

It has been estimated that the production of platinum up to the present has totalled about 4,000,000 troy ounces, to which can be added about 400,000 ounces of the other metals of the platinum group. About one million ounces is probably in dental use, the same amount in chemical apparatus, about half a million ounces each in electrical instruments and jewellery, and about 400,000 ounces is in use as catalyst material. The metal used in dentistry disappears from commerce in appreciable amount with the burial of the human body.

Properties of the Platinum-group Metals.

Platinum itself is tin-white in colour, very ductile and malleable. It takes a very high, permanent polish. It is practically unoxidisable and unattacked by acids other than aqua regia. It can be oxidised by prolonged heating in oxygen, and is attacked by sulphuric acid at 250° C. It is obtainable in the form of "platinum sponge," which is finely-divided metallic platinum, and "platinum black," which has the power of absorbing very much larger quantities of hydrogen than the metallic form, though not so much as palladium.

Osmium was discovered by Smithson Tennant in 1804. It is found in platinum ores, and together with iridium is osmiridium. It has the highest specific gravity of any known material. It is the least volatile of the group, and has the highest melting point; but easily oxidises and passes off as the tetroxide, which is very poisonous. Crystalline osmium is not attacked by aqua regia, but the amorphous variety is soluble in it, and more readily in fuming nitric acid.

Iridium is one of the most useful of the group, for it is used to alloy with pure platinum to give it the hardness necessary for many technical applications. It also was discovered by Tennant in 1804. It is white, steel-like in appearance, and malleable at a white heat. Metallic iridium is not attacked by aqua regia unless alloyed with a considerable proportion of platinum. Rhodium is a hard, white metal, ductile and malleable at a red heat. It was discovered by Wollaston in 1803, and received its name from the distinctive colour of its salts. It is practically insoluble in aqua regia, but is attacked by chlorine and sulphur. It has a very important technical application in the Le Chatelier thermocouple.

Palladium, also, was discovered by Wollaston in 1803. It is silvery in appearance, and of about the same hardness as platinum, and ductile. It oxidises if heated to redness in air, but the oxide is again reduced at a higher temperature. It boils and volatilises as a greenish vapour at about 2,000° C. At ordinary temperatures it does not oxidise in air. It is easily soluble in aqua regia, concentrated nitric acid, and not so readily in other acids. The most interesting physical property of palladium is its great ability to occlude hydrogen, for, if heated in this gas, it can absorb over 800 times its own volume, and retains the hydrogen unless heated again in a vacuum. Ruthenium was discovered in 1845 by Claus, who made a very careful and detailed study of the Ural platinum ore. It is a white metal having a higher melting-point than any of the six with the exception of osmium, which it resembles in the formation of a volatile, poisonous tetroxide.

Adverse Effects of Iridium in Platinum Laboratory Ware.

Pure platinum being a very soft metal, it is generally necessary to alloy it with a small percentage of iridium, to render the various articles made from it of commercial service. Platinum with high percentages (*i.e.*, more than 10 per cent.) of iridium is attacked only slightly by chemical reagents, including aqua regia. In spite of this, it has been recommended for the past twenty-five years that platinum

ware, especially crucibles, which are frequently exposed to high temperatures, should have only a very small iridium content. The 1911 Report of the Committee of the American Chemical Society on the Quality of Platinum Laboratory Utensils, and the reports of the Bureau of Standards in 1915 and 1916, fully confirm the correctness of this opinion. Experiments at the Bureau of Standards have shown that platinum containing appreciable amounts of iridium begins to show serious loss in weight on heating to 900° C., and that this loss increases rapidly with the temperature. It was recommended therefore that the platinum used in crucible ware should show an E.M.F. against pure platinum of less than 1 millivolt at 110° C. (*i.e.*, should contain less than 0.3 per cent. iridium).

The Shimer Combustion Apparatus.

Among platinum articles of interest to chemists is the Shimer combustion apparatus. This apparatus, designed for the rapid determination of carbon in iron and steel, is in general applicable to the same class of chemical operations as the more costly platinum combustion tube, and the cumbersome and inefficient combustion furnace. It offers the advantages of neatness, reduction in the number of parts to be handled, diminished consumption of gas and time to effect combustions, and increased ease and accuracy of manipulation. It is indispensable when a large number of carbon determinations have to be made, and equally useful for determining combined water, carbonic acid, and for general ignition work in atmospheres of hydrogen, nitrogen, or other gases

The apparatus was patented in 1900 and 1901. It comprises a special form of platinum crucible having a water-jacketed top; water-jacketed tapered copper stopper and a rubber gasket sealing the joint between crucible and stopper. The necessary inlet and outlet tubes for flow of gases and cooling water are attached to both crucible and stopper. This construction and arrangement of parts permit heating the lower part of the crucible to the full temperature of a blast lamp without injury to the rubber gasket or security of the seal.

Platinum gauze and perforated sheet electrodes offer many advantages over the solid form. Great uniformity in current density is obtained; freer escape of disengaged gases; uniform deposit of metal entirely surrounding the solid portions of the submerged electrode, reducing losses from peeling and larger working current density, thus reducing time required for separation. Modern platinum electrodes are made without the use of rivets or gold solder, all joints and seams are welded.

Precautions in Working with Platinum Apparatus.

It is important to remember that, although platinum is not oxidised in the air at any temperature, nor attacked by any single acid, yet there are many substances that attack and combine with it at comparatively low temperature. The caustic alkalies, the alkaline earths, nitrates and cyanides, and especially the hydroxides of barium and lithium, attack platinum at a red heat, although the alkaline carbonates have no effect at the highest temperatures. Phosphorus and arsenic attack platinum when heated with it; therefore phosphates and arsenates, etc., should not be ignited in their filter paper in the crucible. Silicon, which may be formed by the reducing action of carbon on silica, causes brittleness. Contact with compounds of easily-reducible metals like lead is dangerous at high temperatures, because low-fusing platinum alloys are readily formed. Do not put platinum in the inner cone of the Bunsen flame; the carbon in this cone reacts with the platinum to form a carbide which causes brittleness and general deterioration.

The Cleaning of Platinum Utensils.

Every careful analyst of necessity uses clean utensils. The habit of cleaning and polishing platinum ware immediately after using is easily formed, and repays the user with increased confidence in his work, as well as with the prolonged life of the article. The loosening effect of the Bunsen flame upon the surface of platinum exposed to its action produces the familiar grey appearance which cannot be removed except by burnishing. Rubbing the surface of platinum with moist sea sand (round grains only), applied with the finger, serves to remove most impurities and to polish the metal, without material loss in weight.

Fusing bisulphate of potash or borax in the vessel and then boiling in water and polishing as above with sand is recommended by Gmelin. When it is desired to clean the outer surface of vessels in this manner, they must be placed in dishes of sufficient size to allow the fused flux to envelop completely the article to be cleaned

Sodium amalgam possesses the property of wetting platinum without amalgamating with it, even when other metals are purposely added to the amalgam. This substance, is, therefore, useful for effecting a quick and thorough cleansing of platinum. The amalgam is gently rubbed upon the metal with a cloth and then moistened with water, which oxidises the sodium and leaves the mercury free to alloy with foreign metals. The mercury is then wiped off and the article cleaned and polished with sand, as above described.

If the existence of a base metal alloyed with the platinum is suspected, immerse the article in question first in boiling hydrochloric acid for a few minutes; then, after thoroughly rinsing with clean water, in boiling nitric acid free from chlorine. If the article is unaffected in weight or appearance, and the acid baths fail to give reaction for base metals, the absence of such is assured.

AMERICAN NON-FERROUS METALLURGY.

A BRITISH METALLURGIST'S IMPRESSIONS.

IN the early part of this year, Dr. Walter Rosenhain, F.R.S. (of the National Physical Laboratory), visited America, primarily for the purpose of delivering a series of lectures on metallurgy. During his visit he had opportunity of seeing something of American science and industry in the North-Eastern States, and, in a lecture which he delivered to the London Section of the Institute of Metals, on Thursday, November 8, he gave some of his impressions of American practice in non-ferrous metallurgy.

He referred first to the electrolytic refining of copper as carried out by the great Anaconda Copper Co., at their works at Raritan (Perth Amboy). The crude copper reached the electrolytic plant in the form of anode plates. The refining was carried out in an enormous number of cells, operating simultaneously, large numbers being connected in series, and groups of them in parallel. The copper was dealt with on an immense scale, and the sheds in which the process was carried out covered literally acres. After being refined in this way the copper was retained in the form of cathode plates, which were stripped, and, as far as the greater part of them were concerned, were re-melted in furnaces.

Recovery of the By-products from Copper Plants.

An interesting feature of the process was the recovery of by-products from the resultant sludge, which included selenium and tellurium, gold, silver, platinum, iridium, and molybdenum, which were in turn carefully separated and refined. The copper was re-melted in furnaces in 300-ton lots, the selenium and tellurium handled in hundredweight lots, silver in pounds, gold in ounces, and platinum, iridium, and molybdenum in milligrammes. Dr. Rosenhain believed that the recovery of the by-products had a good deal to do with the commercial success of the whole operation.

The casting of the copper was done mechanically, the moulds being placed on a rotating table and brought under the pouring spout of the furnace. It was interesting to notice that the firing of the furnace was done by a single oil burner, which was sufficient to maintain the necessary temperature—viz., about 1,200° C. On re-melting, the copper contained a certain amount of sulphur; this was got rid of by oxidation, followed by a poling process.

Discussing the moulding arrangements, Dr. Rosenhain pointed out that the moulds for casting the copper were themselves made of copper, and he had been told that the ingots were not so sound when cast in other kinds of moulds. He personally was inclined to doubt that, and thought it was rather a case of "nothing like leather."

Quality a Secondary Consideration in American Practice.

The brass industry in America was centred mainly around Waterbury, Connecticut, apparently, because English brass makers had settled there originally. Actually, however, the brass industry was showing a tendency to migrate westward into more favourable surroundings. He had visited four large works near Waterbury, owned by the American Brass Co., the Scoville Co., the Bridgeport Brass Co., and the Chase Co., which, between them, turned out a volume of metal astonishing to our ideas. Quality, unfortunately, seemed to be rather a secondary consideration, since the

demand for quality did not exist. The Americans, when buying, say, a motor car, did not want one to last a lifetime, because in a few years it would be out-of-date, and would be replaced, so that it did not matter whether it was worn out at that time or not.

Wide Use of the Electric Furnace.

In describing the methods by which the exact proportions of the various metals were weighed and tipped into skips travelling along a roller path, and how the operations were checked by balances along the roller path, the lecturer said that the methods employed were so accurate that in these works they did not hesitate to make alloys containing aluminium alongside ordinary brass, although the brass founder hated aluminium as a poison in brass, because it tended to render his castings and ingots porous. The most striking feature was the extensive use of the electric melting furnace, in spite of the fact that the electricity had to be generated from coal or oil. The reason was that the slightly higher cost of energy was counterbalanced by uniformity of working and product, and diminution in the loss of metal by volatilisation, through the complete avoidance of over-heating. The type of furnace used largely was the Ajax-Wyatt, which was rapidly ousting all others from the brass foundry, but it was not used for high-copper alloys. One man looked after two of the Ajax-Wyatt furnaces and poured the metal into the moulds at perfectly regular intervals. The furnaces, however, had to be worked day and night, in order that they should not get cold, but this disadvantage did not appear to weigh heavily under American conditions.

The Aluminium and Nickel Industries.

Other metals dealt with were aluminium and nickel, and the lecturer referred to the great development of the aluminium industry in America, particularly at Cleveland, in the hands of the Aluminium Co. of America, under the scientific guidance of Dr. Zay Jeffries. He also pointed out that aluminium bronzes had been developed commercially, and were widely used. The nickel industry had suffered a very marked depression as the result of armament reductions, but, in spite of this, a remarkable new rolling mill for dealing with nickel had been installed at the Huntington (West Virginia) plant of the International Nickel Co. This was entirely electrically driven and controlled, the whole plant being operated by two men from a bridge overlooking the mill, by means of electric switches. This mill had been installed in an endeavour to counteract the devastating effect of the slump, and Dr. Rosenhain considered it very likely that it would succeed.

Neglect of Pure Scientific Research in Metallurgy.

The lecturer concluded with a reference to the general relation of science to the non-ferrous industries. His impression was that these industries were very ready to avail themselves of scientific methods and appliances—more so than is the case here—but that, on the other hand, America looked to England for metallurgical research and did not contribute adequately to the advancement of the science. As an example of their readiness to apply scientific knowledge in a practical manner, he mentioned that at the works of the American Brass Co., Hilger's spectrograph was used for the spectroscopic analysis of metals and alloys by means of the ultra-violet spectrum, whilst this instrument was also used with success at the Bureau of Standards, Washington. As regards real scientific research on metals, however, there appeared to be a lack of leadership and initiative, and it was admitted by Americans to be unfortunate and unsatisfactory that American metallurgy, both ferrous and non-ferrous, should look to this country for stimulus and guidance. Dr. Rosenhain commented on the deplorably low salaries paid to research workers there, however, which had resulted in trained men being attracted to industry, where they could command higher salaries. There was a very large turnover in the staff at the Bureau of Standards, and soon after the war whole divisions of that institution were entirely depleted of their staffs, owing to the rapid growth of industry. Many of the men in the colleges were booked up two years before the end of their curriculum, which would be a very refreshing state of affairs if it existed here. On the whole, while British non-ferrous industries had much to learn from America in regard to the application of scientific methods and results, labour-saving devices and organisation on a large scale, America showed decidedly less regard for the last refinements of high-quality materials, and did not sufficiently encourage or provide for the wider aspects of metallurgical research.

OUR BOOKSHELF.

Varnishes and Their Components. Robert Selby Morrell, M.A., Ph.D., F.I.C. Publishers: Oxford University Press (Frowde, Hodder and Stoughton); 25s. net.

We commenced to review this work with great expectations, and the further we got into the volume the more justification we found for these expectations, until, staid technologists as we are, we very soon became enthusiastic, above all things at the wonderfully skilful way the author blends very high chemical attainment with great experience in varnish technology. The contents of books of this type too frequently alternate between wordy theory and masses of brief recipes, or, at the most, scanty paragraphs which make them little better than workshop manuals. Dr. Morrell keeps the chemistry of the subject "going" all the way through, and he does this so well that it can never be abstruse or burdensome, even to readers of limited chemical knowledge. The author never fails to convince on the ever-present connection between chemical composition and properties. A very outstanding feature is the modernity of the work; there is an "up-to-the-moment-of-writing" flavour about theory, materials, and effects. Chapter 2 on "Catalytic Oxidation of Oils by Driers" is both concise and sound. The treatment of linseed oil and all the drying and semi-drying oils is much better than can be found elsewhere. Varnish resins, both natural and synthetic, provide a fund of information of the most practical nature conceivable. Bituminous substances are discussed with a wealth of essential detail. Varnish solvents, many of them new, or at any rate very modern, such as dekaline, tetraline, etc., are admirably treated from all points of view. The matter written at considerable length upon the properties and defects of varnishes is a feature which a less able author might well have shrunk from attempting. Spirit varnishes, followed by insulating varnishes and general analysis, complete about the most valuable "up-to-the-minute" technical book of this character available.

Kelly's Directory of the Chemical Industries, 1923. Kelly's Directories, Ltd., 186, Strand, London, W.C. 2; price, 30s.

The title of this old-established directory might legitimately have been extended or modified in order to do more justice to its comprehensive range of contents. Every druggist, drysalter, and manufacturing chemist in the British Isles is included, so far as we can judge, as well of course as the large and more exactly defined chemical manufacturers, and all appear both in local areas as well as under proper classified sections. To illustrate the value of an up-to-date directory, it is estimated that alterations in revising the previous edition amount to 41 per cent .of the total. The concluding section of the volume gives an excellent list of proprietary brands and articles together with makers' names and addresses.

Van Nostrand's Chemical Annual (1922). John C. Olsen (Editor). London: Constable and Co., Ltd.; 21s.

The fifth issue of this annual is of the usual marked accuracy. Many new compounds have been included, and many recent data added. About 46 new tables of wide general utility have been included. It would be difficult to discover any reference detail of the type that chemists want at their finger-ends every day which is not to be found in this very efficient handbook.

Blasting With High Explosives. W. Gerard Boulton. Sir Isaac Pitman and Sons, Ltd.; 5s. net.

A small book written largely with the object of showing the advantages and economy of high explosives over gunpowder in general operations, and also, of course, giving details of their relative value and mode of employment to the best advantage. Quarry owners, mineral proprietors, salvagers, and even farmers are types whom it should interest.

Oil Analysis, a Short Handbook of. Augustus H. Gill. London: J. B. Lippincott Company.

This, the revised 10th edition, includes a section on the examination of motor gasoline and a description of the latest model MacMichael absolute viscometer. Tests, methods of analysis, and description of special oils and greases have been revised where necessity has arisen. In every way this concise manual has been brought up to date.

ITEMS OF INTEREST.

Soap Works Destroyed by Fire.—Dixon's Soap Works, Rochdale, were completely destroyed by fire on Friday evening last. The damage is estimated at over £30,000.

Nobel Prize Awards. — The Nobel Chemistry Prize for 1923 has been awarded to Professor Pregl, of Jugo-Slavia, for his work in connection with micro-analysis. The physics prize has been awarded to Dr. Millikan, of California.

Proposed Coconut Product Factory in British Guiana. - The British Guiana Farmers' Conference has decided to ask the Government to establish a factory in Georgetown where full use could be made of the products and by-products of the coconut

Personal.—Mr. C. E. Gardner, chairman of Wm. Gardner and Sons (Gloucester), Ltd., was, on Friday last, unanimously elected Mayor of Gloucester for the ensuing year.—Mr. R. B. Pilcher, of the Institute of Chemistry, has been elected Treasurer of the Chartered Institute of Secretaries for the coming year.

Fuel Economy Progress.—We are informed by Meldrums, Ltd., of Timperley, that during October they have received orders for forced-draught furnaces for 16 boilers, mechanical stokers for five boilers, also seven refuse destructors, a steam disinfector, and a gas washer-scrubber to deal with 22 million cub. ft. per 24 hours.

Change of Address.—Owing to the large expansion of the merchant and export business of Chance and Hunt, Ltd., they have found it necessary to remove the London offices to more commodious premises at 5 and 7, St. Helen's Place, London, E.C. 3. Telegrams: "Amonicid Stock, London." Telephone: Avenue 8863 (5 lines).

Proprietary Medicines in South Africa.—By a South African Government Notice issued on September 29, the following articles, among others, are wholly exempted from the stamping requirements applicable to "patent or proprietary medicines": Carbolic oil, castor oil, cod liver oil, Epsom salts, glycerine, medicinal paraffin, and zinc ointment.

Business Notice.—Mr. J. E. Hewlett, Mr. T. Martin, Mr. A. Reid, and Mr. T. Tayler have been appointed directors of the Anchor Chemical Company, Ltd., of Clayton, Manchester. The founder of the business, Councillor T. R. Hewlett, J.P., will continue to act as chairman of the company, whilst he and Mr. T. Harry Hewlett will be the managing directors.

Patent Office in Japan.—Owing to the recent earthquake and fire in Tokio, the whole of the registers and almost the whole of the documents in the Patent Office were destroyed. The Japanese Consulate in London has asked the Institute of Patentees to make public the fact that the Institute have at their offices in Great Russell Street a copy of the laws and regulations promulgated with a view to avoiding any possible detriment or inconvenience to parties who may be concerned.

Artificial Wool Patent Litigation.—Artificial silk yarn composed of filaments inflated with air, and which appears to have tubes or bubbles inside the individual filaments, is sometimes referred to as "artificial wool." Patents purporting to protect such product have been taken out by the Frenchmen, Messrs. Drut and Rousset. Messrs. Courtaulds, Ltd., it is reported, have instructed their solicitors to take proceedings for revocation of these patents on the ground, *inter alia*, that this inflated yarn is nearly as old as the ordinary yarn with solid fibres.

Indian Groundnut and Sesamum Crops. — According to reports prepared by the Indian Department of Statistics, the total area of groundnut sown in the present season in the provinces of Madras, Burma, and Bombay is estimated at 1,687,000 acres, as against 1,855,000 acres (revised) at this time last year, or a decrease of 9 per cent. The sesamum forecast is based on reports from provinces, which contain on an average 99.6 per cent. of the total area under sesamum in British India. The returns in this forecast exclude estimates for the "mixed" crop of the United Provinces and for the late crops of Bengal and Madras. The total area so far reported for the present season is 3,016,000 acres, as against 3,432,000 acres reported at this time last year, or a decrease of 12 per cent.

Dr. Muspratt's Estate.—The net estate of the late Dr. Edmund Knowles Muspratt, of Seaforth Hall, Seaforth, Liverpool, president of the United Alkali Company, Ltd., and who died on September 1 last, amounted to £434,842. 15s. 1d.

Ship Fumigation Fatalities.—During fumigation of the French steamer Caroline in Havana Harbour five seamen were asphyxiated by hydrocyanic-acid gas, and seven others are reported to be dying. The gas percolated through loose plates into the engine-room.

American Indigo Prices for 1924. — E. I. du Pont de Nemours and Co. have announced contract prices on indigo 20 per cent. paste for 1924 delivery on the basis of 25 cents per lb., carload lots, f.o.b. shipping point, freight allowed. The new price is 1 cent. below the prevailing spot quotation.

Grant for Insulin Research Work.—The University of Alberta has received a grant of £2,000. from the Carnegie Foundation for research work. The grant is made with the particular purpose of enabling a continuation of the investigations of Dr. Collip, who was associated with Dr. Banting in the discovery of insulin.

Model Sugar Factory for Trinidad.—The Governing Body of the Imperial College of Tropical Agriculture are establishing and equipping at St. Augustine, Trinidad, a model sugar factory, towards which the British sugar machinery manufacturers are contributing plant to the value of £20,000. It is expected that the factory will be completed next year.

Reparation Dyestuffs Deliveries.—Representatives of the German dyestuffs industry have signed an agreement with delegates of the Inter-Allied High Commission by the terms of which the manufacturers pledge themselves to resume regular reparation deliveries in conformity with the manner prescribed by the High Commission. They also agree to Customs control over the despatch of goods from the factories.

British Order for Oil Tanks.—The Admiralty have placed a repeat order with the Tees-side Bridge and Engineering Works, Middlesbrough, for 12 oil tanks, with a capacity of 3,000,000 gallons each, to be erected abroad. The order is to be completed by May, 1925. The whole of the steel plate and sections required for the tanks will be manufactured on Tees-side, and will thus provide a great deal of employment.

Tariff Changes. — New regulations governing the manufacture and sale of pharmaceutical specialities in Spain are to be drawn up, and to come into operation on January 1 next. In the meantime, as from November 1, the importation of foreign pharmaceutical specialities is to be permitted only under special orders or authorisation from the Spanish Direction General of Health. The dumping duty on caustic soda originated in or exported from the United Kingdom is applied on its importation into the Commonwealth of Australia. The duty is applied to all such caustic soda entered for home consumption on and after August 4, 1922.

The British Empire Exhibition.—Elaborate arrangements are being made for organised parties to visit the British Exhibition at Wembley next year. The railway companies will run special excursions to London at reduced rates from all the principal stations in the country, and special reduced rates of admission are being given by the exhibition authorities for organised parties booked before March 1, 1924. It is also announced that the various sections of the gas industry have combined, and have taken a space of 12,500ft. in the Palace of Industry. Mr. D. Milne Watson, governor of the Gas Light and Coke Company, Ltd., is chairman of the British Empire Gas Exhibition.

The Van der Waai Equation.—Dr. J. H. Jeans, secretary of the Royal Society, who delivered the Van der Waals Memorial Lecture before the Chemical Society on Thursday, November 8, gave an interesting discussion of the Van der Waal Equation. He pointed out that the a and b of Van der Waals admit of exact interpretation in terms of the physical conception of to-day. His b arises from what may be called the quantum forces—the perfectly unyielding restraints which bind the electrons to definite orbits within the atom—while his a arises from the ordinary electric fields of force. It is the b of Van der Waals which saves us from immediate annihilation through positive and negative charges rushing together to their mutual destruction, just as it is his a which saves us from rapid disintegration.

COMING EVENTS.

Institution of the Rubber Industry.—Annual meeting and dinner, **Friday, November 16,** at the Hotel Victoria, London.

Institute of Chemistry (Glasgow Section).—Discussion, **Friday, November 16,** at the Royal Technical College.—**(South Wales Section):** Annual general meeting, **Friday, November 16,** to be followed by dinner.

Society of Dyers and Colourists (Manchester Section).—Meeting, **Friday, November 16.** Paper: "Investigations into the Changes which Occur in Cotton Fabrics During Calendering and Beetling," by J. Huebner and V. Malwin.

Institute of Metals (Swansea Section).—Meeting, **Friday November 16,** at **7.15 p.m.,** at University College, Singleton Park. Paper: "The Density of Alloys," by Professor Thomas Turner.

Society of Chemical Industry (Chemical Engineering Group).—Meeting, **Friday, November 16,** at **8 p.m.,** at the Chemical Industry Club, 2, Whitehall Court, London, S.W. 1. Paper: "A New Source of Potash and Its Industrial Exploitation," by Professor J. W. Hinchley.—**(South Wales Section):** Meeting, **Friday, November 16,** at **7.15 p.m.,** in the Technical College, Mount Pleasant, Swansea. Paper by E. A. Tyler.

Institution of the Rubber Industry. — Meeting, **Monday, November 19,** at **7.30 p.m.,** at the Midland Hotel, Manchester. Paper: "Costing in the Rubber Industry as an Essential Factor to Successful Production," by C. A. Fryer.

Society of Dyers and Colourists (Midlands Section).—Meeting, **Tuesday, November 20,** at Leicester. Paper: "Bleaching with Hydrogen Peroxide," by I. E. Weber.

Institution of Civil Engineers. — Meeting, **Tuesday, November 20,** at **6 p.m.,** at Great George Street, Westminster,S.W. 1. Paper: "The Tides from an Engineer's Standpoint," by E. W. Hollingworth.

Society of Glass Technology. — Meeting, **Wednesday, November 21,** at the University, Leeds.

Institute of Chemistry (London Section).—Annual general meeting, **Thursday, November 21,** at **7.45 p.m.,** at 30, Russell Square, W.C. 1. Discussion: "The Relationship Between Employers, Works Chemists, and Consultants," to be opened by Dr. W. R. Ormandy.

Society of Dyers and Colourists (London Section).—Meeting, **Thursday, November 22,** at **7 p.m.,** at the Dyers' Hall, Dowgate Hill, E.C. 3. Paper: "Macbeth Artificial Daylight, and the Fade-ometer," by A. D. Lang.

Society of Chemical Industry (Glasgow Section).—Meeting, **Friday, November 23,** at **7.15 p.m.,** at 39, Elmbank Crescent. Paper: "Artificial Resins: Their Preparations and Uses," by Dr. H. Hepworth.—**(Manchester Section):** Annual dinner, **Friday, November 23,** at **7.30 p.m.,** at the Queen's Hotel.

West of Scotland Iron and Steel Institute. — Meeting, **Friday, November 23,** at **7 p.m.,** at the Royal Technical College, George Street, Glasgow. Paper: "Effects of Time and Temperature on High Speed and Similar Steels," by W. E. Woodward.

Institute of Chemistry (Bristol Section).—Meeting, **Saturday, November 24,** at Exeter. Papers by A. Marsden and F. Southerden.

Faraday Society.—Meeting, **Monday, November 26,** at **3 p.m.,** at the Institution of Electrical Engineers, Victoria Embankment. Discussion: "Electrode Reactions and Equilibria."

Society of Dyers and Colourists (Leeds Junion Branch).—Meeting, **Monday, November 26.** Paper: "Works Filtration," by Dr. Forster.—**(West Riding Section):** Meeting, **Thursday, November 29.** Paper: "The British Dye Industry," by Dr. H. Levinstein.—**(Midlands Section):** Meeting, **Thursday, November 29,** at Nottingham. Paper: "Bleaching with Hydrogen Peroxide," by I. E. Weber.

Hull Chemical and Engineering Society.—Meeting, **Tuesday, November 27,** at **7.45 p.m.,** at the Hull Photographic Society's Rooms, Grey Street. Paper: "Recent Advances in Colloid Chemistry," by A. V. Slater.

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, November 30,** at **7 p.m.,** at 36, George Street,

BRITISH OVERSEAS CHEMICAL TRADE.

OCTOBER IMPORTS AND EXPORTS.

ACCORDING to the Board of Trade returns, trade in chemical and allied products during October increased in value, both on import and export account, as compared with the previous month. Imports were valued at £1,245,916., against £1,023,552. in September, and £966,212. in October, 1922. Exports amounted to £2,572,881., against £2,341,761. in September, and £1,590,287. a year ago. The quantity figures of imports and exports of selected products are given in the table below :—

IMPORTS—Increases on September Quantities.

		1923. October.	September.
Acetic acid (including acetic anhydride)	tons	537	475
Boron minerals	,,	1,757	259
Calcium chloride	cwts.	87,509	65,526
Dyeing extracts	,,	9,457	8,610
Manganese ore	tons	76,336	36,709
Mercury	lb.	179,779	44,459
Nickel oxide	cwts.	6,656	1,500
Potassium c'p'ds (except nitrate)	,,	325,474	251,714
Pyrites	tons	28,273	15,260
Rosin	cwts.	131,226	123,307
Sodium nitrate	,,	109,142	91,408
Sodium c'p'ds (except nitrate)	,,	24,462	16,661
Turpentine	,,	100,686	49,203
White lead	,,	10,561	7,574
Decreases on September Quantities.			
Barytes, ground	cwts.	49,135	52,900
Bleaching materials	,,	2,285	3,907
Borax	,,	2,555	3,878
Cream of tartar	,,	2,871	2,912
Glycerine, crude and distilled	,,	3,524	6,902
Gums and resins (except rosin)	,,	16,868	19,761
Indigo, natural	,,	—	74
Paraffin wax	,,	64,578	66,034
Petroleum, crude mineral	galls.	31,907,825	35,995,347
Phosphate of lime	tons	21,181	32,373
Potassium nitrate	cwts.	12,352	27,119
Sulphur	tons	7,982	9,861
Tanning extracts	cwts.	70,933	90,299
Tartaric acid (including tartrates not elsewhere specified)	,,	60	915
Zinc oxide	tons	451	522

EXPORTS—Increases on September Quantities.

Ammonium sulphate	tons	26,587	23,858
Barytes, ground	cwts.	8,148	2,735
Benzol and toluol	galls.	424,599	142,603
Bleaching powder	cwts.	31,918	28,028
Carbolic acid	,,	15,694	12,656
Caustic soda	,,	145,967	116,180
Cement	tons	77,938	48,454
Copper sulphate	,,	340	116
Disinfectants, insecticides, etc.	cwts.	48,279	43,273
Dyes, coal-tar	,,	16,224	14,313
Glue and size	,,	16,128	11,534
Glycerine, distilled	,,	9,653	8,195
Naphtha, coal-tar	galls.	29,456	14,583
Naphthalene	cwts.	21,314	18,122
Pitch, coal-tar	tons	36,208	8,695
Potassium chromate and bichromate	cwts.	3,815	3,604
Potassium compounds (except chromate and bichromate)	,,	5,545	4,053
Salt (other than table)	tons	34,050	30,287
Sodium sulphate	cwts.	187,031	157,456
Tar, coal	tons	770	452
Tar oil, creosote, etc.	galls.	7,250,372	4,580,427
Tartaric acid (including tartrates not elsewhere specified)	cwts.	2,422	2,003
Decreases on September Quantities.			
Ammonium chloride	tons	266	402
Paraffin wax	cwts.	17,448	20,567
Sodium carbonate	,,	375,804	473,801
Sulphuric acid	,,	2,707	2,983
White lead	,,	15,988	16,944
Zinc oxide	tons	240	247

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN OCTOBER.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of October, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended October 31.			Value. Month ended October 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):						
Acids:						
Acetic (including Acetic Anhydride) tons	343	695	537	9,502	26,935	24,469
Tartaric, including tartrates, not elsewhere specified.. cwts.	702	1,335	60	3,525	7,070	410
Bleaching Materials ,,	2,478	2,775	2,285	6,954	3,616	5,523
Borax ..... ,,	2	5,621	2,555	8	6,893	2,218
Calcium Carbide . ,,	37,688	77,769	87,509	33,683	56,155	60,462
Coal Tar Products not elsewhere specified ..... val.	—	—	—	69,766	24,423	30,365
Glycerine:						
Crude ..... cwts.	160	5,225	3,213	340	12,028	8,552
Distilled ..... ,,	398	236	311	1,934	930	1,133
Lead Compounds:						
Red Lead and Orange Lead ... ,,	1,303	3,707	2,577	2,471	5,712	3,974
Nickel Oxide .... ,,	—	—	6,656	—	—	30,453
Potassium Compounds:						
Nitrate (Saltpetre) ..... ,,	12,599	3,640	12,352	16,790	4,355	14,879
Other C'pounds ,,	232,407	608,513	325,474	78,497	124,075	59,651
Sodium Compounds:						
Nitrate ..... ,,	148,138	63,570	109,142	133,076	39,749	67,223
Other C'pounds ,,	9,255	18,939	24,462	10,830	17,904	25,496
Tartar, Cream of . ,,	900	2,454	2,871	4,711	13,054	11,332
Zinc Oxide ..... tons	358	557	451	10,182	16,994	15,271
All other Sorts .. val.	—	—	—	140,655	181,115	284,827
DRUGS, MEDICINES, AND MEDICINAL PREPARATIONS containing no Dutiable Ingredient:						
Quinine and Quinine Salts ..... oz.	14,496	111,913	153,961	2,515	11,953	16,013
Bark, Chinchona (Bark, Peruvian, etc.) ..... cwts.	2,950	514	229	21,809	2,355	1,435
Other Sorts..... val.	—	—	—	89,715	102,176	233,361
DYES and DYE STUFFS (except Dye Woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning:						
Intermediate Coal Tar Products used in the manufacture of Dyes (including Aniline Oil and Salt, and Phenyl-Glycine) ..... cwts.	2	7	198	130	202	5,075
Finished Dye Stuffs obtained from Coal Tar:						
Alizarine ..... cwts.	28	560	1,062	322	7,276	8,987
Indigo, synthetic ,,	1	7	190	16	102	1,150
Other Sorts..... ,,	1,192	3,249	3,854	57,343	86,228	114,157
Extracts for Dyeing:						
Cutch ..... ,,	1,471	5,690	2,936	2,912	8,298	4,105
All other Sorts .. ,,	3,778	10,115	6,521	24,227	44,612	22,164
Indigo, natural .. ,,	7	78	—	422	3,125	—
Extracts for Tanning (solid or liquid) ,,	65,218	59,833	70,933	63,218	58,794	73,247
PAINTERS' COLOURS and MATERIALS, not elsewhere specified:						
Barytes, ground (including Blanc Fixe) ..... cwts.	34,228	25,109	49,135	8,726	8,818	11,107
White Lead (basic carbonate) ..... ,,	6,369	10,044	10,561	12,347	16,885	18,627
Other Sorts..... ,,	40,421	42,013	66,598	58,237	74,380	90,250
OILS, REFINED:						
Essential (other than Turpentine):						
Natural ..... lb.	232,700	265,173	442,010	108,899	68,036	104,584
Petroleum:						
Lamp Oil ..... galls.	8,558,514	18,001,651	11,546,154	302,487	427,337	276,688
Motor Spirit .... ,,	21,049,631	20,165,829	27,611,368	1,521,445	1,307,885	1,084,355
Spirit other than Motor Spirit ... ,,	1,142	—	284,506	123	—	8,071
Lubricating Oil .. ,,	5,351,509	5,717,192	6,772,975	466,252	376,317	384,105
Gas Oil ..... ,,	5,269,963	4,728,360	4,257,909	112,434	79,227	64,784
Fuel Oil..... ,,	54,176,363	13,573,005	32,981,417	1,079,419	187,572	422,945
Other Sorts..... ,,	16,117	3,494	2,043	1,842	375	205
Total ..... ,,	94,423,239	62,189,531	83,456,372	3,484,002	2,378,713	2,241,153

Articles.	Quantities. Month ended October 31.			Value. Month ended October 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
SOAP, not containing Spirit:						
Soft ..... cwts.	124	—	45	412	—	114
Hard, Household and Laundry, in bars and tablets ..... cwts.	14,861	9,848	10,622	42,074	26,176	24,936
Polishing and Scouring ..... ,,	5,973	1,752	3,994	7,631	2,397	5,152
Hard Toilet Soap and Shaving Soap ,,	1,591	3,071	5,776	19,576	19,937	29,011
Soap not elsewhere specified ..... ,,	508	1,047	300	967	1,645	531
Total ..... ,,	23,057	15,718	20,737	70,660	50,155	59,744
TURPENTINE..... ,,	58,886	64,096	100,686	171,661	288,724	362,803
WAX:						
Paraffin Wax .... ,,	62,269	79,576	64,578	68,745	65,111	56,557
OILS and FATS, refined edible:						
Animal (except Marine Animal), refined:						
Lard:						
From U.S.A. .... tons	3,625	6,798	5,511	274,995	459,735	381,737
,, Other C'tries ,,	856	1,070	1,256	60,847	72,193	86,460
Total ..... ,,	4,481	7,868	6,767	335,842	531,928	468,197
Lard, Imitation . ,,	240	427	354	15,020	26,703	21,572
Oleo - margarine and Oleo-oil and Refined Tallow . ,,	2,960	3,016	3,524	192,011	147,141	173,608
Vegetable, other than Essential, Refined:						
Coconut Oil, Refined ..... ,,	669	949	748	42,579	42,827	35,574
Cotton-seed Oil, Refined ..... ,,	743	81	268	41,518	4,425	11,899
Olive Oil, Refined ,,	104	150	284	14,516	13,432	19,307
Palm and Palm-Kernel Oil, Refined ,,	111	30	21	6,282	1,928	1,103
All other Sorts, Refined ..... ,,	234	594	620	16,410	37,642	32,616
Total ..... ,,	2,542	13,115	12,586	664,178	806,026	763,876
SEEDS for expressing Oil:						
Castor ..... tons	546	1,894	2,254	9,884	34,374	44,534
Cotton:						
From Egypt .... ,,	13,678	14,695	23,768	182,948	143,404	273,315
,, Brit. India ,,	12,475	9,148	9,952	133,869	82,103	92,623
,, Other C'tries ,,	9,077	6,166	4,829	87,454	56,055	51,374
Total ..... ,,	35,230	30,009	38,549	404,271	281,562	417,312
Flax or Linseed:						
From Russia .... ,,	—	—	—	—	—	—
,, U.S.A. .... ,,	—	—	—	—	—	—
,, Argentine Republic . ,,	49,459	20,303	8,625	863,066	371,478	168,588
,, British East Indies ... ,,	4,958	9,222	15,399	92,279	186,568	325,452
,, Canada ... ,,	—	—	—	—	—	—
,, Other C'tries ,,	239	711	292	4,715	13,370	6,261
Total ..... ,,	54,656	30,236	24,316	960,060	571,416	500,301
Rape:						
From B. East Indies ,,	2,666	1,224	2,102	57,615	21,565	29,915
,, Other C'tries ,,	333	32	90	6,453	782	2,119
Total ..... ,,	2,999	1,256	2,192	64,068	22,347	32,034
Sesame (or Sesamum, Benni, Gingelly or Teel):						
From China ..... tons	—	—	202	—	—	4,676
,, Other C'tries ,,	103	—	—	2,547	—	—
Total ..... ,,	103	—	202	2,547	—	4,676
Soya Beans:						
From Russia .... ,,	6,963	—	—	85,227	—	—
,, China ..... ,,	—	7	—	—	60	—
,, Japan .... ,,	8,813	—	—	119,919	—	—
,, Other C'tries ,,	—	—	—	—	—	—
Total ..... ,,	14,876	7	—	205,146	60	—
Other Sorts, including Sunflower..... ,,	1,047	10,067	1,442	19,326	120,278	24,921
NUTS and KERNELS for expressing Oil therefrom:						
Copra ..... tons	4,220	8,914	9,345	133,154	218,097	238,879
Ground Nuts (Arachide, Pea, or Monkey Nuts) .. ,,	1,554	1,220	1,956	38,592	21,728	36,453
Palm Kernels ... ,,	30,919	21,301	21,545	636,298	347,303	391,881
Other Sorts..... ,,	18	8	2,457	412	325	58,754
Total ..... ,,	36,711	31,443	35,303	808,456	587,453	725,967

FERTILISER NEWS.

Nitrate of Soda.—One of the questions at present occupying the attention of the Chilean nitrate producers is that of extending the scheme of propaganda entered on by the Producers Association. The lack of such propaganda, or the inefficient use made of the funds allotted for that purpose, was the occasion of an attack made by the chairman of a nitrate company at a recent meeting. It is generally considered, therefore, that the consumption of Chilean nitrate could be greatly increased if more propaganda on a commercial basis were conducted. At the present time, the Association is said to spend approximately £200,000. per annum in this way, towards which the producers subscribe £160,000. and the Chilean Government £40,000. The principal expenditure is incurred in connection with the United States and Canada, France, Belgium, and Holland, the United Kingdom and Spain, a committee in London, it is stated, being responsible for the distribution of the money. In view of the re-opening of this question, delegates of the Nitrate Committee in London, and the United States are now in Chile, and consultations are taking place in Valparaiso with the idea of giving fresh impetus to propaganda. South Africa and New Zealand, countries which have not hitherto taken much nitrate, are to be attempted, and negotiations are proceeding to that end. While the nitrate interests have not lost their faith in a renewed steady demand for nitrate, they are concerned about the difficulties of increasing production. Efforts are being made to ensure a supply of satisfactory labour against the time when more oficinas will be working, but as the Chilean workman progresses, his desire for a higher status increases proportionately as his knowledge of the huge profits which have been made, increases. In this connection, it is refreshing to read the remarks by the chairman of the Santiago Nitrate Company at the annual meeting on Tuesday, abstracted on page 588 of this issue.

Sulphate of Ammonia. — The export market for this product, contrary to the domestic trade, continues to be very active, and the October shipments, as given in the Board of Trade returns, show a very high tonnage taken by overseas customers. During the month, 26,587 tons were shipped, against 23,858 tons in September, and 9,659 tons in October of last year, when, however, the demand from Japan was entirely lacking. Signs of the dislocation in that country consequent upon the earthquake are evident in the reduced export figure for October, much of the material destined for that country—probably contract purchases—having been diverted to other parts. Japan was our best customer in September, taking 9,571 tons, but in October, only 3,646 tons were despatched, and it is probable that the current month will see a further diminution. In October, however, Spain and the Canaries hold first place with 6,499 tons for the month, compared with 5,821 tons in September, and 4,221 tons last year. That country has been a much better buyer this year than was the case in 1922, in no small part due to the lack of offers from America at a price able to compete with the low figure demanded by British producers. Spain's imports of sulphate from the United Kingdom during the 10 months of this year are more than double the tonnage for the corresponding period of 1922. A revival in shipments to the Dutch East Indies is recorded, 4,305 tons in October against 700 tons in September. Here again, last year's total is added to considerably in 1923. The demand from France is maintained at 3,359 tons, nearly 400 tons short of the September figure. Since January 1, 24,570 tons have been imported by France from this country, a very satisfactory total considering the distribution of reparation sulphate obtained from Germany, and the increasing home production. Yet another market which indicates the difficult position of American exporters is the West Indies. Previously, supplies had been furnished mainly from the United States, but it is found cheaper to purchase the British product in spite of the freight charges. Imports from the U.K. therefore, reached 1,094 tons against 132 tons in October, 1922, bringing the total for 1923 up to 8,925 tons. Italy accounted for a greatly increased quantity, taking 949 tons compared with 75 tons in September. Other countries, not separately specified in the returns, took 6,735 tons against 3,284 tons in September and 1,431 tons in October last year. Export figures for the ten months show 211,593 tons for 1923, and 113,280 tons for 1922, Japan accounting for almost 50,000 tons of the increase, and Spain, over 33,000 tons.

Other Fertilisers.—Basic slag and superphosphate are attracting some attention, and the former is in rather better demand on home account. The state of trade in the latter industry is, however, far from good, and imported material is constantly coming in and underselling the British product. In spite of the present situation, the statistics issued by the Board of Trade indicate only the exports of this commodity, so that it is difficult to estimate the real danger, not to the superphosphate industry alone, but to the sulphuric acid industry which is also working very much under capacity. Exports during October amounted to 815 tons, against 421 tons in September, making a total for 1923 (ten months) of 9,296 tons, compared with 4,939 tons for the same period in 1922. When it is remembered that the exports in 1913 amounted to 63,500 tons, and in 1912, 88,890 tons, the extent of the depression may better be realised. In basic slag, of course, the position is rather different, changes in the manufacture of iron and steel accounting for the small exportation as compared with pre-war figures. Exports during October increased to 1,826 tons, making the 10 months figure some 19,344 tons, against 6,183 tons in 1922. This threefold increase is mainly due to the great activity in the iron and steel industries during the first half of this year. Pre-war statistics show that in 1913, 165,100 tons were exported, and 49,313 tons imported, so that post-war imports have increased somewhat to meet the agricultural demand in this country. During the ten months ended October 31, 1923, 76,544 tons of slag were imported, comparing with 57,751 tons in the previous year. Imports of phosphate rock were much lower in October than in September, but compound manures, including guano, bone meal, etc., have been exported in greater quantity this year than in 1922.

Synthetic Nitrates in New Zealand.—Steps are being taken by a group of New Zealand capitalists to investigate the commercial practicability of fixing atmospheric nitrogen. It is proposed to establish works at a suitable site at Bowen Falls, West Coast. The proposed works are to be modelled on those of Germany engaged in the manufacture of nitrates from atmospheric nitrogen. The venture is receiving the full consideration of the Government, in whom the sole rights of the use of water for such purposes is vested. It is reported that the capital required for the works is already assured.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Bedford Chemical Company (1922), Ltd.—Registered October 26, deb., to Lloyds Bank, Ltd., securing all moneys due or to become due to the bank.

Bigsbys (Mitcham), Ltd., ink and varnish manufacturers. —Registered October 19, £4,000. deb., to T. O. King, 55, Manor Park, Lee.

Dodgson White, Ltd., London, S.E., manufacturers of anti-fouling paint, etc.—Registered October 23, £500. debs.

Northampton Glue Company, Ltd.—Registered October 24, £8,000. (not ex.) deb., to Westminster Bank, Ltd.

Standard Brick and Terra Cotta Company, Ltd., Buckley (Ches.).—Registered October 18, £5,000. deb., to Branch Nominees, Ltd., 15, Bishopsgate, London, E.C.

Wood Distillation (England), Ltd., Coleford.—Registered October 26, £9,600. deb., to E. B. Richardson, Potto Hall, Northallerton.

Wray's Drug Company, Ltd., London, W.C.—Registered October 25, £400. deb., to Mrs. O. H. Keen, 10, Ruskin Mansions, Queen's Club, London, W.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Lambeth Glass Works, Ltd., London, E.C.—Resolved October 24: That the company be voluntarily wound up. C. A. Low, Broad Street-ho., London, E.C., liquidator.

London Dye Manufacturing Company, Ltd.—W. G. Wilson ceased to act as receiver October 24.

DISSOLUTIONS OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Reid and Robertson (Alex. Reid and Wm. Robertson), 68, Hydepark Street, Glasgow, sheep dip manufacturers. October 31. Debts by A. Reid, who continues. (November 2.)

REPORTS OF COMPANIES.

Santiago Nitrate Company, Ltd.

The annual meeting was held in London on Tuesday last, Mr. Edward Eyre (the chairman) presiding. The Chairman, in moving the adoption of the report and accounts, dealt with the Chilean labour question as follows:—It would appear that to satisfy the world's supply for next year the output will have to be materially increased. To what extent this is possible depends on the not over-abundant labour available, and on its disposition to render steady, continuous, and efficient service.

In this connection I referred last year to the steps that were being taken to improve the conditions of the workmen. All these, however, deal exclusively with the physical welfare of the labourer and are undoubtedly laudable, but if it is hoped that through those means alone a better understanding between the employer and employed in the nitrate—or, for that matter, in any other—industry is to be looked for, disappointment, I fear, awaits us. Employers of labour on the pampas should encourage and assist the moral well-being of their employés, appealing to the Chilean traditional religious feeling, if for no other reason than that of self-interest.

Wall Paper Manufacturers, Ltd.

The report for the year ending August 31 last states that the profit, after making a reserve for corporation profits tax, is £635,681., to which has to be added £114,696. brought from last year's account, and that, after payment of interest upon debenture stock and interim dividends to preference and ordinary shareholders, and income tax, the amount available for further appropriation is £621,173. The directors paid a final dividend on the preference shares on October 31 and they now propose a final dividend on the ordinary shares at 6 per cent., making, with the interim dividend already paid, 10 per cent. for the year; to pay a dividend on the deferred shares for the year at 10 per cent., to transfer £100,000. to reserve fund, leaving £223,088. to be carried forward. The profit of £635,681. compares with £701,595. a year ago and with a loss of £878,600. for 1920-21. The dividend of 10 per cent. on the ordinary shares repeats last year's figure, but the deferred distribution of 10 per cent. compares with 5 per cent. for 1921-22. The allocation to reserve is unaltered, whilst the carry-forward exceeds that of last year by £108,388.

Amelia Nitrate Company, Ltd.

For the year to June 30 last gross trading profits £3,647., plus income on investments, over-provision of income-tax, and transfer fees £42,428., and £3,712. brought in, making £49,787. Administration expenses, interest, stoppage expenses, loss in exchange, and loss on realisation of old nitrate stocks totalled £41,037., leaving £8,750. After payment of preference dividend, there remains £5,750., which directors propose to carry forward. Report adds trading profit resulted entirely from iodine, but greater part of old expensive nitrate stocks has during year been realised (though at a loss), while balance of these stocks brought into new year will, on realisation, show a reasonable profit. The company restarted production in June last, and with this resumption of activities it hopes to have safely overcome past nitrate crisis, and the consequent prolonged and costly stoppage. It is proposed to subdivide the ordinary £10. shares into shares of £1. each, and resolutions will be submitted.

Weardale Lead Company, Ltd.

The report for the 12 months ended September 30 states that 2,906 tons of dressed lead ore and 7,178 tons of fluor spar have been produced. This compares with 2,420 tons and 6,741 tons respectively in the previous year. The profit, including income from investments, is £14,802. After providing for income tax, etc., and bringing into account the balance brought forward, less £362. as shown in the appropriation account, the total amount to be dealt with is £14,875. Out of this sum an interim dividend of 6d. per share has been paid, amounting to £2,447., leaving a credit balance of £12,427. The directors recommend a final dividend of 1s. 6d. per share (making, with the interim dividend already paid, 10 per cent. for the 12 months), which will absorb £7,343., leaving to carry forward £5,083.

Cellulose Holdings and Investment Company, Ltd.

The report from May 4, 1922, the date of incorporation, to June 30, 1923, discloses a net profit for the period, after meeting expenses, interest on debenture stock, making provision for taxation and debenture stockholders' participation in profits, of £4,359. Preliminary, formation and new issue expenses amounting to £3,825. have been written off, leaving a balance of £534. to be carried forward. In order to assist in providing the funds required to enable the company to subscribe for an additional £400,000. first mortgage debenture stock of the British Cellulose and Chemical Manufacturing Company, Limited, a further amount of £250,000. participating first mortgage debenture stock has been issued, together with an additional 62,500 ordinary shares of the company.

Lawes' Chemical Manure Company, Ltd.

Directors' report for the year ended June 30 states that the fall in prices, to which attention was drawn in the last report, has continued. There has been a serious falling off in the consumption of fertilisers and other articles manufactured by the company, which has caused a material reduction in the volume of sales as compared with previous years. Foreign competition in the company's main product, assisted by continued depreciated Continental exchanges, was felt with increased severity during the year. The directors regret that, in spite of every effort on their part, the heavy loss of £22,294. has to be reported. They recommend that £19,511. be written off the contingent fund created as a reserve during good years, thereby closing that account. The balance of £2,782. to be carried forward.

Santa Catalina Nitrate Company, Ltd.

The report for the year ended June 30 states that profit and loss account shows a gross profit of £21,742. After deducting London expenses, £1,737., and charging stoppage of works expenses £4,423., starting-up expenses £1,224. and repairs £3,145., there remains £11,211., to which has to be added the balance brought forward, £722., making a total of £11,934. Deducting interim dividend of 5 per cent. (1s. per share) paid in June last, £3,950., leaves to be dealt with £7,984. Directors propose payment, on November 23 next, of a further dividend of 10 per cent., making, with the interim dividend, 15 per cent. for the year, carrying forward the balance of £84. Manufacture of nitrate was resumed on March 1 last.

Lagunas Nitrate Syndicate, Ltd.

Report for the 12 months ended June 30 last shows a gross profit of £50,130., from which have been deducted London expenses, income tax, corporation profits tax, and provision for North Lagunas stoppage expenses, £17,151.; debenture interest, £10,482.; leaving a balance of £22,496., which has been transferred to the sinking fund in accordance with the resolution of the debenture-holders of December 14, 1914. Oficina North Lagunas has not yet been re-opened, but it is probable that working operations will be resumed in the course of next year.

Liverpool Nitrate Company, Ltd.

Profits for the year ended June 30 were £41,009., and £17,221. was brought forward. Expenses in connection with the increase of capital absorbed £6,454., and a final dividend of 2s. per share is proposed, making 3s. per share for the twelve months, and carrying forward £15,895. Shareholders are offered the remaining 57,725 shares at 50s. per share.

DIVIDENDS.

Aluminium Corporation, Ltd.—Dividend 7 per cent., less tax on preference stock and shares for year, carrying £6,696. forward.

London Nitrate Co., Ltd.—Final dividend of 1s. 6d. per share, making 2s. 6d. per share, free of tax, for the year. A sum of £30,000. is transferred to reserve for redemption of debentures.

Mount Lyell Mining and Railway Co., Ltd.—After allowing for dividend tax and income taxes £21,031., depreciation £50,712., and mine prospecting £4,120., operations for year to September 30 last resulted in net profit of £151,002. Dividend No. 31 of 1s. per share, less tax.

Amalgamated Zinc (De Bavay's) Co., Ltd.—A dividend of 1s. per share, less tax, will be paid on December 5 to members on the London register on November 20.

"Sanitas" Co., Ltd.—Interim dividend at rate of 9 per cent. per annum on preference, payable December 1.

LEGAL INTELLIGENCE.

ASSESSMENT OF DAMAGES IN RAINHAM EXPLOSION CASE.

Belvedere Fish Guano Company, Ltd. *v.* Rainham Chemical Works.

The explosion at the Rainham Chemical Works in 1916 was the subject of proceedings before Mr. G. A. Scott, High Court Official Referee, who, on November 8, was asked to assess damages claimed by the Belvedere Fish Guano Company, Ltd., for injury to their buildings and plant by the explosion. The defendants, on land adjacent to the plaintiffs' works at Rainham, carried on the business of manufacturing picric acid from dinitrophenol. This being a dangerous explosive, by arrangement with the Ministry of Munitions, it was agreed that the manufacture should be carried on at the contractor's risk. In 1916 a violent explosion occurred, by reason of which the plaintiffs' premises and plant suffered considerable damage. The explosion, plaintiffs alleged, was caused by the defendants' negligence in storing too large a quantity of nitrate of soda, picric acid, and other explosives in proximity to plaintiffs' works, and an action was brought against them in the King's Bench Division in 1917, when Mr. Justice Scrutton found for the plaintiffs. The defendants appealed, and the Court of Appeal confirmed the judgment of the Court below, as did also the House of Lords, before whom the case was then taken, and the case now came before the Official Referee for assessment of the amount of damage sustained by the plaintiffs.

The Referee, in giving judgment, said he was of opinion that plaintiffs had not suffered any general damage by the shutting down of their works, but by law he had to give some damage, and he assessed the amount at £128., and the damage to property at £1,872. There would therefore be judgment for the plaintiffs for £2,000., with costs.

SULPHATE OF AMMONIA SALES DISPUTE.

British Sulphate of Ammonia Federation, Ltd. *v.* The South Metrofolitan Gas Company

This action, which has reference to the proper method of keeping accounts under a pooling and equalisation scheme, again came before Mr. Justice Greer on Monday last.

Mr. Le Quesne, for the plaintiffs, said that on October 31 Mr. Wright partially opened the case (*C.T.J. and C.E.*, November 2, 1923, page 525), and on the application of the parties, it was allowed to stand till that day. In the interval, the parties and their accountants had met, and plaintiffs had supplied full accounts; but the time had not been sufficient to enable the accountants to master them. He was not surprised at this, as the accounts were very voluminous and complicated. In these circumstances he was instructed to apply for a further adjournment.

Mr. Wylie, for the defendant, supported the application, stating that his accountants had found considerable difficulty, in the time at their disposal, in dealing with the accounts which had been placed before them. He hoped, if a further adjournment were granted, the result would be that the Court would not be further troubled with the case.

His Lordship, in ordering the case to stand over until November 29, said he trusted this adjournment would result in the parties arriving at a settlement, as the case was eminently one which ought to be amicably settled.

PURIFICATION OF OIL-CONTAMINATED WATER.

THE "VICKCEN" CENTRIFUGAL OIL SEPARATOR.

SEVERAL interesting devices have been evolved recently for enabling ships to comply with the "Oil in Navigable Waters" Act. Oil-bearing steamers frequently fill their old tanks with salt water after the oil in the tank has been either expended or discharged. When these tanks are again pumped out the water pumped from the tank is necessarily contaminated with a certain proportion of oil. Oil is also inevitably present in the bilges of such ships, and under the "Oil in Navigable Waters" Act it is an offence to pump this contaminated water into harbours or docks on account of the pollution caused. The devices which have been evolved have in mind principally the discharge of oil-free water into the harbour. There is, however, another and extremely important aspect of this operation. The oil as recovered from these devices still contains a proportion of water and dirt, rendering it, as a rule, unfit for actual use as a fuel without further treatment.

There has, however, been put on the market recently an entirely British-made centrifugal oil purifier, by means of which machine it is possible to purify rapidly and efficiently this recovered oil. This new machine is known as the Vickcen Oil Purifier, and is handled by Messrs. British Separators Limited, of 161, Queen's Road, Peckham, who are associated with Vickers Limited. The machines, it is claimed, will run for hours with practically no attention whatever, and a special interest attaches to them in that they enable compliance with the "Oil in Navigable Waters" Act to become in some cases a commercial advantage due to the rapid and efficient recovery of oil in an entirely fit state for use.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The outlook is distinctly better in nearly every direction. The chief feature is the improvement that is taking place in the hematite pig-iron and steel industries in this district and also in the Furness area. There is no doubt whatever that within a comparatively short period there will be considerably more employment for the steel rail mills at Workington. There will be more work for them this year than was anticipated, and it is believed that by the end of January they will be rolling three weeks in four. The hematite pig-iron trade, quite apart from the consideration that so much of the iron will be reserved for local consumption, is exhibiting no small signs of improvement. This week, for instance, consumers are buying forward, a thing they have not done anytime previously this year. The advance in price is itself a proof of the larger demand. Ordinary iron is now £5. 5s. per ton at works, and it would not be surprising were a further rise to take place. A furnace at Workington is ready to be relighted, and it is expected that one or two more furnaces may be put into blast. This activity, of course, means greater pressure upon the collieries and the coking plants. Already the coke ovens are so busy that they are absorbing nearly all the small coal that is being raised. It looks as if when iron smelters get all the furnaces blowing that they have in blast in normal periods, they will be unable to obtain from the coking plants here the whole of the coke they require. It is true that the ovens are not working at the moment at the maximum capacity, but however much more production may be increased it will not be quite sufficient to meet needs. East Coast coke supplies this week, it is to be noted, have risen to 10,000 tons. Little coke can be spared for the Continent, and makers command 35s. per ton. Of the residuals sulphate of ammonia is slow and is being stocked.

SOUTH WALES NOTES.

(Specially Contributed.)

During the week further orders have been received, and the tinplate trade is steadily expanding. The patent-fuel business is fairly active with firm quotations, owing to the high prices of binding materials. Cokes are in much better demand, and stocks at the ovens are rapidly diminishing. By-products have a strong market, especially in benzol, and the tar residuals. Sulphate of ammonia has moved slowly, but as stocks are very low, no curtailment in output is expected. The nickel factories are in full operation, and the demand for the metal is well maintained. By-products also are selling promptly. Sulphuric acid makers report a steady and even slightly increasing trade. The spelter trade is brisk, the demand from the galvanised sheet manufacturers having increased on account of the pressing call for corrugated sheets in the Far East.

The shipping returns for the week show 4 tons magnesite from Drammen, 8 tons calcium carbide from Kragero, 20 tons nitrate of soda from Christiania, 25 tons calcium carbide, and 50½ tons nitrate of soda from Sarpsborg to Swansea; 838cwt. calcium carbide from Sarpsborg, 1,005cwt. red arsenic from Antwerp, 103cwt. iron oxide from Malaga, 21 tons white arsenic from Antwerp to Cardiff; 21 tons ferro silicon to Newport.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained.

France.

An agent established in Paris is desirous of obtaining the representation of British manufacturers for the sale in France of petroleum products, rubber chemicals and raw materials, industrial chemicals, glues, gums, etc. (Ref. No. 510.)

Greece.

The acting British Consul-General at Salonica reports that a quantity of tar or suitable composition for road-making will shortly be required by the Municipal Council of Salonica. (Ref. D.O.T. 11729/F.E./M.C./2.)

Netherlands.

An agent in Amsterdam desires to secure the sole representation, on a commission basis, for the Netherlands of British manufacturers of tinplates. (Ref. No. 511.)

Norway.

A firm of agents in Christiania are desirous of securing the representation in Norway of British exporters of raw materials for margarine factories (such as oleo oil, etc.). (Ref. No. 513.)

Portugal.

A British firm of good standing in Oporto wish to get into touch with firms dealing in lubricating oils, with a view to securing their representation. (Ref. No. 516.)

Denmark.

Tenders are being invited in Copenhagen for the supply and erection of a tar-distilling plant. Tenders are to be presented by November 20. A copy of the specification and conditions of tender are available for inspection. (Ref. D.O.T. 8211/C.C./2.)

China.

The Shanghai Branch of an old-established British firm of manufacturers of pharmaceutical preparations, infant and invalids' foods, and druggists' sundries, wishes to secure the representation in China of well-established British manufacturers of perfumery, etc. (Ref. No. 521.)

India and the Far East.

A gentleman with experience in export trade to the Far East is shortly visiting India, Burma, Straits Settlements, Hong Kong, and Japan, and is desirous of acting as representative for British firms dealing in paints and varnishes, bag blue, soaps, perfumery, and patent medicines. (Ref. 522.)

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," November 17, 1888.)

The Salt Trade in Parliament.—Sir G. Campbell asked the President of the Board of Trade whether Her Majesty's Government had considered and taken the advice of their law officers on the question whether combinations of capitalists to establish monopolies, and raise the price of salt and other articles by means of rings and trusts, were offences against the law of conspiracy, or against the laws making penal proceedings in restraint of trade in salt or other articles of consumption; and, if so, whether measures would be taken to protect the public against the salt and other rings now being formed? Sir M. Hicks-Beach: The Government have no information before them which would justify them in taking the course which the hon. member's question suggests. Sir G. Campbell said that he would take an opportunity of calling the attention of the House to that subject. Mr. Bradlaugh said that in the law reports there was a decided case of a conviction in regard to raising the price of salt. Sir M. Hicks-Beach: That may be so, but we have no information before us that would justify us in referring this matter to the law officers of the Crown for their consideration. Every case must be dealt with on its own grounds. Mr. Bradlaugh asked whether the right. hon. gentleman was aware that one of the promoters of the combination wrote to the *Times* stating that one of its objects was to obtain a more remunerative price for salt? Sir M. Hicks-Beach: That may be so.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

October 29 to November 3 (inclusive).

Organic Compounds of Mercury. Albert, A. 27,376.
Rubber Sheets from Latex. Anode Rubber Co., Ltd. 27,464 and 27,465.
Rubber Latex. Bostock, N. S. 27,010, 27,011, and 27,012.
Triarylguanidines and Their Use in Vulcanisation of Rubber. British Dyestuffs Corporation, Ltd.; Cronshaw, C. J. T.; and Naunton, W. J. S. 27,462.
Diarylguanidines. British Dyestuffs Corporation, Ltd.; Cronshaw, C. J. T.; Naunton, W. J. S. and Green, S. J. 27,463.
Activation and Synthesis of Gases. Buckley, J. W.; and Metropolitan-Vickers Electrical Co., Ltd. 27,181.
Anti-corrosion Medium. Butler, E.; and Soar, T. L. 27,040.
Treating Crude Oxide and Carbonate of Zinc. Chance and Hunt, Ltd.; Gidden, W. T.; and Ragg, W. G. 27,048.
Disintegrating and Dehydrating Feat. Clewlow, C. W. G. 27,552.
Fractional Distillation. Dorman, Long, and Co., Ltd.; Lowe, H. M.; and Roelofson, J. A. 27,679.
Drying Copra. Elsworth, O. 27,339.
Acid Azo-dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning. 27,219.
Esters. Hefti, F.; and Schilt, W. 27,272.
Insecticides and Fungicides. Howles, F.; and McDougall and Yalding, Ltd. 27,588.
Fuel. Illingworth Carbonisation Co., Ltd.; and Illingworth, S. R. 27,047.
Azo-dyestuffs. Imray, O. Y. (*Soc. of Chemical Industry in Basle*). 27,069.
Dyeing of Leather. Lamb, M. C. 27,429.
Regeneration of Base Exchanging Bodies. Lassen, S. V. H.; and United Water Softeners, Ltd. 27,312.
Temperature-control Valves. Maclaren R. 27,242.
Synthetic *l*-cocaine. Merck, F.; Merck, K.; Merck, L.; Merck, W.; Merck, W. E.; Maeder, H.; and Wolfes, O. 27,340.
Leaching Copper. Metals Production, Ltd. 27,345.
Ammonium Sulphate. Nicholson, T. 27,648.
Condensation Products from Formaldehyde and Urea. Pollak, F. 27,613.
Retorts for Carbonisation of Solid Fuels. Queneau, A. L. J. 27,348.
Insecticide. Ralph, J. W. 27,559.
Oxides of Nitrogen. Ramsay, H. G. A. 27,052.
Acridinium Compounds. Ransford, R. B. (*Cassella and Co.*). 27,233.
Artificial Cotton. Rosenthall, F. A.; and Stevenson, W. J. 27,502.
Composition for removing Rust. Siegel, H. 27,131.
Solation of Gelatinising Organic Colloids. Waele, A. de. 27,071.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.

1922.

Purification of Cracked Hydrocarbon Spirit. Remfry, F. G. P. 20,151. **205,868**
Electrode Structure. Scott, J. P. 20,350. **205,883**
Electrolytic Cells. Scott, J. P. 20,352. **205,884**
Grinding-machines. Marks, E. C. R. (*Bock Bearing Co.*). 20,355. **205,885**
Viscose. Dreyfus, H. 20,557. **205,898**
Alkali Salts. Plauson's (Parent Co.), Ltd. (*Plauson, Dr. H.*). 24,748. **205,955**
Chlorination of Methane. Holzverkohlungs-Industrie Akt.-Ges. 27,107. **195,345**
Thermometers. Sugden, T. 31,910. **206,028**

1923.

Fire-extinguishing Medium. Pyrene Co., Ltd. (*Pyrene Manufacturing Co.*). 331. **206,045**
p-phenetol-carbamide. Sonn, Dr. A. 7,507. **206,083**
Evaporating Water from Semi-liquid Substances. Trocknungs-Anlagen-Ges. 9,532. **197,656**

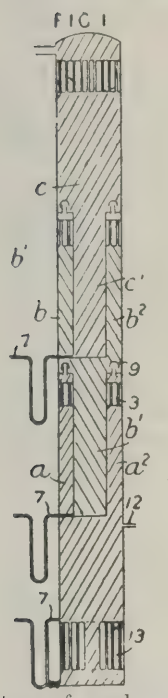
COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Perylene Vat Dye. Pereira, H. 25,665. **206,133**
3,10 Perylene Quinone. Pereira, H. 25,666. **206,134**
Naphthaquinone Derivatives. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis; Wahl, A.; and Lantz, R. 26,037. **206,142**
Substituted Products of an Aliphatic Arsinic Acid. Etablissements Poulenc Frères; and Oechslin, C. 26,163. **206,143**
Reverberatory Furnaces. Heimsoth and Vollmer Ges. 26,171. **206,144**
New Derivatives of Naphthaquinone. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis; Wahl, A.; and Lantz, R. 26,612. **206,150**
Hydroxylated Aliphatic Arsinic Acids. Etablissements Poulenc Frères; and Oechslin, C. 26,617.
Formol. Soc. des Etablissements Barbet. 26,749. **206,158**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Fractionating Liquids. A. L. Bloomfield, Buckhurst Hill, Essex; and A. Boake, Roberts and Co., Ltd., London. British Patent **203,506,** of 1922.



An apparatus for separating by fractional distillation three or more volatile components of a liquid mixture comprises a series of superposed fractionating-units each having a lower boiling or analysing-portion and an upper rectifying-portion arranged so that the rectifying-portion of one unit forms the heating-means for the analysing-portion of the unit next above. An apparatus to separate three components and discharge them in liquid form comprises three units *a*, *b*, *c*, Fig. 1. The rectifying-portion a^2 of the unit *a* surrounds the analysing-portion *b'* of the unit unit *b*, and the rectifying-portion b^2 of the *b*, and the rectifying-portion b^2 of unit unit *c*. The mixture to be separated is supplied to the lower unit *a* through an inlet 12 either in the form of pre-heated liquid or as vapour. The unit is heated by a heater 13 which may receive the vapours of the highest-boiling component or may be heated by steam, etc. The highest-boiling component is withdrawn by pipe 7 from the base of the lower unit, and the vapours of the other components pass through opening 9 fitted with capped tubes or with ball or check valves into the middle of the second unit *b*, from the base of which a second component is withdrawn. The remaining vapours pass into the middle of the third unit *c*. Heating or cooling devices 3 may be arranged at the top of each unit to regulate the temperature gradient throughout the column.

Benzanthrone Dyestuffs. J. Y. Johnson, London. (Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany.) British Patent **203,533,** of 1922.

Condensation products, which are probably 2:2'-dibenzanthronyl compounds, are prepared by heating benzanthrone or its derivatives with alkaline condensing-agents under more moderate conditions than those yielding dibenzanthrone dyes; any dye simultaneously produced is removed by means of alkaline hydrosulphite. These condensation products are converted into dibenzanthrone dyes by heating, with or without alkaline, acid, or oxidising condensing-agents; if free halogens or sulphuric acid are used as condensing-agents, the resulting dyes contain halogen or sulphonic groups; strongly oxidising condensing-agents produce oxidised dibenzanthrones.

Thioindigoid Vat Dyestuffs. S. Sokal, London. (Kalle and Co., Akt.-Ges., Biebrich-on-Rhine, Germany.) British Patent, **202,734,** of 1922.

By heating with acid condensing agents, naphthalene-dithioglycollic acids or their derivatives are converted into naphthalene-di (oxythiophenes); by oxidation or by condensation with cyclic *o*-diketones or derivatives thereof, for instance, isatin, naphthisatin, diketodihydrothionaphthenes, or their α-derivatives, or acenaphthenequinone, the oxythionaphthenes yield thioindigoid dyestuffs dyeing cotton in green, violet, brown, olive, etc., shades from the hydrosulphite vat; the mixed dyestuffs may also be prepared in one operation by treating a mixture of a naphthalene-dithioglycollic acid and the *o*-diketone with chlorsulphonic acid. Naphthalene-dithioglycollic acids are obtained from the corresponding disulphonic acids by conversion into chlorides with phosphorus pentachloride, reduction, and condensation with chloracetic acid.

Aryl Phosphates. A. G. Bloxam, London. (Chemische Fabrik Griesheim Elektron, Frankfurt-on-Main, Germany.) British Patent **203,820,** of 1922.

Aryl esters of phosphoric acid are prepared by treating an aromatic hydroxyl compound, whether carbocyclic or heterocyclic, or a substitution product thereof, with a phosphorus oxyhalide in the presence of an alkaline earth metal, magnesium or aluminium, or a halogen compound of such metal or of a metal of the chromium or iron group. Mixtures of the aromatic hydroxyl compounds may be employed; and indifferent solvents or diluting agents, such as benzene, toluene, or chloro-benzene, may be present. The products are useful as softening agents in the cellulose and other industries. The preparation is described of triphenyl phosphate from phenol and phosphorus oxychloride in the presence of aluminium chloride, *p*-cresyl phosphate from *p*-cresol and phosphorus oxychloride in the presence of magnesium filings and several others. Phosphorus oxybromide may replace the phosphorus oxychloride; and chlorophenols, nitrophenols, α-naphthol, dioxynaphthalenes and oxyquinolines, may be used as starting materials.

Sodium Silicate. W. Clayton, Liverpool; and H. W. Richards, Wallasey, Cheshire. British Patent **203,749,** of 1922.

Sodium-silicate solution is evaporated by spraying into heated air. The solution may be of 100° Tw., and may contain 2.1 parts by weight of silica to 1 part by weight of Na_2O. The spraying may be effected with the liquid at 45° C. by means of an air pressure of 65lb. per sq. in. Beneath the jet of liquid is a high velocity air jet at right angles to the liquid jet as in milk spraying, a pressure of 150lb. per sq. in. being suitable. Instead of an air jet superheated steam or flue gases may be employed, or a fine spray may be produced by other means, such as a whirling jet. The spray may be directed into the top of a chamber in which the air is at 110° C. at the top and 75-85° C. at the outlet at the bottom. Potassium silicate may be added to the sodium silicate to reduce the viscosity.

Formamide. J. Y. Johnson, London. (Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany.) British Patent **203,812,** of 1922.

Formamide is obtained by the interaction of carbon monoxide and ammonia under a pressure of not less than 20 atmospheres and at a temperature exceeding 100° C. Catalysts, such as pumice, clay, earthenware, alumina, metals, especially copper, or water may be used. In the presence of larger proportions of water, ammonium formate or a mixture thereof with formamide is produced. The reaction is effected in an autoclave capable of withstanding high pressures and not made of iron or tin. The process may be operated in a continuous manner, and diluent gases, such as hydrogen or nitrogen, may be employed. Examples of the process are given.

Soya-Bean Adhesives. O. Johnson, San Diego, California, U.S.A. British Patent, **203,969,** of 1922.

Soya beans or the seeds of other leguminous plants are soaked in water to produce a pulpy mass which is ground, boiled and filtered. The filtrate is treated as by centrifuging to extract oil, and is then curdled. The curd is preferably washed with sodium-arsenate solution to remove acid, and is finally dried and ground. The product may be mixed with materials such as hydrated lime, sodium fluoride, and water to produce an adhesive; it may also be used as a base for sizes, calcimines, and paints. The step of filtering the boiled pulp may be omitted.

Sulphur Dioxide from Metallurgical Gases. A. E. White, London. (American Smelting and Refining Company, New York, U.S.A.) British Patent **203,722,** of 1922.

Substantially pure sulphur dioxide, in solution or as a gas and of predetermined strength, is obtained from intermittently supplied metallurgical gases by passing the cooled scrubbed gases in counter-current with water or a solution of sulphur dioxide prepared at a previous stage in the process. A suitable plant is illustrated and described.

Production of Insulin. F. V. Feeny, London. (F. G. Banting, J. B. Collip, C. H. Best, Toronto, Ontario, Canada.) British Patent **203,778,** of 1922.

A pancreas extract to be injected intravenously or subcutaneously in the treatment of diabetes is obtained from fresh glands by extracting them with a solvent, such as alcohol, which inhibits the action of enzymes on the active substance or hormone and then removing toxic impurities by precipitation. According to an example fresh ox pancreas is minced, mixed with alcohol, and the mixture strained and filtered. The filtrate is treated with more alcohol to precipitate proteins, and the solution is distilled under vacuum to remove the alcohol. The concentrated solution so obtained is extracted with ether to remove lipoid sub-

stances, and, after elimination of the ether, alcohol is again added, and the mixture agitated and centrifuged, whereby "salted-out" saline impurities and more proteins are separated and removed. Additional volumes of 95 per cent. alcohol are added to precipitate further impurities and the filteral solution distilled to remove the alcohol. The hormone so obtained is dissolved in distilled water and the solution is standardised by concentration, sterilised by filtration, and a small quantity of a preservative such as tri-cresol is added.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Iron-Free Alumina Salts. Chemische Fabrik Griesheim Elektron, Frankfort-on-Main, Germany. British Patent, **203,706.** Convention date, September 8, 1922.

Aluminium is separated from ferruginous solutions by precipitation as aluminium-alkali fluoride by adding to the solution hydrofluoric acid and an alkali salt or a fluoride and a mineral acid such as hydrochloric or sulphuric acid under such conditions that the iron is not precipitated. To ensure that the precipitate shall be free from iron either a small excess of unprecipitated aluminium salt is left in solution, or the solution is treated before the precipitation, so as to reduce the iron to the ferrous condition, for instance by passing sulphuretted hydrogen through the solution.

Electrolytic Zinc Production. Electrolytic Zinc Company of Australasia, Ltd., Melbourne, Australia. British Patent, **202,299.** Convention date, August 8, 1922.

In the recovery of zinc from ores or metallurgical products, the residue after leaching the roasted material with spent electrolyte, is mixed with strong sulphuric acid in a rotating drum or other apparatus, and is preferably formed into nodules. It is then dried and heated in a shaft or other furnace to which gases containing sulphur dioxide, such as roaster gases, are supplied. The furnace temperature is sufficient to decompose iron sulphate, but not zinc sulphate. The product is then leached with part of the solution obtained in the previous leaching, and the resulting solution is added to the main circuit. The gases leaving the furnace are conducted to a plant for the recovery and production of sulphuric acid. The product of the first leaching is classified into slimes and coarse material, the former of which is thickened and decanted and the residue filtered for the acid treatment. The coarse material is treated by flotation, and the tailings filtered and added to the slime residue, the concentrates being roasted for production of the gases used in the furnace treatment and the calcines returned to the initial leaching-vats. The liquid products of both leachings are agitated with limestone to precipitate iron and silica, and are filtered before return to the cells. Chlorides may be added to precipitate silver, if sufficient chloride is not present in the leaching-solution.

Furfural. Quaker Oats Company, Chicago, U.S.A. (Assignees of C. S. Miner and H. J. Brownlee.) British Patent **203,691.** Convention date, September 7, 1922.

Furfural is prepared by mixing the raw material, such as oat, rice, or cottonseed hulls, corn cobs, etc., with sufficient liquid, preferably containing acid, to damp the mass and subjecting the mixture to the continuous action of steam to remove the furfural as formed. In an example a mixture of oat hulls, about 25 per cent. by weight of water and rather less than 2 per cent. of sulphuric acid, is charged into a jacketed digester, which is then continuously revolved and heated. Steam is then passed into the digester through a plurality of jets with the valve closed until a pressure of 60 pounds is attained, when the valve is opened and the supply steam adjusted to maintain the pressure within the digester. The steam and furfural pass into the condenser and thence to a receiver. The distillate is neutralised, preferably with slaked lime, and is distilled to obtain the furfural.

Electrolytic Production of Alkali Bichromates. A. J. B. Jouve, A. Helbronner, and Soc. Hydro-Electrique and Métallurgique du Palais, all in Paris. British Patent, **203,709.** Convention date, November 23, 1921. Addition to 177,174.

In the electrolysis of an alkali-carbonate solution with an anode of a chromium alloy, such as ferrochrome, according to the parent Specification, the electrolysis is continued after the complete conversion of the carbonate into chromate, in order to form bichromate. Concentrated solutions are preferably employed so that the resulting bichromate solution is near the crystallising point. A current density of some hundreds of ampères per square metre is employed so as to heat the electrolyte. The electrolysis may be carried out in a series of baths between which the electrolyte circulates. The cathodes may be of lead. Iron oxide is removed from time to time by agitation and filtration of the liquid or by centrifugal separation. Neutral chromate may be obtained from the bichromate solution so prepared by adding excess of alkali carbonate.

NEW COMPANIES.

Alexander Cross and Sons (London), Ltd.—Private company. Capital £50,000., £10. shares. Chemical manufacturers, dealers in fertilisers and feeding stuffs. Office: 81, Gracechurch Street, London, E.C.

Deptford Glass Works, Ltd.—Private company. Capital £1,000. Solicitor: T. H. Goodwin, 14-15, Coleman Street, London, E.C.

John Quilliam and Co. (1923), Ltd.—Private company. Capital £5,000. Manufacturing and wholesale chemists, and medical plaster manufacturers. Office: Canterbury Works, Victoria Bridge, Manchester.

Nugget Polish Company of Ireland, Ltd.—Private company. Capital £50,000., in £1. shares. Blacking and polish manufacturers, etc. Office: 23-24, Lower Bridge Street, Dublin

Super-Centrifugal Engineers, Ltd. — Private company. Capital £100. Agents in the U.K. for the patented machines and processes of the Sharples Specialty Company of New York. Office: Imperial House, Kingsway, W.C.

Lennox Chemicals, Ltd.—Private company. Capital £2,000. General manufacturing chemists, etc. Office: 19, Upper Ormond Quay, Dublin.

PUBLICATIONS RECEIVED.

Methods of Analysis of Coal.—Interim Report of the Fuel Research Board of the Department of Scientific and Industrial Research (Physical and Chemical Survey of the National Coal Resources, No. 2). London: H.M. Stationery Office; price 1s. 6d. net.

Scouring: Oil Extraction and Degreasing.—Booklets from R. W. Greeff and Co., Ltd., descriptive of the products of the Weston Chemical Company, Ltd.

Haughton Patent Metallic Packing.—We are in receipt of two highly attractive blotters from Messrs. Haughton's Patent Metallic Packing Company.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals. — The demand for heavy chemicals continues limited in volume, with the tone of the market fairly steady, and showing but little change during the past week. **Acetic Acid,** 80% technical, £46.; 80% pure, £47. 10s. to £48.; 98% glacial, £60. in casks and £72. in glass demijohns, ex wharf London; prices are being kept fairly steady, but business has again been slow. **Acetone,** British Government specification, about £124. per ton, in drums; this market remains steady, with business limited. **Alum,** lump, £10. to £10. 10s. per ton, in casks; dealers' prices are unaltered; business slow. **Arsenic,** Cornish white powdered,

about £65. per ton, f.o.r. Cornwall; inquiry for export to America continues strong, and, with supplies available rather restricted, it is expected that there will be further advances before long. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; matters are rather dull here; dealers' prices are about the same. **Bleaching Powder,** 35—37%, £10. to £10. 5s. per ton; dealers are offering Continental material at about these rates, but are not finding much demand. **Barium Chloride,** 98—100%, £14. 10s. to £15. per ton; some slightly cheaper offers are being made by importers; market still dull. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P., crystals, about 1s. 5d. per lb., less 5%; this market shows improvement, and conditions are much firmer. **Cream of Tartar,** 99—100%, about 85s. per cwt., in ton lots; dealers are doing a limited business at about this figure. **Epsom Salts,** commercial quality, £4. 10s. to £4. 15s. per ton; dealers are quoting at about these figures, but appear to be doing very little business. **Formaldehyde,** 40% volume, about £62. to £63. per ton; although there has been but little business doing, the spot position is very steady, and tends to harden on account of the Continental position. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; dealers' quotations show no change; business dull. **Lead Acetate,** brown, £41. to £43.; white, £42. to £43. per ton; as expected, prices are dearer here, and stand very firm; supplies short. **Litharge,** imported, about £35. 10s. per ton; importers are doing a little business at about this figure. **Lithopone,** 30% Continental red seal, about £22. 10s. to £23. per ton; a fair volume of business continues here, and prices are well maintained. **Ammonium Chloride,** grey galvanising, £30. 10s. to £31. per ton; dealers holding spot stocks of Continental material are fully maintaining their prices; any movement is likely to be to higher values. **Nickel Sulphate,** home trade single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at these unchanged rates. **Oxalic Acid,** 5¾d. to 6d. per lb.; quoted here at these figures, with the market dull and not at all steady. **Carbonate of Potash,** 90—92%, about £25.; 96—98%, about £26. 10s. to £27.; dealers are offering at cheaper rates, but there is still little doing. **Chlorate of Potash,** crystals and granular, 2¾d. to 3d. per lb.; these prices are mentioned by dealers, but little inquiry is on the market. **Caustic Potash,** 88—92% solid, about £31. per ton; spot stocks are available, with not much demand at present; Continental offerings are unsteady, but may harden. **Permanganate of Potash,** commercial quality, about 9d. per lb.; dealers find it difficult to realise this figure in actual business. **Prussiate of Potash,** yellow, about 10¼d. per lb.; last week's cheaper price is still being quoted by agents for British material; business remains slow. **Sulphate of Potash,** £11. per ton, ex ship; the position is as last reported. **Mercury,** about £10. per ton; during the past week business has been fair, and prices on spot are being maintained. **Red Lead,** imported, about £35. 10s. per ton; dealers quoting on spot at about this figure, with business slow. **Salammoniac,** dog-tooth crystals, about £50.; medium, £42. to £45.; fine white, about £26. per ton, in casks; dealers holding spot stocks are rather firmer in their offerings, and there is a slight tendency towards higher values. **Saltcake,** home trade, about £4. 10s. per ton; for export quotations are slightly dearer; there is little material available up to the end of the year. **Acetate of Soda,** about £24. 15s. per ton; dealers have a few small spot parcels offering at about this figure. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers' quotations are unchanged at these levels, with business still small. British makers' prices to domestic consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; and 76—77%, £19. 7s. 6d. per ton, in drums free, carriage paid to any station in Great Britain; their prices for export vary according to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags free; British makers continue to quote at this level for home trade only, carriage paid. **Bichromate of Soda,** home trade, 4½d. per lb.; British makers' prices are steady at this rate; export prices are slightly dearer. **Cyanide of Soda,** export, about 8d. to 8½d. per lb.; British material is quoted at about these figures. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in free bags, carriage paid to any station in Great Britain; British makers offering at this price for home trade only; dealers are quoting at competitive rates. **Hyposulphite of Soda,** pea crystals, £14. 10s. to £15. per ton, in 1cwt. kegs; commercial quality, about £10. per ton, in casks; the tone here is good, and spot values tend to harden; Continental offerings are dearer. **Nitrate of Soda,** 96%, £13. 5s. per ton; this item keeps very steady, with quoted values unchanged. **Nitrite of Soda,** 100%, about £26. 10s. per ton; the slight reduction in prices recorded last week has been followed by a full recovery. **Prussiate of Soda,** about 5½d. per lb.; dealers offering British material at about this figure find business very slow and limited. **Sodium Sulphide,** 60—62%, solid, about £14.; ditto, broken, about £15. per ton, in drums; dealers are offering imported material at about these rates, but are not meeting with much demand. **Tin Crystals,** about 1s. 3½d. per lb.; quoted rates are a little better here, with the market steady. **Tartaric Acid,** B.P., crystals, about 1s. 1¾d. per lb., less 5%; although there is still but little demand for this product, the position seems to be steadier. **White Lead,** imported, about £42. to £43. per ton; dealers continue to offer Continental material at about this rate; demand slow. **Zinc Oxide,** B.P., £52.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers quote at about these rates, f.o.r. works.

Pharmaceutical Chemicals.—The firmer tone, accompanied by considerably higher levels in value, continues in this market, and any further movement is likely to be to still higher rates. Business has been brisk in many items, and in a number of products spot supplies are very limited, with fresh imports rather doubtful. **Acetanilid,** crystals and powder, about 2s. 3d. per lb.; the higher rate quoted last week is well maintained, and there has been good inquiry. **Acetyl-Salicylic Acid,** B.P., about 3s. 9d. per lb.; after the very considerable advances in prices, this market is again at higher values; the demand has been active, and supplies seem limited. **Benzoic Acid,** B.P., about 4s. 3d. per lb.; importers are quoting at about this figure to arrive. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. per lb.; this market remains quiet, with values about the same. **Salicylic Acid,** B.P., 2s. 4d. to 2s. 6d. per lb.; at these rates the spot position is well maintained, with inquiry active. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; with not much business doing, this item keeps quite steady. **Amidopyrin,** about 15s. per lb.; very little inquiry has been on the market; quoted values unchanged. **Ammonium Bromide,** B.P., 8d. to 8¼d. per lb.; the recently improved position is maintained here, and business has been good. **Benzonaphthol,** about 5s. per lb.; nominal; the market has again been idle. **Betanaphthol,** resublimed, about 2s. 6d. per lb.; spot holders have put their prices up to this level, but it is doubtful if business has been done on this basis. **Benzaldehyde 03,** about 3s. per lb.; prices quoted on spot are steady, with market quiet. **Calcium Lactate,** about 2s. per lb.; prices are slightly dearer this week, and are likely to hold firm. **Chloral Hydrate,** duty paid, about 4s. 3d. per lb.; some fair business has been done in small lots at about this figure; the position is firm. **Creosote,** B.P., about 2s. 6d. per lb.; the tone of the spot position is well maintained, although there has not been much business about. **Creosote Carbonate,** nominal; there are still no quotations being made. **Guaiacol Carbonate,** about 13s. per lb.; the higher price level quoted last week is well maintained, and inquiry has been good. **Hexamine,** about 4s. 3d. per lb.; there is very little material offered on spot below this level; higher rates are expected for fresh imports. **Hydroquinone,** about 4s. per lb.; spot quotations are varying here, but the figure mentioned is about the average offer. **Methyl Salicylate,** 2s. 10d. to 3s. per lb.; the spot market is fully maintained at the higher rates recorded last week; business good. **Methyl Sulphonal,** about 25s. per lb.; there is no doubt that the price of this article has advanced considerably, but it is doubtful whether

the price quoted as mentioned here is obtained for actual business. **Paraformaldehyde,** about 3s. 9d. per lb.; the quoted price for spot supplies is steadily maintained at this level, with business slow. **Paraldehyde,** about 1s. 7d. to 1s. 8d. per lb.; dealers are quoting at higher rates this week, with the market firm. **Phenacetin,** about 7s. 6d. per lb.; this market is still rather irregular on quotation, but seems to be gradually firming up to this figure. **Phenazone,** 8s. 6d. per lb.; dealers holding spot stocks are not accepting much less than their quoted rate as given here. **Phenolphthalein,** about 8s. per lb.; very few dealers seem to be in a position to quote this material. **Potassium Bromide,** B.P., crystals and granular, about 7½d. per lb.; business has been active again in this product both for home and export; prices are being well maintained, and tend to move higher. **Potassium Permanganate,** B.P., about 9½d. per lb.; importers are quoting in this region, but business is slow; prices are not likely to decline. **Potassium Sulphoguaiacolate,** about 7s. per lb.; some dealers mention this as their selling price; not much interest shown at present. **Resorcin,** about 6s. per lb.; the better tone here is maintained, and some business has been done. **Salol,** about 4s. per lb.; there has been no further advance in spot values; inquiry good, with market very steady. **Sodium Benzoate,** about 2s. 9d. per lb.; dealers are quoting at unchanged rates on the week. **Sodium Bromide,** B.P., crystals and granular, about 8d. per lb.; there has been plenty of inquiry here, and the market as quoted is healthy. **Sodium Diethylbarbiturate,** 18s. per lb.; little inquiry has been received; dealers' offers are unchanged. **Sodium Salicylate,** B.P., crystals, 3s.; powder, 2s. 10d. per lb.; this market has again been active, with spot stocks now rather limited; prices as quoted appear quite firm, and, if anything, seem likely to move to higher levels. **Sulphonal,** about 20s. per lb.; last week this market was irregular, and the few spot holders put their prices up considerably until they could form their opinion of the position; quotations at their present level are likely to hold firm. **Terpin Hydrate,** about 1s. 9d. per lb.; dealers' prices are steadily maintained at this figure, with business rather slow.

Coal-tar Products, Intermediates, Etc.—The volume of business continues small, with prices in the majority of cases unchanged. The market is rather unsteady, however, and in some lines may decline a little. **Aniline Salt,** about 9½d. per lb., casks free; prices are firmer here, and British makers' prices are somewhat dearer. **Aniline Oil,** 9d. to 9½d. per lb., drums free; prices are fully maintained at these levels, and tend to advance. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; the market seems steady, but has again been quiet. **Benzol,** about 1s. 3½d. to 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; prices quoted are about the same, with business small. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; business is still lacking in volume; prices quoted are about the same. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; the demand from dealers remains small; their quotations are unchanged. **Naphtha,** about 1s. 2d. per gallon; this market at the recently reduced price remains dull, and is still rather unsteady. **Solvent Naphtha,** 90/160, about 1s. 3d. per gallon, drums extra; at the figure given the position is weak, and any business would be generally on a lower level. **Heavy Solvent Naphtha,** 90/190, 1s. 3d. per gallon, drums extra; prices as quoted are weak, with the market dull. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; this market keeps steady, but has again been quiet. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; quoted prices are maintained on a steady market. **Creosote Oil,** about 9½d. per gallon, f.o.b.; the position is fairly steady, but business is far from good. **Carbolic Acid,** crystals, about 1s. 1½d. per lb.; some limited business has been done, but there is a want of confidence in this article. **Naphthalene,** about £19. per ton; the lower prices quoted here have not brought any improvement in demand; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; tablets and candles, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; dealers continue to quote at this figure, with business quiet. **Pyridine,** fully 22s. per gallon; the spot position is exceedingly firm at this level, and tends to go still higher. **Hexamethylene,** 3s. 9d. per gallon; this is about the lowest price quoted by dealers for spot supplies. **Pure Methyl Alcohol,** about £90. per ton, in drums, ex wharf London; dealers are finding fair business, and their prices are being well maintained. **Pitch,** about 140s. per ton, f.o.b. East Coast; the position is quite satisfactory, with prices firm and tending to go higher; inquiry is good.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £62. 12s. 6d. to £62. 15s., cash; £63. 5s. to £63. 7s. 6d., three months; electrolytic, £68. to £69. **Tin:** Standard, £200. 7s. 6d. to £220. 10s., cash; £220. 7s. 6d. to £220. 10s., three months; Straits, £221. 7s. 6d. to £20. 10s.; English, £221. 5s. **Lead,** soft foreign, £31., prompt; English, £32. 15s.; chemical sheet, 37s. 6d. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £33. 7s. 6d.; hard, £28. **Antimony,** English regulus, 99%, £35. 5s. to £35. 10s.; special brands, £42. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. 15s. **Bismuth,** 10s. **Platinum,** £28. per oz.; scrap, £26. **Wolfram,** spot, 12s. to 12s. 3d. per unit, c.i.f. U.K. or Continent. The demand for **Zinc Dust** has increased, and the higher grades are in short supply; there is no Australian offering, all supplies having been cleared; prices as a whole are unchanged, with a firm tendency: Highest grade English, 93—95%, £48 per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

The home-trade demand for heavy chemicals remains on the dull side, and, with the continued decline in values, there is very little interest shown in forward business. Quotations for alkali products are unchanged, and so far prices have not been fixed for 1924 contracts. **Bleaching Powder,** dull at £11. 5s. per ton, softwoods, on rails makers' works. **Glauber's Salt,** easy at 70s. per ton, carriage paid. Roasted **Saltcake,** quiet at £4. 10s. in bulk, carriage paid. **Chlorates** are unchanged, **Potash** at 2¾d., and **Soda** 2⅝d., ex store Manchester. **Bichromates** are unaltered. Imported American **Sulphur,** firm at £5. 5s., free on rails. **Copper Sulphate** is only in small request for export, and quotations remain nominal at £25. to £25. 10s., f.o.b. Liverpool. **Phosphate of Soda,** steady at £14. 10s., ex store. Commercial **Hyposulphite of Soda,** dull at £9. 10s. on rails, in bags. **Nitrite of Soda** is in fair inquiry, and price firm at £26. 10s., ex store, basis 100%. Concentrated **Sulphide of Soda,** £14. per ton. White powdered **Arsenic** continues in strong demand, and price has further advanced to £69., carriage paid, for Cornish make. Yellow **Prussiate of Potash,** steady at 10¼d. to 10½d. per lb., carriage paid; **Soda,** 5¾d. per lb. **Carbonate and Caustic Potash** are only moving off slowly, and prices have a lower tendency. **Acetic Acid** and **Acetate of Soda** are maintained at recent rates. Grey and brown **Acetate of Lime** continue in short supply, and quotations are firm. **Acetone,** quiet at £124. per ton. Miscible **Wood Naphtha,** 6s. per gallon. **Lead Salts** are again higher, in sympathy with the firm position of lead, and stocks are low: White **Acetate** £43., brown £45.; and **Nitrate** £44., net., all carriage paid. The prices of lump **Salammoniac** have been reduced to 55s. and 52s. 6d. for first and seconds respectively. **Barium Chloride,** quiet at £14. 10s. to £15. per ton. Green **Copperas** is in good request, and prices are steadier. **Oxalic Acid,** slower sale at 5¾d. per lb., ex store. **Permanganate of Potash,** commercial, unchanged at 8½d., carriage paid. All **Tin, Zinc,** and **Ammonia Salts** are moving off satisfactorily, and values are fairly steady.

SWANSEA MARKET REPORT. Wednesday.

There is an improved tone in **Tinplates,** and quotations are firm on the basis of £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets** are brisk at £19. 2s. 6d. per ton, f.o.b. **Copper** slightly dearer, for prompt £62. 12s. 6d. per ton, and three months £63. 2s. 6d. **Tin** in better supply, and easier at £215. 17s. 6d. per ton cash, and £215. 12s. 6d. three months. **Lead** dearer, and not freely offered for immediate delivery at £31. 2s. 6d. per ton, and forward at £30. 12s. 6d.; English, £32. 12s. 6d. **Spelter** cheaper, but steady at £33. 2s. 6d. per ton prompt, and £33. 7s. 6d. forward. **Zinc Sheets** in fair demand at £39. 12s. 6d. per ton, on rails at makers' works. **Sulphate of Copper,** dull at £25. 7s. 6d. per ton, less 5%, in casks, f.o.b. **Sulphate of Ammonia,** very steady home trade at £14. 15s. per ton. **Nitrate of Soda,** quiet at £13. 7s. 6d. per ton. **Bone Meal,** slow trade, with Indian, prompt, at £9. 2s. 6d. per ton. **Arsenic** is attracting more attention, Cornish supplies being short; white

powdered, £64. 7s. 6d. per ton. **Oxalic Acid,** quiet at 6¼d. per lb., f.o.r. **Sulphuric Acid** in good demand, with rates unchanged. **Copperas,** dull at £2. 3s. 6d. per ton, including delivery London or equal. **Pitch** in good inquiry, but quotations high, and very little business at £6. 17s. 6d. per ton. **Seed Oils** were firmly held, with raw **Linseed** at £2. 5s. 9d. per cwt., and boiled £2. 7s. 9d. **Cottonseed Oil,** common edible £2. 2s. 9d., and deodorised £2. 5s. 9d. per cwt. **Rape Oil** steady, with refined prompt at £2. 6s. 6d. per cwt., net, in barrels. **Cod Oil** quiet; Newfoundland prompt £2. 5s. 3d., and English £1. 15s. 3d. per cwt. **Coconut Oil,** firm at £2. 5s. 9d. per cwt. for Ceylon. **Castor Oil,** very firm at £2. 13s. 6d. to £2. 19s. 6d. per cwt., net, in barrels. **Palm Oil** firmly held; Lagos, £37. 7s. 6d. prompt, and £37. 2s. 6d. forward; softs, £37. 2s. 6d. prompt, £37. 5s. forward; mediums, £37. 7s. 6d. prompt, and £37. 5s. forward; hards, £37. 2s. 6d., all per ton at docks. **Olive Oil** steady, with prompt Spanish at £67. 12s. 6d. per ton. **Turpentine** firm, with prompt American at £3. 12s. 9d. per cwt. **Creosote,** in good demand at 8¾d. per gallon. **Coals** show a steadier tendency: Best Admiralty smokeless £1. 7s. 6d., seconds £1. 6s.; ordinaries, £1. 5s. 6d.; Monmouthshire black vein, £1. 6s. 6d., all per ton, f.o.b. **Anthracite** steady: Best large £2. 5s., seconds £1. 15s.; Paris and French nuts, £2. 17s. 6d. per ton, f.o.b. **Patent Fuel** prices firm from £1. 8s. 6d. to £1. 11s. 9d. per ton, f.o.b. **Cokes** firm; export, £2. 2s. 6d. per ton, f.o.b.; foundry, £1. 19s. 9d.; furnace, £1. 9s. 9d. per ton.

LIVERPOOL CHEMICAL MARKET. Wednesday.

A steady and very fair business in chemicals of the heavier class has been done with the buyers in the United Kingdom, the tendency being for sales to improve somewhat. In the export branch of the trade a good general shipment of chemicals has been made, but the aggregate volume of products shipped has not been so great as in recent preceding weeks. **Bleaching Powder** has been quiet in the home-trade department, but has been shipped rather freely; the price is £11. 5s. per ton for spot, special quotations being given for contracts, according to requirements. **Chloride of Calcium** has been more in demand, and is £5. 12s. 6d. per ton. **Caustic Soda** has had a very fair inquiry on home-trade account, and has had a moderately active shipment for export; the price of spot, for home-trade use, is £19. 7s. 6d. per ton, special terms being quoted for contract lots, according to requirements. **Bicarbonate of Soda** has again been in good request for home-trade use, and has had a moderate shipment for foreign ports; the price is £10. 10s. per ton, carriage paid, to users in the U.K. **Soda Crystals** have had a steady inquiry for use in the U.K., and are £5. 5s. per ton to home-trade buyers, carriage paid; business in the export branch has been on a small scale. **Nitrate of Soda** continues to meet with a limited inquiry, and is £13. 5s. to £13. 10s. per ton. **Borax** has had a steady sale for home-trade use; commercial crystals are £25. per ton, and powdered £26.; higher grades are—crystals £29. per ton, powdered £30. per ton, and superfine £31. per ton, in 2cwt. bags, carriage paid in the U.K. **Saltcake** has been quieter, and is £4. 10s. to £5. per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has had a quietly steady sale, and is 4¾d. per lb., c.i.f., to stated ports. **Ammonia Alkali** has been in rather good demand for U.K. use and for export; it is £7. 10s. per ton for spot, f.o.r. at works; for contracts, special prices are being given, according to requirements; for export £8. per ton is quoted, varying according to destination. **Hyposulphite of Soda** has been steadily called for; it is £10. per ton, in 2cwt. bags, for commercial, and £15. per ton for photographic. **Sulphide of Soda** has had a limited inquiry; prices are £14. 10s. to £15. 10s. per ton for solid, and £8. 15s. to £9. per ton for crystals. **Chlorate of Soda** has again been but little in request, and is 3d. per lb. **Phosphate of Soda** has been inactive, and is £14. 10s. to £15. per ton. **Prussiate of Soda** has been quiet, and is 6d. per lb. **Yellow Prussiate** has been rather more in demand; the price has eased, and is 10½d. to 11d. per lb. **Red Prussiate** has had a quietly steady sale, and is 2s. 10d. to 3s. per lb. **Carbonate of Potash** has had a fair inquiry, and is £25. to £27. per ton. **Nitrate of Potash** has had a rather free demand, and is £29. to £30. per ton. **Chlorate of Potash** has had a fair inquiry, and is 3½d. to 4d. per lb. **Caustic Potash** has been steadily called for, and is £29. to £30. per ton. **Permanganate of Potash** has been more in demand, and is 9d. to 9½d. per lb. **Bichromate of Potash** has met with a steady inquiry, and is 5¾d. per lb., c.i.f. to usual ports **Salammoniac** has been in fair request; first quality is £60., and second quality £57. per ton. **Sulphate of Ammonia** has been but little in demand on home-trade account, and has had only a light shipment on export account; prices for November are: Neutral of 25¾% £14. 15s. per ton, and ordinary of 25¼% £13. 12s. per ton. **Carbonate of Ammonia** has been in rather good demand, and is 4d. per lb. **Muriate of Ammonia** has had a quietly steady sale, and is £32. per ton. **Magnesia** has sold with some freedom; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has had a steady inquiry, and is £11. per ton for home-trade use, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has again had a very moderate sale, and is £8. to £11. per ton, according to quality. **Sulphur** has sold more readily; flowers are £10. per ton, roll is £8. 10s. per ton, rock is £8. to £8. 10s. per ton, and American £5. 10s. per ton. **Tartaric Acid** has been in fair demand, and is 1s. 1d. to 1s. 1½d. per lb. **Cream of Tartar** has again been steadily called for; the price has tended to ease, but may be given as £4. 10s. per cwt. **Boric Acid** has been rather more in request; commercial is £48. per ton, and powdered £51. per ton; B.P. grades are £54. and £60. per ton. **Citric Acid** has been but little in demand, and the price has further eased; it may be given as 1s. 4½d. to 1s. 5d per lb. **Oxalic Acid** has moved but slowly, and is 6d. per lb. **White Acetate of Lead** has been more in request, and is £42. to £43. per ton. **Sulphate of Copper** has been very quiet for use in the U.K. and for export; it is £25. 10s. to £26. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has had a very fair inquiry, and the price of white powdered has tended to harden; it may be given as £63. to £65. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

The steady day-to-day demand for chemicals on home-trade account continues, but export inquiry is still limited. The position is quiet, however, improvement depending upon a revival in the chemical-consuming industries. Prices are about the same, with a rising tendency in white acetate of lead. Quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, unchanged at £67. per ton on spot; an improving market. **Barium Chloride,** £14. 10s. per ton; at this price the market remains steady. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, makers' prices; demand rather poor. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities competing strongly. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted at slightly below this figure. **Citric Acid,** 1s. 6d. per lb., less 5%; little business about at last week's quotation. **Copper Sulphate,** £26. 15s. per ton, less 5%, at Liverpool; a rather neglected market. **Cream of Tartar,** £4. 2s. 6d. per cwt. for 99% at Glasgow; quotation steady, and inquiry small. **Lead Acetate,** white, £42. 15s. per ton on spot; brown, more inquiry at £44. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. per lb.; at this reduced price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £60. and £57. per ton respectively; crystals £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 11s. 6d. per cwt., net; a better market, with quotation unaltered. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady. **Sodium Bicarbonate,** £9. 10s. per ton, in 2cwt. bags; £11. 10s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid,** 1s. 1¼d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending November 10.

BARIUM CHLORIDE—
Hamburg, 14 cks.

BARYTES—
Antwerp, 250 bgs.
Hamburg, 73 cks.

BITUMEN—
Antwerp, 3 cks.

CARBON BLACK—
New York, 10 cs.

CREAM OF TARTAR—
Bordeaux, 60 brls.
Tarragona, 12 brls.

GELATINE—
Hamburg, 10 cs.

GLUCOSE—
Hamburg, 100 brls.

LITHOPONE—
Hamburg, 18 cs.

MAGNESIUM CHLORIDE—
Hamburg, 73 drms.

OCHRE—
Marseilles, 36 cks.

PARAFFIN SCALE—
New York, 206 brls.

POTASSIUM SALTS (*otherwise undescribed*)—
Antwerp, 1,000 bgs.

SALT—
Calcutta, 3 bgs.

SOAP—
Genoa, 5 cs.
Marseilles, 13
New York, 50

TANNING MATERIALS—
Myrabolans
Bombay, 700 pkts.
Calcutta, 600
Quebracho
Buenos Ayres, 765 t.
Sumac
Palermo, 100 bls.

WHITE LEAD—
Antwerp, 4 brls.
New York, 134 cks.

GOOLE.

Week ending November 10.

CAUSTIC POTASH—
Hamburg, 8 brls., 18 drms.

COLOURS (*otherwise undescribed*)—
Antwerp, 32 pkgs.

KAINIT—
Antwerp, 265 t.

MAGNESITE—
Amsterdam, 150 bgs.

PYRITES—
Pomaron, 920 t.

SOAP—
Hamburg, 19 cs.

WHITE LEAD—
Antwerp, 14 brls.

GRANGEMOUTH.

Week ending November 10.

BLEACHING POWDER—
Hamburg, 20 cks.

FORMIC ACID—
Hamburg, 10 cks.

MAGNESITE—
Trieste and Sfax, 15,636 dbl. bgs.

SODIUM HYPOSULPHITE—
Antwerp, 50 bgs.

TARTARIC ACID—
Rotterdam, 48 cks.

GRIMSBY.

Week ending November 10.

BARYTES—
Hamburg, 50 bgs.

COLOURS (*otherwise undescribed*)
Hamburg, 2 cs., 6 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 97 cks.

FORMIC ACID—
Hamburg, 117 bkts.

GLUE—
Antwerp, 17 bls.

KAINIT—
Hamburg, 304 t.

MAGNESITE—
Hamburg, 1,179 bgs.

SOAP—
Hamburg, 8 cs.

HULL.

Week ending November 10.

CALCIUM CARBIDE—
Christiania, 3 t. 10 c.
Christiansand, 10 t.

CAUSTIC POTASH—
Bremen, 4 t. 16 c.

CHEMICALS (*otherwise undescribed*)
Copenhagen, 48 galls.; Dunkirk, 4 t.; Genoa, 10 t.; Gothenburg, 2 c.; Naples, 10 c.; Rotterdam, 1 t. 10 c.

DEXTRINE—
Amsterdam, 1 t. 10 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 120 lb.

FERRO CHROME—
Antwerp, 9 t.

GLUE—
Norrkoping, 14 t. 15 c.

KAINIT—
Antwerp, 20 t.

MAGNESITE—
Leghorn, 4 c.

PHOSPHATE (*otherwise undes.*)—
Antwerp, 192 t.

POTASSIUM CARBONATE—
Bremen, 3 t. 3 c.

ROSIN—
Jacksonville, 113 t.
Savannah, 946 t. 7 c.

SOAP—
Marseilles, 5 t.
Philadelphia, 21 t. 5 c.

STEARINE—
Antwerp, 2 t. 6 c.

SUPERPHOSPHATE OF LIME—
Antwerp, 50 t.

TANNING MATERIALS—
Myrabolans
Bombay, 200 t.

TAR (WOOD)—
Gefle, 21 t. 3 c.

TURPENTINE—
Jacksonville, 15 t.
Savannah, 18 t.

LEITH.

Week ending November 10.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 92 cks.

DEXTRINE—
Amsterdam, 50 bgs.

GLUE—
Antwerp, 100 bgs.
Hamburg, 240 bgs.

LEAD ACETATE—
Rotterdam, 10 cks.

LITHOPONE—
Amsterdam, 1,600 cks.
Hamburg, 2 t.

NAPHTHA (WOOD)—
Amsterdam, 6 cks.

POTASSIUM SALTS—
Antwerp, 200 bgs.

ROSIN—
Bordeaux, 257 cks.

SALT—
Hamburg, 520 bgs.

SILICON—
Gothenburg, 3 cs.

SOAP—
Copenhagen, 9 cs.

STEARINE—
Antwerp, 25 bgs.

SUPERPHOSPHATE—
Antwerp, 860 bgs.

TANNING MATERIALS—
Myrabolans
Bombay, 524 bgs

TAR (*otherwise undescribed*)—
Archangel, 3,247 brls.

LIVERPOOL.

Week ending November 10.

ACETATE OF LIME—
Germany, 612 bgs.

ACETIC ACID—
Belgium, 6 cks.

ARSENIC—
Australia, 76 cks.
Japan, 89 cs.

BARIUM SULPHATE—
Belgium, 100 bgs.

BARYTES—
Spain, 40 brls., 200 csk., 300 bgs.

BEESWAX—
Germany, 100 pkgs.
W.C. Africa, 99 pkgs., 20 blks.

BOILER COMPOSITION—
Australia, 40 cks.

BONE BLACK—
Holland, 595 bgs.

BORAX—
U.S., 5,000 bgs.

CALCIUM CARBIDE—
Jugo-Slavia, 20 drms.
Switzerland, 60 drms.

CASEIN—
Argentine, 167 bgs.

CHEMICALS (*otherwise undescribed*)
Spain, 205 kgs., 33 brls.

COAL TAR PRODUCTS—
Tar Oil
Sweden, 3 cks.

COPPER SUBOXIDE—
Germany, 10 drms.

CREAM OF TARTAR—
France, 120 cks., 20 kgs.
Holland, 50 kgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Canada, 4 kgs., 4 cks., 1 drm.

DYESTUFFS (NATURAL)—
Cutch
Straits, 500 bgs.
Fustic
Australia, 55 cks.
Logwood
France, 20 cs., 71 cks.
Unspecified
France, 4 cs., 5 cks.
Germany, 1 kg.

FORMALDEHYDE—
Canada, 83 brls.
Germany, 50 cks.

GLUE—
Belgium, 100 bgs.

ISINGLASS—
Brazil, 16 cs.
Japan, 20 bls.

KAINIT—
Belgium, 110 t.

KIESELGUHR—
Spain, 1,100 bgs.
U.S., 543 bgs.

LEAD ORE—
Chile, 33 t. 16 c.
Spain, 4 t. 18 c.

LITHOPONE—
Germany, 1 ck.
Holland, 80 cks.;
Spain, 50 brls.

MAGNESITE (CALCINED)—
Greece, 150 bgs.

MANGANESE ORE—
India, 1,622 t.
W.C. Africa, 1,000 t.

MOLYBDENITE ORE—
Australia, 1 t.

OCHRE—
France, 25 cks.

PARAFFIN SCALE—
U.S., 1,076 brls.

PARAFFIN WAX—
Burma, 800 bgs.
U.S., 12 drms.

PHOSPHATE ROCK—
Morocco, 252 t.

PLUMBAGO—
Germany, 14 t. 15 c.

POTASSIUM CHLORIDE—
Belgium, 400 bgs.
Germany, 100 bgs.

POTASSIUM NITRATE—
Germany, 100 brls.

RED LEAD—
Belgium, 28 cks.

ROSIN—
France, 40 cks.
U.S., 2,165 brls.

SOAP—
Italy, £356.
U.S., £957.

SODIUM NITRATE—
Chile, 1,400 t.

STEARINE—
Argentine, 55 tcs.
Belgium, 63 bgs.

TALLOW—
Argentine, 128 pkgs., 396 cks., 108 pps.
Brazil, 194 cks., 345 pps.
New Zealand, 75 cks.

TANNIC ACID—
Germany, 2 cs.

TANNING MATERIALS—
Chestnut
France, 678 bgs., 849 cks.
Divi Divi
India, 69 bgs.
Gambier
Borneo, 170 cs.
Straits, 1,292 cs.
Myrabolans
India, 237 bgs., 1,001 pkts.
Quebracho
Argentine, 6,374 bgs.
Wattle
Germany, 80 cks.
South Africa, 3,290 bgs.
Unspecified
Australia, 10 cks.

TAR (*otherwise undescribed*)—
Danzig, 200 brls.

TARTARIC ACID—
Holland, 50 kgs.

TIN ORE—
Argentine, 6 c.
Bolivia, 331 t.
W.C. Africa, 2 t.

ULTRAMARINE BLUE—
Belgium, 30 cks.
France, 1 ck.

WAX (VEGETABLE)—
Japan, 25 cs.

WHITE LEAD—
Belgium, 4 brls., 20 kgs.
Italy, 41 cks.

ZINC ASHES—
U.S., 160 brls.

ZINC OXIDE—
Belgium, 50 cks.
Holland, 38 cks.

LONDON.

Week ending November 10.

ACETIC ACID—

Canada,	55 brls.	Greeff
France,	25 pkgs.	
Germany,	422 crbys.	V. Blagden

ACETYL SALICYLIC ACID—*
——— £562.

ALBUMEN—

Belgium,	£70.	Felton & Crepin
China,	£12,705.	Baxter, Hoare
,,	£886.	J. W. Cook
,,	£152,921.	
N.Z.,	£315.	H. A. Lane

ALUMINIUM HYDRATE—

Germany,	10 pkgs.	Stancour & Muir

AMMONIUM NITRATE—

Germany,	42 pkgs.	Stott & Hotopf

ARGOLS—
France, 783 pkgs.

ARSENIC—

Germany,	1 t. 19 c.	Bush, Beach, & Gent.
Japan,	10	

BARIUM NITRATE—*
——— £113.

BARIUM SULPHATE (BLANC FIXE)—
Germany, £318. H. W. Winter

BARYTES—

Belgium	250 bgs.	Felton &
	184 cks.	Crepin
Germany	61 cks.	W.
	700 bgs.	Harrison
,,	60 cks.	
,,	111	Pallister, Luck
,,	55	Taylor & Cox
,,	57	Beck & Pollitzer
,,	39 brls.	Dexters

BEESWAX—

Anglo-Egypt. Sudan,	226 pkgs.	Baxter, Hoare
Brit. India,	14 cs.	
Germany,	20	
Madagascar,	3 pkgs.	
Kenya Col.	133	J. W. Cook
Tanganyika Ter.,	40 cs.	

BEESWAX—
Zanzibar, 150 bgs.

BONE BLACK—
U.S.A., £900.

BORATE OF LIME

Chile,	239 t.	Borax Consol.

CALCIUM CARBIDE—

Jugo-Slavia,	10 t.	
Norway,	20	C. J. Quirk
Switzerland,	45	

CALCIUM CHLORIDE—

Germany,	60 t.	Petri
,,	4 t. 19 c.	W. Cannell
,,	20 6	H. Battin
,,	9 19	J. Bailey

CARBON BISULPHIDE—
Germany, £180.

CARBON BLACK—

Belgium,	7 cks.	Van Oppen
Canada,	150 cs.	
U.S.A.,	110	Hughes & Hughes
,,	22	Binney,
,,	126 brls.	Smith
,,	11 t.	

CARNAUBA WAX—

Brazil,	78 bgs.	
France,	66	

CASEIN—

France,	£160.	Rennacid Casein
,,	£782.	E. G. Boize
N.Z.,	£700.	J. Nathan

CAUSTIC POTASH—

Germany,	17 drms.	J. M. Steel

CHEMICALS (*otherwise undescribed*)

Belgium,	£150.	O. Murray
France,	£126.	,,
,,	£103.	C. Atkins & Nisbet
Germany,	£340.	W. Cannell
,,	£53.	Ronsheim & Moore
,,	£23.	J. Bailey
,,	£6.	H. J. Phillips
,,	£74.	
,,	£46.	J. B. Ballantyne
,,	£222.	H. Battin
Italy,	£4,080.	Borax Consol.
Madagascar,	£8.	
U.S.A.,	£48.	R. & J. Park
,,	£49.	Amer. Exp.
,,	£169.	
,,	£162.	Bolton & Fairhead

CHEMICALS (*otherwise undes.*)—*
——— £2,107.

COAL TAR PRODUCTS—
Creosote

Sweden,	£177.	J. B. Ballantyne

Naphthalene

Belgium,	36 bls.	H. H. Poole

Pitch

France,	20 brls.	G. Elliott

CREAM OF TARTAR—

France,	5 kgs.	
,,	20 brls.	
Holland,	10 t.	
Italy,	80 pkgs.	

DEXTRINE—

Germany,	12 t. 12 c.	
,,	9 18	H. Johnson
Holland,	2	Pronk, Davis, & Rushby
,,	2	F. G. Angel
,,	35	K. J. Kulder
U.S.A.,	27 10	K. J. Mulder

DYESTUFFS (ARTIFICIAL)—
Alizarine

Switzerland,	2 kgs.	

DYESTUFFS (ARTIFICIAL)—
Unspecified

Canada,	45 pkgs.	Knight & Morris
France,	£26.	
Germany,	£1,085.	
,,	1 pkg.	Stott & Hotopf
,,	20 kgs.	Greeff
Switzerland,	5 pkgs.	
U.S.A.,	£123.	

DYESTUFFS (NATURAL)
Annatto

Denmark,	1 brl.	Ray

Cochineal

France,	6 pkgs.	Mory
,,	2	Weigel, Leygonie

Indigo

U.S.A.,	1 drm.	Knight & Morris

Madder

Holland,	1 pkg.	R. E. Drummond

Turmeric

Brit. India,	5 pkgs.	
,,	5	Baxter Hoare

ETHER—

Germany,	£17.	K. B. Mavlankar

FERTILISERS (*otherwise undes.*)—

Belgium,	20 t.	H. Knight
Denmark,	100 t.	Hollingshurst
Egypt,	72	
Germany,	15	A. Ochol

FORMALDEHYDE—

Sweden,	15 pkgs.	
U.S.A.,	150	V. Blagden

FUSEL OIL—

Holland,	2 drms.	
Poland,	17	Scheuer

GELATINE—

Belgium,	£1,925.	Duche
,,	£552.	
France,	£8.	Mory
Germany,	£107.	E. Friedlander
,,	£32.	W. A. J. Tilleray
,,	3417.	C. Zimmermann
,,	£64.	Crowe

GLUE—

Belgium,	£153.	
,,	£373.	P. Ingenlath
,,	£276.	O. Murray
,,	£38.	Duche
France,	£105.	Union Glue & Gel.
,,	£38.	A. J. Malicet
Holland,	£83.	P. Ingenlath
Hungary,	£375.	
Italy,	£540.	Union Glue & Gel.
U.S.A.,	£31.	G. W. Wheatley

GLYCERINE—

Holland,	£144.	
Brit. India,	49 cs.	
French Indo-China,	6 bls.	W. M. Smith
Straits Setts.	6 cs.	,,

KETONE (*otherwise undescribed*)—
Germany, £534. V. Blagden

KIESELGUHR—

Spain,	10 t.	Clyde

LITHOPONE—

Belgium,	40 cks.	Taylor & Cox
Germany,	60 cks.	
Holland,	261 cks.	F. T. H. Nye

MAGNESITE

Brit. India,	£20.	
Holland,	£60.	Cazaly Mills
,,	£196.	Ray
,,	£155.	

MINERAL COLOURS (*otherwise undescribed*)—

Germany,	5 cs.	Armfield, Owen
Spain,	8 cks.	Hemingway
,,	19	Griffiths

MONTAN WAX—

Germany,	200 bgs.	Holroyds Oil & Cer.

OCHRE—

France,	266 brls.	W. Harrison
Spain,	45	Jenson & Nicholson

PARAFFIN WAX—

U.S.A.,	98 t. 16 c.	
,,	4 9	Vacuum Oil
,,	73	Anglo-Amer. Oil
,,	126 16	Price's Pat. Cand.
,,	70 15	Mawson, Clark

PARAFFIN WAX—

Poland,	9 t. 17 c.	A. Garnham
,,	9 19	Poth Hille

PARAFORMALDEHYDE—*
——— £249.

PHENACETIN—*
——— £117.

PHOSPHATE (*otherwise undes.*)—

Tunis,	400 t.	De Pas Fertilisers

PLUMBAGO

Germany,	176 bgs.	H. Johnson

POTASH ALUM—

Germany,	13 pkgs.	Petri
,,	41	

POTASSIUM CARBONATE

Germany,	10 pkgs.	Petri
,,	21	Scheuer
,,	30	Stephens
,,	35	J. M. Steel

POTASSIUM PERMANGANATE—*
——— £584.

POTASSIUM SILICATE—

France,	2 drms.	M. Ashby

PRUSSIAN BLUE—

Holland,	8 cks.	K. Keller

RED LEAD

Italy,	36 cks.	

ROSIN—

France,	13 cks.	Bowring, Jones & Tidy
,,	28	Langley Smith
,,	50	
Portugal,	68	Coverley Wall, & Westray

SALAMMONIAC—

Germany,	27 pkgs	Bush, Beach & Gent.

SALT—

Germany,	15 t.	Swift

SALTPETRE

Germany,	£2,108.	Stott & Hotopf
,,	£3,387.	Nobel Industries
Holland,	£342.	A. Abelin
,,	£74.	

SHELLAC—

Brit. India,	2 t. 5 c.	J. W. Cook
,,	46 13	Litchfield & Saundy
Germany,	5	A. F. Suter
Holland,	6	W. H. Muller

SOAP—

Austria,	£336.	Moss, Roughton
Belgium,	£164.	
,,	£50.	S. Kalisky
Denmark,	£79.	
,,	£16.	Beck & Pollitzer
Egypt,	£12.	Phillips Conquest & Damala
France,	£26.	Gerhard & Hey
,,	£12.	Mory
,,	£189.	Pronk, Davis & Rushby
,,	£25.	E. A. Kimpton
,,	£48.	W. H. Muller
Germany,	£105.	S. Kalisky
,,	£50.	
Irish F. State,	£18.	
U.S.A.,	£1,105.	Knight & Morris
,,	£19.	H. A. Lane
,,	£1,231.	H. C. Hackney
,,	£600.	L. F. Smith
Victoria,	£1,800	,,

SODA CRYSTALS—

Belgium,	5 t.	P. Winn

SODIUM ACID PHOSPHATE—*
——— £277.

SODIUM BIBORATE—

Germany,	5 c.	

SODIUM FERROCYANIDE—

Holland,	2 t. 1 c.	W. Waugh

SODIUM PHOSPHATE—

Germany,	5 t.	Scheuer

* Entered under the Safeguarding of Industries Act.

STEARINE—
Denmark, 200 cs.
Germany, 271 pkgs.

SULPHUR—
Chile, £260. Borax Consol.

SUPERPHOSPHATES—
Belgium, 300 t. De Pass. Fertilisers

TALLOW—
Arg. Rep., 61 brls.
Belgium, 6 A. Garnham
N.Z., 26 t. 2 c. Lever
,, 244 11 Weber, Smith & Hoare
,, 34 10 Goad Rigg
,, 21 4 Anning & Cobb
,, 255 3
U.S.A., 19 pkgs.
W. Australia, 70 t. 8 c.

TANNING MATERIALS—
Chestnut Extract
France, 110 pkgs.
Myrabolans
Brit. India, 1,284 pkgs.
,, 280 Leach
Sumac
Belgium, 14 pkgs.
Unspecified
Jugo-Slovakia, 33 pkgs.
Natal, 100 t. Williamson

TAR (*otherwise undescribed*)
Sweden, 25 brls. Stromwell
,, 50
Switzerland, 100

TAR OIL (*otherwise undescribed*)—
Sweden, 25 brls. Stromwell

TARTARIC ACID—
Holland, 80 pkgs.

ULTRAMARINE—
Germany, 5 cks.

WAX (*otherwise undescribed*)—
U.S.A., 11 pkgs. J. B. Ballantyne
,, 34 G. W. Wheatley

WHITE LEAD—
Belgium, 52 cks. Farmiloe
Holland, 7 cks. Chance & 120 drms. Hunt
Italy, 205 cks.

ZINC OXIDE—
Belgium, 169 cks. M. Ashby
Germany, 125 Greeff
,, 125 Stephens
Holland, 215 F. T. H. Nye

MANCHESTER.

Week ending November 10.

ALBUMEN—
Antwerp, 40 bgs.

BARIUM CHLORIDE—
Hamburg, 30 brls.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 64 cks.

BLEACHING POWDER—
Genoa, 116 drms.

CALCIUM CARBIDE—
Rotterdam, 550 drms.

CARBON BLACK—
Hamburg, 10 cks.

CAUSTIC POTASH—
Hamburg, 34 cks.

CHEMICALS (*otherwise undescribed*)
Antwerp, 110 bgs., 10 drms.
Rotterdam, 10 brls., 20 kgs.

COAL TAR PRODUCTS—
Naphthalene
Hamburg, 3 cs.

DEXTRINE—
Amsterdam, 350 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Hamburg, 50 cks.
Rotterdam, 3 cks., 3 brls.
Unspecified
Genoa, 3 cks.; Hamburg, 70 cks.; Rotterdam, 5 brls.

GLUCOSE—
Hamburg, 100 brls.

GLUE—
Antwerp, 100 bls.
Copenhagen, 50 bgs.

LEAD ACETATE—
Hamburg, 17 brls.

LITHOPONE—
Rotterdam, 16 cks.

MAGNESITE
Rotterdam, 184 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 79 drms.

MANGANESE ORE—
Calcutta, 3,000 t.

OXALIC ACID—
Hamburg, 5 brls.

PHOSPHATE (*otherwise undes.*)—
Antwerp, 1 bg.

PHOSPHORUS
Montreal, 94 drms.

POTASH (*otherwise undescribed*)—
Antwerp, 400 bgs., and 20 t.

POTASSIUM CARBONATE—
Hamburg, 16 brls.

RED LEAD—
Genoa, 19 cks.

SALT—
Hamburg, 150 bgs.
Montreal, 12 brls.

SOAP—
Marseilles, 11 cs.

SODIUM BROMIDE—
Hamburg, 5 cs.

SODIUM PRUSSIATE—
Rotterdam, 10 cks.

STEARINE—
Antwerp, 20 bgs.

TIN OXIDE—
Hamburg, 20 cks.

WAX (*otherwise undescribed*)—
Antwerp, 25 cs.
Hamburg, 23 bgs.

WHITE LEAD—
Antwerp, 28 cks., 20 drms.
Dunkirk, 10 cks.

ZINC ASHES—
Montreal, 26 brls.

ZINC DUST—
Antwerp, 100 cks., 224 cs.

ZINC OXIDE—
Antwerp, 100 cks.
Rotterdam, 25 cs.

NEWCASTLE-ON-TYNE

Week ending November 10.

ACETIC ACID—
Montreal, 75 brls.
Rotterdam, 20 cks.

BARIUM CHLORIDE—
Hamburg, 11 cks.

CALCIUM CARBIDE—
Christiania, 300 drms.

CREAM OF TARTAR—
Malaga, 20 brls.

IRON OXIDE—
Malaga, 85 brls.

LITHOPONE—
Malaga, 8 brls.

MAGNESITE—
Rotterdam, 150 bgs.

OCHRE—
Antwerp, 52 cks.

POTASSIUM CARBONATE—
Hamburg, 18 brls.

SALT—
Hamburg, 200 bgs.

ZINC OXIDE—
Rotterdam, 65 cks.

N. & S. SHIELDS.

Week ending November 10.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending November 10.

CHEMICALS (*otherwise undescribed*)
Adelaide, 35 cks.; Brisbane, 11 pkgs.; Calcutta, 14 pkgs.; Fremantle, 85 pkgs.; Genoa, 21 pkgs., 22 cks.; Kobe, 120 pkgs.; Melbourne, 60 pkgs.; Perth, W.A., 330 cs.; Rouen, 403 pkgs.; Singapore, 2 pkgs.; Sydney, 77 pkgs.

COAL TAR PRODUCTS—
Pitch
Manila, 1 t. 15 c.
Tar
Bangkok, 8 t.; Penang, 30 t.; Pt. Swettenham, 9 t.; Singapore, 23 t.

GUANO (FISH)—
Kobe, 49 t. 7 c.

PARAFFIN WAX—
Melbourne, 21 t.
Messina, 10 t.

POTASSIUM BICHROMATE—
Alexandria, 8 t. 12 c.
Calcutta, 1 t.

SOAP—
Calcutta, 1 t. 6 c.; Penang, 10 c.; Rouen, 4 c.

SODA CRYSTALS—
Calcutta, 2 t.

SODIUM BICHROMATE—
Calcutta, 1 t.; Fremantle, 1 t. 18 c.; Rouen, 14 t. 8 c.

SPERMACETTI WAX—
Rouen, 13 c.

GRANGEMOUTH.

Week ending November 10.

COAL TAR PRODUCTS—
Pitch
Christiania, 65 bgs.

ROSIN—
Rotterdam, 4 brls.

HULL.

Week ending November 6.

AMMONIUM SULPHATE—
Rotterdam, 354 bgs.

BORAX—
Bilbao, 5 bgs.

CAUSTIC SODA—
Amsterdam, 7 drms.

CHEMICALS (*otherwise undescribed*)
Abo, 50 drms.; Antwerp, 17 drms.; Bremen, 1 cs.; Bilbao, 5 drms.; Christiania, 5 kgs., 3 drms.; Copenhagen, 1 ck.; Danzig, 13 cks.; Gothenburg, 1 cs., 3 cks., 55 drms.; Hamburg, 100 drms.; Hango, 2 drms.; Malmo, 45 pkgs.; Palermo, 150 bgs.; Riga, 1 brl., 203 drms.; Rotterdam, 2 cs., 7 drms.; Valencia, 20 bgs.; Wiborg, 5 cks., 220 drms.

COAL TAR PRODUCTS—
Pitch
Bilbao, 16 cs.
Dunkirk, 140 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiania, 1 cs., 1 ck., 7 kgs.
Christiansand, 1 kg.

GLUE—
Bilbao, 85 bgs.
New York, 20 bgs.

GYPSUM—
Bilbao, 100 bgs.

SALT—
Amsterdam, 25 cs.; Copenhagen, 143 cs.; Malmo, 20 cs.

SOAP—
Gothenburg, 58 cs.

SODA ASH—
Christiansand, 11 bgs.

STEARINE—
Hamburg, 36 brls.

TURPENTINE—
Antwerp, 15 cks.

WHITE LEAD—
Worborg, 20 kgs.

LEITH.

Week ending November 10.

FERTILISER (*otherwise undes.*)—
New York, 48 bgs.

PARAFFIN WAX—
Ghent, 800 bgs.
Hamburg, 3 bgs.

PITCH (*otherwise undescribed*)—
Copenhagen, 3 brls.

POTASSIUM BICHROMATE—
Hamburg, 30 cks.

LIVERPOOL.

Week ending November 9.

ACETIC ACID—
Rangoon, 15 c., £40.

ALUM—
Callao, 1 t. 14 c., £17.; Sydney, 2 t. 1 c., £21.; Salonika, 1 t., £10.

ALUMINIUM SULPHATE—
Antwerp, 5 t., £41.; Alexandria, 1 t. 2 c., £10.; Bombay, 25 t., £197.; Drammen, 10 t., £49.; Gothenburg, 120 t., £999.; Kotka 20 t., £204.; Reval, 20 t., £94.

AMMONIA—
Rangoon, 2 t. 5 c., £72.

AMMONIA (ANHYDROUS)—
Lagos, 2 c. 3 qrs., £20.

AMMONIUM CARBONATE—
Alicante, 19 c., £25.; Barcelona, 10 c., £18.; Bordeaux, 10 c., £12.; Bombay, 2 t., £75.; Copenhagen, 1 t., £29.; Calcutta, 3 t., £112.

AMMONIUM CARBONATE—
Constantinople, 2 t. 9 c., £63.; Christiania, 1 t. 15 c., £49.; Drammen, 10 c., £15.; Gothenburg, 1 t., £26.; Hamburg, 6 t. 2 c., £153.; Lisbon, 1 t. 5 c., £35.; Manila, 4 t. 10 c., £125.; Marseilles, 3 t., £82.; New York, 4 t., £141.; Piraeus, 1 t. 9 c., £42.; Rangoon, 1 t., £15.; Rotterdam, 1 t., £27.; Riga, 10 c., £14.; Salonika, 1 t., £27.; Santander, 10 c., £18.; Tuticorin, 1 t., £38.

AMMONIUM CHLORIDE—
Auckland, 7 c. 2 qrs., £13.; Barcelona, 10 c., £17.; Baltimore, 22 t. 11 c., £676.; Karachi, 10 t., £406.; Pt. Said, 2 t. 9 c., £103.; Tarragona, 1 t., £36.

AMMONIUM SULPHATE—
Cheribon, 635 t. 3 c., £10,074.; Dunkirk, 18 t. 19 c., £686.; Las Palmas, 75 t., £1,071.; Oporto, 6 t. 9 c., £95.; St. Lucia, 3 t., £15.; Samarang, 100 t.

ANTIFOULING PAINT—
Antwerp, 1 t. 1 c., £85.; Buenos Ayres, 2 t. 13 c., £209.; Monte Video, 1 t., £115.; Valparaiso, 6 t. 10 c., £367.

ANTIMONY SALTS (*otherwise undes.*)
Bombay, 2 t., £149.

ANTIMONY SULPHIDE—
Kobe, 4 t. 19 c., £280.

ARSENIC—
Valencia, 1 t., £88.

BARIUM CHLORIDE—
Lisbon, 14 c., £10.

BLEACHING POWDER—
Bombay, 7 t., £84.; Calcutta, 55 t. 1 c., £536.; Drammen, 20 t. 15 c., £208.; Delagoa Bay, 21 t. 1 c., £252.; Durban, 2 t., £24.; Melbourne, 9 t. 1 c., £224.

BLEACHING POWDER—
Montreal, 15 t. 5 c., £140. ; Piraeus, 9 t. 10 c., £107. ; Pernambuco, 3 t., £35.

BOILER COMPOSITION—
Shanghai, 10 c., £30.
Tientsin, 2 t. 3 c., £183.

BORAX—
Gibraltar, 1 c., £9. ; Naples, 1 t. 19 c., £50. ; Singapore, 1 c., £2.

BORIC ACID—
Singapore, 2 c., £7.
Stockholm, 1 t., £19.

CALCIUM ACETATE—
Calcutta, 1 t., £54.

CALCIUM CARBIDE—
Bilbao, 1 t., £22.
Mombasa, 18 c., £23.

CALCIUM CHLORIDE—
Melbourne, 9 t. 19 c., £57. ; Nantes, 20 t. 2 c., £96. ; Newcastle, 9 t. 19 c., £57. ; Rio de Janeiro, 9 t. 7 c., £56. ; Sydney, 10 t. 4 c., £58. ; Tampico, 5 t. 6 c., £27.

CHEMICALS (*otherwise undescribed*)
Antwerp, 2 c., £27. ; Amsterdam, 1 c. 2 qrs., £144. ; Barcelona, 3 t. 10 c., £89. ; Calcutta, 5 t. 3 c., £260. ; Constantinople, 1 t., £27. ; Christiania, 1 t., £26. ; Kobe, 5 t., £50. ; Lisbon, 4 t. 9 c., £132. ; Melbourne, 3 t. 12 c., £556. ; Malaga, 2 t., £56. ; Madras, 10 t. 13 c., £70. ; Pt. Sudan, 4 c. 1 qr., £20. ; Pto. Alegre, 3 t. 1 c., £30. ; Santos, 4 t. 2 c., £43. ; St. John's, N.F., 5 c., £10. ; Wellington, 1 t., £30.

CHLORINE—
Shanghai, 1 t., £50.

CITRIC ACID—
Barcelona, 1 t., £148.

COAL TAR PRODUCTS—
Carbolic Acid
Brisbane, 2 c., £14. ; Hamburg, 1 t., £126. ; Kobe, 24 t. 16 c., £3,101. ; Montreal, 2 c., £14. ; Shanghai, 4 t., £563. ; Singapore, 2 c., £25. ; Switzerland, 15 c., £101. ; Yokohama, 5 t., £630.
Creosote
Copenhagen, 3 t. 18 c., £106.
Say-la-Mar, 18 c., £25.
Tar
Lagos, 9 t., £88. ; Sapele, 1 t., £10.
Unspecified
Dunkirk, 1 t. 18 c., £40.
Rotterdam, 15 t., £1,890.

COBALT NITRATE—
Sydney, 2 c. 2 qrs., £52.

COBALT OXIDE—
Shanghai, 9 c., £462.

COBALT SULPHATE—
Santos, 5 c., £87.

COPPER OXIDE—
Seville, 3 c., £12.

COPPER SULPHATE—
Dunedin, 1 t., £26. ; Monte Video, 10 t. 16 c., £260. ; Philadelphia, 2 c., £3. ; Rangoon, 1 t., £24. ; Wellington, 2 t., £52.

CREAM OF TARTAR—
Albany, W.A., 10 c., £40. ; Durban, 4 c., £23. ; Sydney, 9 t., £783.

DISINFECTANTS (*otherwise undes.*)
Accra, 1 c., £13. ; Brisbane, 7 c. 1 qr., £15. ; Colombo, 3 t. 8 c., £118. ; Montreal, 6 t. 6 c., £222. ; New York, 83 t. 5 c., £3,042. ; Penang, 1 t. 7 c., £67. ; Philadelphia, 9 t. 19 c., £306. ; Sarawak, 9 c., £15. ; Switzerland, 2 t., £457. ; Stockholm, 5 t. 1 c., £120. ; Vancouver, 5 t. 7 c., £201.

DYESTUFFS (NATURAL)—
Annatto
Halifax, N.S., 4 c., £25.
Fustic
Melbourne, 11 c., £64.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Kobe, 18 c., £800.
Riga, 18 c. 2 qrs., £237.
Indigo
Sydney, 5 t., £699.
Shanghai, 51 t. 12 c., £7,195.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Abo, 1 t., £104. ; Barcelona, 11 c., £308. ; Bordeaux, 1 c., £50. ; Bombay, 1 t. 5 c., £112. ; Brisbane, 10 c., £78. ; Boston, 1 t., £299. ; Jesselton, 3 c. 1 qr., £22. ; Lagos, 1 c. 1 qr., £13. ; Melbourne, 1 t. 11 c., £533. ; Montreal, 1 t. 19 c., £662. ; Maranham, 5 c., £105. ; Rio de Janeiro, 1 c., £12. ; Sydney, 2 t. 2 qrs., £876. ; Shanghai, 11 c., £173.

ESSENTIAL OILS (SYNTHETIC)—
Durban, 2 qrs., £53.

FERTILISERS (*otherwise undes.*)—
Singapore, 6 t. 5 c., £120.

GLYCERINE—
Antwerp, 10 c., £42. ; Bangkok, 5 c., £22. ; Calcutta, 19 c., £69. ; Bourgas, 1 t., £91. ; Christiania, 50 t., £3,800. ; Durban, 2 c., £25. ; Kobe, 62 t. 5 c., £4,478. ; Malta, 10 c., £35. ; Piraeus, 1 t., £85. ; Salonika, 3 c., £11. ; Shanghai, 11 t. 3 c., £801. ; Stockholm, 19 c. £75. ; Yokohama, 24½ t., £1,772.

IODOFORM—
Iddo, 19 lb., £24

LACTIC ACID—
Melbourne, 2 t. 2 c., £102.

LACTOSE—
Calcutta, 2 c., £18.

LEAD LINOLEATE—
Rouen, 4 c., £17.

MAGNESIA (CALCINED)—
Mayaguez, P.R., 9 c., £70.

MAGNESIUM CARBONATE—
Bombay, 5 t., £165. ; Boston, 50 t., £1,299. ; Calcutta, 2 c., £11.

MAGNESIUM SULPHATE—
Abonema, 1 c., £1 15s. ; Burutu, 6 c., £7. 10s. ; Calabar, 1 c. 3 qrs., £4. ; Cape Coast, 1 c. 3 qrs., £1. 15s. ; Cartagena, 10 c., £13. 5s. ; Marmagoa, 10 c., £12. 10s. ; Pt. Harcourt, 5 c., £10. ; Singapore, 1 t., £17.

MANGANESE LINOLEATE—
Rouen, 3 c. 2 qrs., £15.

NICKEL OXIDE—
Santos, 2 c., £46.

NICKEL SULPHATE—
Melbourne, 5 c., £11.

NITRIC ACID—
Rangoon, 1 t. 2 c., £78.
Rio de Janeiro, 1 t., £94.

PHOSPHORUS SESQUISULPHIDE
Wellington, 1 t. 9 c., £325.

PITCH (VEGETABLE)—
Beira, 5 c., £10.

PITCH (*otherwise undescribed*)—
Genoa, 31 t. 3 c., £628.

PLATING SALTS (*otherwise undes.*)
Cape Town, 4 c. 1 qr., £32.

POTASSIUM BICHROMATE—
Alexandria, 2 t. 18 c., £139. ; Norrkoping, 7 c., £18. ; Reval, 1 t., £521.

POTASSIUM CHLORATE—
Melbourne, 10 t., £397.

POTASSIUM IODIDE—
Calcutta, 1 c., £93. ; Degama, 15 lb., £14. ; Duala, 10 lb., £9. ; Opobo, 75 lb., £77. ; Sapele, 37 lb., £58.

SALAMMONIAC—
Rouen, 1 t. 2 c., £25.

SALTCAKE—
Reval, 25 t., £163.

SHEEP DIP—
Blenheim, 1 t. 16 c., £65. ; Buenaventura, 1 t., £80. ; Buenos Ayres, 55 t. 9 c., £2,795. ; Copenhagen, 5 c. 1 qr., £17. ; Durban, 3 t. 11 c., £342. ; Gisborne, 2 t. 13 c., £101. ; Invercargill, 1 t. 3 c., £14. ; Lyttleton, 5 t. 6 c., £175. ; Mombasa, 1 t. 16 c., £134. ; Napier, 1 t. 13 c., £61. ; Nelson, 3 t. 2 c., £128. ; Oran, 1 t. 2 c., £35. ; Wellington, 12 t. 7 c., £137.

SULPHURIC ACID—
Maranham, 15 c., £25.

SUPERPHOSPHATE—
Barbados, 5 t., £18.

TANNING MATERIALS—
Unspecified
Antwerp, 10 t., £218. ; Algoa Bay, 2 t. 4 c., £40. ; Ancona, Italy, 1 t. 6 c., £19. ; Alexandria, 5 t., £100. ; Bari, 2 t. 5 c., £33. ; Genoa, 3 t. 3 c., £55. ; Mossel Bay, 10 t. 2 c., £171. ; Quebec, 2 t. 5 c., £32. ; Rotterdam, 10 t. 19 c., £131. ; Santander, 2 t. 1 c., £51.

TAR (VEGETABLE)—
Grand Canary, 2 t., £39.

TARTARIC ACID—
Adelaide, 10 c., £19. ; Fremantle, 5 c., £32. ; Montreal, 2 t., £261.

TIN OXIDE—
Sevilla, 2 c., £26. ; Santander, 2 c., £26. ; Santos, 10 c., £119.

VANILLIN—
Kobe, 4 c., £108.
Shanghai, 1 c., £90.

WOOD PRESERVATIVE—
Duala, 1 t. 2 c., £30. ; Penang, 3 t. 8 c., £88. ; Rangoon, 12 c., £22.

ZINC CHLORIDE—
Bombay, 7 t. 7 c., £156.
Buenos Aires, 1 t. 7 c., £36.

ZINC OXIDE—
Piraeus, 15 t., £663. ; Poria, 3 t. 2 c., £138. ; St. John's, N.F., 12 c., £26.

Week ending November 9.

BASIC SLAG—
Brisbane, 20 t. ; Calcutta, 15 t.

CAUSTIC SODA—
Adelaide, 100 drms. ; Amsterdam, 34 drms. ; Barranquilla, 30 drms. ; Beira, 32 pkgs. ; Bombay, 420 drms. ; Beyrout, 50 drms. ; Bremen, 59 drms. ; Buenos Ayres, 261 pkgs., 10 drms. ; Brisbane, 25 cs. ; Calcutta 120 drms. ; Christiania, 155 drms. ; Dar-es-Salaam, 35 pkgs. ; Constantinople, 58 drms. ; Dalny, 202 pkgs. ; Durban, 523 drms. ; East London, 10 drms. ; Genoa, 30 pkgs. ; Hamburg, 212 drms. ; Kobe, 217 drms. ; Helsingfors, 13 pkgs. ; Hobart, 15 pkgs. ; Luderitz Bay, 30 cs. ; Hong Kong, 20 drms. ; Karachi, 720 drms. ; Melbourne, 505 pkgs. ; Monte Video, 30 drms. ; Montreal, 100 drms. ; Newcastle, 50 cs., 90 drms. ; Oporto, 96 drms. ; Panama, 20 drms. ; Sourabaya, 50 drms. ; Sydney, 30 drms. ; Sydney, 114 cs., 83 drms. ; Tampico, 299 drms. ; Trondhjem, 20 drms. ; Valparaiso, 300 drms. ; Volo, 75 drms. ; Wellington, 30 drms. ; Wiborg, 17 drms.

FERRO CHROME—
Bilbao, 1 t.

FERRO MANGANESE—
Halifax, N.S., 10 t.
New Orleans, 175 t.

FERRO TITANIUM—
Bilbao, 6 t.

FULLER'S EARTH—
Antwerp, 22 t.

GLUE, SIZE, AND GELATINE—
Amsterdam, 34 pkgs. ; Auckland, 22 pkgs., 10 cs. ; Barcelona, 2 cks. ; Batavia, 20 cs. ; Boston, 100 cks., 10 pkgs. ; Callao, 10 pkgs. ; Dunedin, 20 pkgs. ; Havana, 241 pkgs. ; Lyttleton, 24 pkgs. ; Madras, 20 bgs. ; Manila, 50 bgs.

PARAFFIN WAX—
Barcelona, 2 cs. ; Cartagena, 480 pkgs. ; La Guaira, 16 bgs.

ROSIN—
Teneriffe, 5 brls.

SALT—
Abonema, 60 t. ; Adelaide, 2 t. ; Antwerp, 230 t. ; Auckland, 251 t. ; Baltimore, 25 t. ; Bombay, 2 t. 10 c. ; Buenos Ayres, 8 t. ; Brisbane, 7 t. ; Buenos Ayres, 5 t. ; Cape Coast, 18 t. ; Calcutta, 4,362 t. ; Cape Town, 5 t. ; Christiania, 527 t. ; Degama, 4 t.

SALT—
Drammen, 40 t. ; Dunedin, 247 t. ; Durban, 31 t. ; Gothenburg, 310 t. ; Grand Lahou, 18 t. ; Grand Bassam, 50 t. ; Halifax, N.S., 35 t. ; Iddo, 800 t. ; Kingston, Ja., 85 t. ; Koko, 10 t. ; Lyttleton, 205 t. ; Malmo, 150 t. ; Melbourne, 2 t. ; Mombasa, 2 t. 10 c. ; Montreal, 1,016 t. ; Newcastle, 15 t. ; New Orleans, 175 t. ; Norrkoping, 50 t. ; Pto. Novo, 18 t. ; Sekondi, 16 t. ; Sierra Leone, 66 t. ; St. John's, N.F., 28 t. ; Sydney, 16 t. ; Valparaiso, 4 t. ; Wellington, 169 t. ; Winnebah, 13 t.

SOAP—
Abonema, 50 pkgs. ; Accra, 700 bxs. ; Aden, 15 pkgs. ; Alexandria, 1 cs. ; Algoa Bay, 2 pkgs. ; Almirante, 35 pkgs. ; Amboina, 500 pkgs. ; Antwerp, 64 pkgs. ; Auckland, 1,550 bxs. ; Amoerang, 100 pkgs. ; Arreciffe, 13 pkgs. ; Banda Neira, 626 bxs. ; Bandjermassin, 538 bxs. ; Bangkok, 762 pkgs. ; Barbados, 200 cs. ; Barranquilla, 128 cs. ; Batavia, 2,000 bxs. ; Beira, 50 bxs. ; Belawan, 300 bxs. ; Benkoelen, 100 bxs. ; Beo, 20 bxs. ; Blinjoe, 25 bxs. ; Boeleleng, 100 bxs. ; Bombay, 3,439 pkgs. ; Bolaang, 50 bxs. ; Bolivia, 325 cs. ; Bourgas, 225 cs. ; Cape Coast, 673 pkgs. ; Cape Town, 925 pkgs. ; Callao, 18 pkgs. ; Calicut, 132 pkgs. ; Casablanca, 5 pkgs. ; Chittagong, 31 pkgs. ; Calcutta, 637 pkgs. ; Cheribon, 150 pkgs. ; Cochin, 97 pkgs. ; Colombo, 223 bxs. ; Constantinople, 20 bxs. ; Copenhagen, 32 bxs. ; Dar-es-Salaam, 30 bxs. ; Danzig, 11 bxs. ; Djambi, 75 bxs. ; Djeloes, 50 bxs. ; Dobo, 50 bxs. ; Dominica, 165 bxs. ; Dunedin, 530 bxs. ; Durban, 35 bxs. ; East London, 5 bxs. ; Funchal, 10 bxs. ; Gibraltar, 38 bxs. ; Gothenburg, 711 pkgs. ; Gorontalo, 100 bxs. ; Haifia, 12 pkgs. ; Havana, 2 bxs. ; Invercargill, 160 pkgs. ; Jaffa, 14 pkgs. ; Karachi, 908 bxs. ; Kahas, 50 pkgs. ; Khota Radka, 130 pkgs. ; Kilindini, 382 bxs. ; Kingston, Ja., 333 bxs. ; Kobe, 5 pkgs. ; Kota Barol, 15 pkgs. ; Laboean Hadji, 10 bxs. ; Langsa, 280 pkgs. ; La Libertad, 106 pkgs. ; Las Palmas, 342 bxs. ; Lho Seurnaweh, 160 pkgs. ; Limassol, 7 pkgs. ; Linde, 5 pkgs. ; Liroeng, 20 pkgs. ; Madras, 350 bxs. ; Marmagoa, 309 pkgs. ; Matadi, 24 pkgs. ; Melilla, 60 bxs. ; Mombasa, 446 bxs. ; Mongonden, 50 bxs. ; Muntok, 70 bxs. ; New York, 9 pkgs. ; Olehleh, 200 bxs. ; Pacasmayo, 30 cs. ; Padang, 10 cs. ; Panama, 100 cs. ; Penang, 910 pkgs. ; Petta, 25 bxs. ; Panarockan, 200 bxs. ; Piraeus, 30 bxs. ; Pongkal Pinang, 150 bxs. ; Pontianak, 150 bxs. ; Port-au-Prince, 20 bxs. ; Punta Arenas, 4 cs. ; Pt. Elizabeth, 1 cs. ; Pt. Harcourt, 100 bxs. ; Pt. Said, 313 pkgs. ; Pt. Swettenham, 209 bxs. ; Pt. Sudan, 142 pkgs. ; Puerto Colombia, 4 bxs. ; Rotterdam, 111 cs. ; Rangoon, 1,732 pkgs. ; Salonika, 90 pkgs. ; Sabang, 28 bxs. ; Saltpond, 56 bxs. ; Samarinda, 200 bxs. ; Santa Cruz de la Palma, 16 cs. ; Saparoca, 75 bxs. ; Sierra Leone, 20 bxs. ; Serembau, 25 bxs. ; Sekondi, 3 bxs. ; Sourabaya, 43 bxs. ; Singapore, 516 bxs., 20 cs. ; St. Kitts, 110 cs. ; St. John's, N.F., 664 pkgs. ; St. Lucia, 65 cs. ; Shanghai, 1,000 bxs. ; Stockholm, 1,100 cs. ; Sydney, 1 cs., 80 drms. ; Tagoelandang, 25 bxs. ; Tamako, 25 bxs. ; Tandjong Pandan, 105 bxs. ; Tanga, 100 bxs. ; Taroena, 25 bxs. ; Teneriffe 211 bxs. ; Ternate, 476 bxs. ; Tetuan, 125 bxs. ; Timosa, 22 cs. ; Tolal, 125 bxs. ; Trinidad, 550 pkgs. ; Tuticorin, 200 cs. ; Valparaiso, 185 cs. ; Vatoeroesa, 100 bxs. ; Wellington, 189 cs. ; Winnebah, 124 bxs.

SODA CRYSTALS—
Buenos Ayres, 10 brls.; Ceuta, 25 bgs.; Colombo, 100 pkgs.; Durban, 20 pkgs.; Jersey, 70 pkgs.; Malta, 50 bgs.; Panama, 270 pkgs.; Penang, 30 pkgs.

SODA ASH—
Adelaide, 430 pkgs.; Antofagasta, 491 pkgs.; Arica, 20 pkgs.; Auckland, 20 pkgs.; Brisbane, 217 pkgs.; Buenos Ayres, 575 cks.; Calcutta, 5,000 pkgs.; Christiania, 600 pkgs.; Colombo, 800 pkgs.; Constantinople, 200 pkgs.; Copenhagen, 1,700 pkgs.; Drammen, 100 pks.; Durban, 200 pkgs.; Fremantle, 278 pkgs.; Hamburg, 6,500 pkgs.; Helsingfors, 300 pkgs.; Hobart, 27 pkgs.; Iquique, 200 pkgs.; Karachi, 5,180 bgs., 2,820 pkgs.; Kobe, 11,274 bgs., 11,571 pkgs.; Kotka, 1,300 pkgs.; Launceston, 236 bgs.; Madras, 44 pkgs. Malmo, 400 bgs.; Melbourne, 259 pkgs.; Medellin, 45 bgs.; Moji, 3,788 bgs.; Odense, 1,000 bgs.; Rotterdam, 5,000 bgs.; Samarang, 100 bgs.; Shanghai, 952 pkgs.; Sourabaya, 100 bgs.; Stockholm, 2,000 bgs.; Sydney, 118 bgs.; Tuticorin, 8 cks.; Volo, 80 pkgs.; Wiburg, 300 bgs.; Yokkaichi, 808 bgs.

SODIUM ARSENITE—
East London, 20 pkgs.

SODIUM BICARBONATE—
Adelaide, 18 pkgs.; Alexandria, 130 pkgs.; Aden, 20 pkgs.; Auckland, 40 pkgs.; Bari, 75 kgs.; Batavia, 40 pkgs.; Beyrout, 20 kgs.; Bourgas, 60 kgs., 122 pkgs.; Braila, 150 kgs.; Copenhagen, 12 pkgs.; Dalny, 112 pkgs.; Durban, 90 pkgs.; Genoa, 50 pkgs.; Karachi, 200 pkgs.; Kilindini, 10 kgs.; Kingston, Ja., 5 pkgs.; Leghorn, 130 pkgs.; Madras, 191 pkgs.; Malta, 30 bgs.; Manila, 280 kgs.; Melbourne, 20 kgs.; Montreal, 75 pkgs.; Naples, 125 kgs.; Newcastle, 112 bgs.; Para, 70 pkgs.; Penang, 30 pkgs.; Piraeus, 50 pkgs.; Pt. Sudan, 5 pkgs.; Pt. Swettenham, 20 pkgs.; Shanghai, 42 drms.; Sydney, 201 kgs.; Varna, 140 kgs.

SODIUM BISULPHITE—
Cochin, 20 drms.

SODIUM CYANIDE—
Cartagena, 65 cs.

SODIUM HYPOSULPHITE—
Sydney, 100 kgs., 40 cks.

SODIUM PRUSSIATE—
Kobe, 100 kgs.

SODIUM SILICATE—
Adelaide, 172 pkgs.; Auckland, 7 pkgs.; Bordeaux, 3 cks.; Buenos Ayres, 146 cks.; Cartagena, 50 cks.; Durban, 76 pkgs.; Kobe, 30 pkgs.; Fremantle, 28 dble. bgs.; Melbourne, 215 pkgs.; Montreal, 16 pkgs.; Monte Video, 60 cks.; Newcastle, 1 pkg.; Pt. Said, 40 pkgs.; Singapore, 3 cks.; Sydney, 32 cks.

SODIUM SULPHIDE—
East London, 6 pkgs.

STEARINE—
La Guaira, 20 bgs.

LONDON.

Week ending November 7.

ACETIC ACID—
Brisbane, 10 cs., £35.; Christchurch, 5 cs., £17.; Calcutta, 2 cs., £8.; Durban (F.), 3 cs., £10.; Malta (F.), 1 ck., £9.; Salonika (F.), 5 cs., £9.; Toronto, 2 cs., £8.; Wellington, 4 cs., £12.

ACETONE—
Antwerp (in transit) (F.), 33 drms., £1,067.

ACETYL SALICYLIC ACID—
Bombay, 5 cs. (pt.), £21.; Calcutta, 1 cs. (pt.), £11.; Iddo, 1 cs. (pt.), £11.; Sydney, 2 cs. (pt.), £19.

ALUM—
Bombay, 6 kgs., £8.

ALUMINIUM SULPHATE
Iddo, 4 cs., £15.

AMMONIA—
Accra, 25 cs., £48.; Belgian Congo, via Antwerp, 5 cs., £9.; Beira, 3 cs., £6.; Bombay, 15 cs., £27.; Calcutta, 10 cs., £18.; Durban, 35 cs., £57.; Irish Free State, 20 cs., £36.; Kilindini, 4 cs., £7.; Madras, 5 cs., £9.; Penang, 4 cs., £8.; Pt. Elizabeth, 8 cs., £15.; Pt. Harcourt, 5 cs., £9.; Sekondi, 9 cs., £16.; Singapore, 19 cs., £18.

AMMONIA (ANHYDROUS)—
Durban, 10 cs., £17.; Penang, 28 cylds., £175.; Pernambuco, 2 cylds., £13.; Pt. Sudan, 3 cylds., £17.

AMMONIUM BIFLUORIDE
Paris, 2 cks., £26.

AMMONIUM CARBONATE—
Bangkok, 7 c., £29.; Brussels, 1 t., £26.; Calcutta, 4 c., £18.; Chiclayi, 3 c., £8.; Copenhagen, 1 t., £28.; Dunkirk, 1 t. 19 c., £58.; Hamburg, 5 t., £118.; Hong Kong, 6 c., £17.; Kobe, 5 t., £126.; Menado, 3 c., £9.; Paris, 3 t. 16 c., £116.; Penang, 11 c., £28.; Pt. Elizabeth, 4 c., £8.; Singapore, 2 c., £6.

AMMONIUM CHLORIDE—
Calcutta, 3 kgs., £7.
Montreal, 2 t., £62.

AMMONIUM NITRATE—
Calicut, 20 t. 10 c., £502.

AMMONIUM PHOSPHATE—
East London, 1 ck., £7.

AMMONIUM SULPHATE—
Auckland, 25 t., £398.; Hong Kong, 10 t., £152.; Kobe, 100 t., £1,597.; Mauritius, 50 t., £700.; Piraeus, 300 t., £4,050.

ANTIMONY OXIDE—
Mollendo (F.), 1 ck., £10.

ANTIMONY SALT—
Genoa, 6 cks., £62.

ANTIMONY SULPHIDE—
Christiania, 1 ck., £18.; Copenhagen, 14 cks., £138.; Genoa, 7 cks., £162.; Hamburg, 2 cks., £29.; New York, 8 cks., £156.

ARSENIC—
Barcelona, 3 cks., £28.; East London, 2 drms., £7.; Riga (F.), 10 cks., £108.; San Paulo, 20 drms., £64.; Wanganui, 100 drms., £375.

BARIUM CHLORIDE—
San Paulo, 1 ck., £6.

BARIUM PEROXIDE—
Rotterdam, 30 drms., £450.

BASIC SLAG—
Channel Islands, 50 t., £131.

BISMUTH CARBONATE—
Bombay, 1 cs., £71.
Melbourne, 1 cs., £73.
Wellington, 2 cs., £142.

BISMUTH SALTS (*otherwise undes.*)
Auckland, 1 cs. (pt.), £34.; Bombay, 4 cs. (pt.), £5.; Karachi, 1 cs. (pt.), £16.

BISMUTH SUBNITRATE—
Bombay, 2 cs., £182.
Calcutta, 4 cs. (pt.), £30.
Madras, 3 cs. (pt.), £8.
Sydney, 1 cs., £98.

BISULPHITE OF LIME—
Dunedin, 15 cks., £70.

BITUMEN—
Calcutta, 34 pkgs. (pt.), £23.
Copenhagen, 19 brls., £26.

BLEACHING POWDER—
Bagdad, 4 cs. (pt.), £8.

BORAX—
East London, 1 c., £3.
Melbourne, 1 c., £9.

BORAX GLASS—
Sekondi, 15 c., £60.

BORIC ACID—
Calcutta, 10 c., £35.; Callao, 5 c., £17.; Dunedin, 2 c., £6.; Hamburg, 9 t. 17 c. (F.), £472.; Jamaica, 4 c., £12.; Karachi, 2 c., £7.; Singapore, 3 c., £10.

CALCIUM CARBIDE—
Accra (F.), 6 c., £5.; Accra, 10 c., £12.; Sekondi, 7 c., £6.

CALCIUM CARBONATE
Calcutta, 8 cks., £36.

CALCIUM CHLORIDE—
Adelaide, 9 pkgs., £12.
Bombay, 2 cs., £6.
Perth, 12 kgs., £13.
Pt. Sudan, 7 drms., £14.

CALCIUM HYPOPHOSPHITE—
Calcutta, 3 cs. (pt.), £14.

CALCIUM SULPHATE
Barcelona, 20 dks., £30.

CARBON TETRACHLORIDE
Calcutta, 3 cs., £13.
Fremantle, 5 cs., £70.

CAUSTIC SODA—
Rotterdam, 2 c., £6.

CHEMICALS (*otherwise undescribed*)
Adelaide, 10 cs., £106.; Auckland 17 pkgs. (pt.), £35.; Bangkok, 1 c., £7.; Beira, 20 pkgs., £71.; Bombay, 25 cs. (pt.), £79.; Brussels, 2 cs., £6.; Buenos Ayres, 82 cs. (pt.), £791.; Calcutta, 10 cs. (pt.), £55.; Callao, 20 pkgs., £49.; Cape Town, 6 pkgs., £12.; Colombo, 15 cs. (pt.), £66.; Colon, 10 cs. (pt.), £22.; Dar-es-Salaam, 6 cks., £8.; Delagoa Bay, 160 pkgs., £568.; Durban, 2 cs., 14 pkgs. (pt.), £13.; East London, 13 cs., £11.; Foochow, 4 pkgs., £6.; Gothenburg, 15 pkgs. (F.), £18.; Havana, 19 pkgs., £25.; Hong Kong, 4 cs., £5.; Irish Free State, 10 pkgs., £13.; Karachi, 14 pkgs. (pt.), £66.; Kilindini, 11 pkgs. (pt.), £16.; Kobe, 5 cs., £105.; Lisbon, 6 cs., £10.; Madras, 95 pkgs., £116.; Melbourne, 20 pkgs., £173.; Penang, 6 pkgs., £7.; Petrograd, 2 cs., £38.; Rio de Janeiro, 2 cks. (pt.), £8.; Rotterdam, 64 pkgs., £162.; Sekondi, 14 pkgs., £48.; Shanghai, 2 cs., £6.; Singapore, 11 pkgs., £84.; Smyrna, 4 cs. (pt.), £10.; Sydney, 29 pkgs. (pt.), £1,318.; Trichinopoly, 1 cs., £8.; Tulagi, 6 cs., £9.; Vera Cruz, 125 pkgs., £386.; Wellington, 5 cs., £7.; Yokohama, 1 cs., £26.

CITRATES (*otherwise undescribed*)—
Calcutta, 1 cs., £6.

CITRIC ACID—
Amsterdam, 10 c., £73.; Bangkok, 1 c., £6.; Calcutta, 5 c. (F.), £55.; Calcutta, 1 c., £10.; Colombo, 5 c., £35.; Copenhagen, 10 c. (F.), £210.; Hobart, 10 c., £83.; Melbourne, 5 c., £38.; Perth, 5 c., £35.; Rio de Janeiro, 5 c., £61.; Rotterdam, 10 c., £73.; Sydney, 2 t. 10 c., £364.; Yokohama, 3 t. 10 c., £509.

COAL TAR PRODUCTS—
Carbolic Acid
Bombay, 6 cs., £31.; Hong Kong, 1 cs., £11.; Pt. Swettenham, 1 cs., £5.

Naphthalene
Rotterdam, 1,000 bgs., £1,010.

Pitch
Alexandria, 350 pkgs., £139.; Cette (bulk), 1,050 t., £7,613.; Dunkirk (bulk), 250 t., £1,563.; Pt. Said, 160 brls., £180.; Rouen, 8 brls., £240.; Sydney, 25 brls., £74.

Pyridine
Helsingborg, 4 drms., £317.; Rotterdam, 17 drms., £962.; Stockholm, 7 drms., £620.

Tar
Durban, 25 cks., £64.; East London, 44 drms., £9.; Pt. Said, 60 drms., £104.; Singapore, 35 runlets, £154.

Xylol
Rotterdam, 6 drms., £80.

COBALT ACETATE—
Sydney, 1 cs., £25.

COPPER SULPHATE—
East London, 8 c., £12.

CREAM OF TARTAR—
Adelaide, 5 t., £423.; Channel Islands, 2 c. (F.), £9.; East London, 1 fc., £6.; Fremantle, 10 c, £52.; Hobart, 1 t., £87.; Hong Kong, 1 c. (F.), £5.; Karachi, 1 c. (F.), £6.; Launceston, 2½ t., £214.; Menado, 1 c. (F.), £6.; Mollendo, 1 c. (F.), £5.

DISINFECTANTS (*otherwise undes.*)
Acajutla, 9 c., £17.; Antigua, 4 c., £8.; Bagdad, 2 c., £7.; Bangkok, 5 c., £8.; Bonny, 9 c., £25.; Calabar, 1 t., £61.; Calcutta, 2 t. 3 c., £87.; Canton, 18 c., £23.; Cartagena, 1 c., £14.; Christchurch, 1 t. 7 c., £290.; Colombo, 1 t. 4 c., £98.; Cotonou, 3 c., £8.; Dunedin, 1 t. 16 c., £130.; Forcados, 19 c., £56.; Gisborne, 13 c., £40.; Hong Kong, 3 t. 6 c., £100.; Iddo, 1 t. 3 c., £35.; Irish Free State, 3 t. 8 c., £82.; Karachi, 6 c., £10.; Kilindini, 6 c., £20.; Las Palmas, 6 c., £16.; Penang, 14 c., £42.; Pt. Elizabeth, 5 c., £8.; Rangoon, 2 t. 15 c., £138.; Singapore, 5 c., £11.; Sydney, 1 t. 4 c., £58.

DYESTUFFS (ARTIFICIAL)—
Nigrosine
Brussels, 1 ck., £8.
Sydney, 3 pkgs., £11.
Unspecified
Bombay, 1 cs. (pt.), £11.; Boulogne, 4 cks., £100.; Montreal 1 cs. (pt.), £7.; Sydney, 8 pkgs., 1 cs. (pt.), £121.; Valencia, 8 kgs., £13.

ETHER—
Bombay, 2 cs., £9.

ETHYL CHLORIDE—
Pt. Swettenham, 1 cs. (pt.), £11.

FERTILISERS (*otherwise undes.*)—
Buenos Ayres, 2 t., £25.; Channel Islands, 6 t. 12 c., £77.; Ghent, 24 t. 10 c., £138.; New York, 5 t. 5 c., £136.

FORMALDEHYDE—
Calcutta, 2 cs., £9.; Irish Free State (F.), 1 brl., £17.; Wellington, 12 cks., £30.

GLYCERINE—
Bombay, 3 c., £26.; Canton, 1 c., £6.; Florence, 10 c., £42.; Melbourne, 2 c., £5.; Oporto, 1 t., £99.

GLYCEROPHOSPHATES (*otherwise undes.*)
Bombay, 1 cs. (pt.), £10.

HYDROCHLORIC ACID—
Lagos, 1 c., £7.

HYDROFLUORIC ACID—
Pt. Elizabeth, 1 cs., £13.

HYDROGEN PEROXIDE—
Pt. Said, 2 cs. (pt.), £10.

IODIDES (*otherwise undescribed*)—
Auckland, 1 cs. (pt.), £71.
Calcutta, 1 cs. (pt.), £9.

IODINE—
Rio de Janeiro, 1 cs. (pt.), £38.

IODINE (RESUBLIMED)—
Brussels, 4 cs. (pt.), £155.
Sydney, 1 cs. (pt.), £26.

IRON AMMONIUM CITRATE—
Bombay, 5 cs., £32.
Buenos Ayres, 4 cs., £23.

IRON IODIDE—
Rangoon, 1 cs. (pt.), £6.

IRON PERCHLORIDE—
Sydney, 10 cs., £11.

LEAD ARSENATE—
Cerro Azul, 100 drms., £481.
Pt. Swettenham, 5 cks., £28.

LEAD PEROXIDE—
Antwerp, 5 cks., £25.

MAGNESIA—
Auckland, 6 cs., £8.; Christchurch, 5 cs., £13.; San Juan del Sur, 1 cs., £9.; Switzerland, 3 cs., £7.; Sydney, 35 cs., £84.; Wellington, 4 cs., £9.

MAGNESIUM CARBONATE—
Melbourne, 10 cs., £23.; Rio de Janeiro, 5 cs., £28.; Sydney, 10 bgs., £29.

MAGNESIUM CITRATE—
Havre, 13 cs., £214.

MAGNESIUM SULPHATE—
Accra, 6 c., £11. ; Bahrein, 1 c., £5. ; Basreh, 4 c., £5. ; Bombay, 17 c., £26. ; Brisbane, 1 t. 15 c., £11. ; Calcutta, 10 c., £8. ; Colon, 8 c., £10. ; Lagos, 10 c., £12. ; Launceston, 1 t. 5 c., £28. ; Maryborough, 5 c., £6. ; Melbourne, 7 t. 9 c., £168. ; San Juan del Sur, 5 c., £7. ; Sydney, 1 t. 14 c., £39. ; Toronto, 10 c., £8.

MERCURIALS (*otherwise undes.*)—
Auckland, 1 cs. (pt.), £5.
Calcutta, 3 cs., £51.

MERCURY CHLORIDE—
Calcutta, 3 cs. (pt.), £6.

MERCURY OXIDE—
Rio de Janeiro, 1 cs. (pt.), £15.

MERCURY SUBCHLORIDE
Bombay, 2 cs., £26.

METHYL SALICYLATE—
Durban, 1 cs., £6.

NICKEL SALTS (*otherwise undes.*)
Durban, 14 pkgs. (pt.), £14.
Melbourne, 5 cs., £11.

PHOSPHORIC ACID—
Calcutta, 4 cs., £12.
Dunedin, 2 cs., £6.

POTASH (*otherwise undescribed*)—
Dunedin, 1 kgs., £22.

POTASSIUM BICARBONATE—
Sydney, 5 cs., £14.

POTASSIUM CARBONATE
Hong Kong, 5 cs., £18.
Sydney, 2 cs., £6.

POTASSIUM CHLORATE
Calcutta, 3 kgs., £6.

POTASSIUM CITRATE
Bombay, 2 cs., £21.

POTASSIUM IODIDE—
Brussels, 4 cs. (pt.), £129. ; Beira, 1 cs. (pt.), £11. ; Bombay, 2 cs., 4 cs. (pt.), £190. ; Calcutta, 3 cs., 3 cs. (pt.), £307. ; Cape Town, 1 cs. (pt.), £12. ; Karachi, 1 cs., £88. ; Kobe, 5 cs., £392. ; Madras, 3 cs. (pt.), £12. ; Melbourne, 1 cs., £90. ; Rio de Janeiro, 1 ck., 4 cs. £466. ; Singapore, 2 cs., £178. ; Sydney, 2 cs., 1 cs. (pt.), £186.

POTASSIUM METABISULPHITE
Melbourne, 20 cs., £63.

POTASSIUM SALTS (*otherwise undes.*)
Toronto, 2 cs., 7 cks., £38.

ROCHELLE SALTS—
Canton, 1 c., £13.

SALAMMONIAC—
Wellington, 2 cks., £27.

SALICYLATES (*otherwise undes.*)—
Sydney, 3 cs. (pt.), £27.

SALTCAKE—
Bilbao, 250 t., £1,406.

SALTPETRE—
Auckland, 2 t. 5 c., £82. ; Bahia, 2 t. 9 c., £98. ; Dunedin, 2 t. 5 c., £82. ; Wellington, 5 t., £204.

SHEEP DIP—
Durban, 1 t. 6 c., £38.
Irish Free State, 1 c., £8.

SILVER NITRATE—
Canton, 1 cs., £52.
Hong Kong, 3 cs., £238.

SILVER SALTS (*otherwise undes.*)
Melbourne, 1 cs., £65.

SODA CRYSTALS—
Karachi, 3 c., £19.

SODIUM ARSENITE—
Delagoa Bay, 2 t., £146.

SODIUM BENZOATE—
Kobe (F.), 1 t., £224.
Paris, 1 t., £259.

SODIUM BICARBONATE—
Calcutta, 6 c., £19. ; Fremantle, 10 c., £15. ; Hong Kong, 1 c., £5. ; Monte Video, 15 c., £40. ; Oruro, 10 c., £16. ; Rio de Janeiro, 2 t., £35. ; San Juan del Sur, 15 c., £24.

SODIUM BISULPHITE—
Auckland, 1 t., £20. ; Callao, 1 t. 19 c., £29. ; Cochin, 10 c., £19. Penang, 2 t. 10 c., £46.

SODIUM CARBONATE—
Christiania, 10 c. £8. ; Delagoa Bay 9 c., £17. ; Singapore, 2 c., £5.

SODIUM CARBONATE
Stockholm, 1 t., £13.
Yokohama, 9 c., £27.

SODIUM CITRATE
Bombay, 1 c., £9.

SODIUM HYDROSULPHITE
Calcutta, 10 c., £89.

SODIUM HYPOSULPHITE—
Basrah, 3 c., £5.
Colombo, 10 c., £9.

SODIUM IODIDE—
Brussels, 1 cs. (pt.), £24.

SODIUM PRUSSIATE
Mexico Bay, 1 t. 1 c., £58.

SODIUM SALICYLATE—
Irish Free State, 1 c., £11.
Pt. Swettenham, 1 cs., £7.

SODIUM SALTS (*otherwise undes.*)
Dunedin, 17 c., £40.

SODIUM SULPHATE
Demerara, 20 kgs., £10.

SODIUM SULPHIDE—
Montreal, 10 t. 17 c., £95. ; Perth, 1 t., £17. ; Rotterdam, 5 t. 3 c., £72.

SODIUM SULPHITE—
Antwerp, 10 c., £10.
Singapore, 6 c., £24.

SODIUM TARTRATE—
Calcutta, 1 c., £5.

SODIUM TUNGSTATE
Sydney, 1 c., £8.

SULPHUR—
Beira, 10 c., £9.
Irish Free State, 1 c., £8.

SULPHURIC ACID—
Aden, 6 c., £7. ; Bagdad, 1 c., £6. ; Beira, 1 t. 10 c., £24. ; Durban, 13 c., £35. ; Iddo, 1 t. 10 c., £95. ; Pernambuco, 10 t., £200. ; Pt. Sudan, 1 t. 5 c., £25. ; Pt. Swettenham, 2 t. 4 c., £89.

SUPERPHOSPHATE—
Channel Islands, 155 t., £122.

TARTARIC ACID—
Adelaide, 1 t., £120. ; Bombay, 2 c., £17. ; Buenos Ayres, 50 t., £5,563. ; Calcutta, 1 c., £32. ; Galatz, 1 t. (F.), £120. ; Karachi, 1 c., £8. ; Limon, 3 c. (F.), £24. ; Melbourne, 2 t., £240. ; Perth, 5 c., £30. ; Pt. Elizabeth, 1 c., £7. ; Sydney, 3 t., £360. ; Valparaiso, 1 t., £122. ; Yokohama, 12 t., £969.

TIN OXIDE—
Melbourne, 4 cks., £200.

TURPENTINE—
Cape Town, 2 drms., £7.

ZINC OXIDE—
Alexandria, 10 brls., £59. ; Boulogne, 2 cks., £10. ; Christiania, 80 cks., £161. ; Copenhagen, 220 cks., £665. ; East London, 10 kgs., £13. ; Medellin., 10 cks., £21. ; Paris, 80 cks. £330. ; Victoria, 10 cks., £17.

ZINC SULPHIDE—
Danzig, (F.), 1 ck., £8.

Week ending November 10.

CARNAUBA WAX—
Amsterdam, 1 t.

CERESINE WAX—
Irish Free State, 14 c.

COPPER RESIDUE—
Hamburg, 26 t.

DYESTUFFS (NATURAL)
Turmeric
Ghent, 2 c.

FULLER'S EARTH—
Hamburg, 25 t.

GLUE, SIZE, AND GELATINE—
Antwerp; 1 t. ; Bombay, 2 t. ; Brisbane, 1 t. ; Brussels, 2 t. ; Callao, 10 c. ; Calcutta, 15 t. ; Christchurch, 1 c. ; Colombo, 1 c. ; Copenhagen, 1 t. 10 c. ; Delagoa Bay, 1 c. ; Durban, 2 t. 1 c. ; East London, 5 c. ; Ghent, 10 c. ; Karachi, 3 c. ; Limon, 2 c. ; Lourenco Marques, 2 t. 9 c. ; Madras, 1 c. ; Melbourne, 4 t. 4 c. ; Montreal, 3 t. ; Mollendo, 1 c. ; New York, 10 t. ; Paris, 27 t. ; Perth, 2 c. ; Pt. Swettenham, 1 t.

GLUE, SIZE, AND GELATINE—
Pt. Elizabeth, 2 t. ; Pt. Harcourt, 10 c. ; Pt. Said, 1 c. ; Shanghai, 5 t. 4 c. ; Singapore, 5 c. ; Stockholm, 4 c. ; Sydney, 1 t. 15 c. ; Vera Cruz, 2 t. ; Wellington, 1 t. ; Yokohama, 10 t.

ISINGLASS—
Helsingfors, 2 cs.

PLUMBAGO—
Arica, 1 t. ; Malmo, 12 c. ; Montreal, 1 t. 16 c. ; Penang, 12 c. ; Rosario, 7 t. 8 c.

QUININE—
Bombay, 3,312 oz. ; Calcutta, 8,724 oz. ; Kilindini, 100 oz. ; Pt. Swettenham, 5,010 oz. ; Rangoon, 235 oz. ; Rio de Janeiro, 1,056 oz. ; Sekondi, 416 oz. ; Trinidad, 211 oz.

SALT—
Bombay, 6 c. ; Delagoa Bay, 11 c. ; Djibouti, 2 c. ; Durban, 5 c. ; Hong Kong, 4 c. ; Karachi, 1 t. 12 c. ; Madras, 13 c. ; Pt. Elizabeth, 2 c. ; Singapore, 2 c.

SHELLAC—
Gothenburg, 2 c.
Italy, 10 c.

SOAP—
Accra, 10 t. 15 c. ; Ahwaz, 2 t. ; Amsterdam, 13 c. ; Auckland, 1 c. ; Bangkok, 17 c. ; Belawan, 14 c. ; Calabar, 5 t. 5 c. ; Calcutta, 1 c. ; Colombo, 1 t. 8 c. ; Cuba, 7 c. ; Delagoa Bay, 2 c. ; Dunedin, 1 t. 5 c. ; Durban, 19 c. ; Genoa, 2 c. ; Irish Free State, 2 c. ; Jamaica, 21 t. 5 c. ; Karachi, 1 c. ; Lagos, 5 c. ; Launceston, 12 c. ; Lisbon, 12 c. ; Lome, 2 c. ; Melbourne, 12 c. ; Monte Video, 11 c. ; Montreal, 1 t. 13 c. ; New York, 2 c. ; Opobo, 17 t. 17 c. ; Pt. Elizabeth, 6 c. ; Pt. Harcourt, 9 t. 3 c. ; Pt. Said, 1 c. ; Sapele, 17 c. ; Sekondi, 11 c. ; Sierra Leone, 1 t. ; Singapore, 7 t. 5 c. ; Sydney, 1 t. ; Valparaiso, 3 c. ; Wellington, 19 c. ; Danzig, 21 t. 5 c. ; Dusseldorf, 11 t. 17 c. ; Hamburg, 9 t. ; Rotterdam, 41 t. 11 c. ; Paris, 32 t. 1 c. ; Wiborg, 35 t.

TANNING MATERIALS—
Sumac
Rio de Janeiro, 1 c.

TAR (STOCKHOLM)—
Calcutta, 2 t. ; East London, 1 c. ; Fremantle, 1 t. 3 c.

WAX (*otherwise undescribed*)—
Catania, 16 c.

WHITE LEAD—
Cape Town, £67. ; Cyprus, £9. ; Delagoa Bay, £10. ; Dunedin, £48. ; Durban, £126. ; East London, £25. ; Fiji Islands, £54. ; Hong Kong, £85. ; Kilindini, £5. ; Lisbon, £19. ; Malta, £9. ; Mossel Bay, £6. ; Rangoon, £169. ; Shanghai, £9. ; Sydney, £378. ; Toronto, £51. ; Wellington, £1,228.

MANCHESTER.

Week ending November 10.

ALBUMEN—
Providence, R. I., 4 cks.

ALUM—
Canada, 20 bgs.
St. John, N.B., 20 bgs.

AMMONIA ALUM—
Brisbane, 7 brls.

ANTIFOULING PAINT—
St. John, N.B., 50 drms.

CARBON BLACK
Belgium, 12 cs.
Holland, 1 cs.

CHEMICALS (*otherwise undescribed*)
Austria, 1 ck. ; Cairo, 10 cs. ; Canada, 25 cks., 40 kgs. ; Copenhagen, 22 cks. ; France, 10 kgs. ; Montreal, 10 cs.

COAL TAR PRODUCTS—
Aniline Oil
Basle, 13 drms.
Unspecified
Switzerland, 90 drms.

COBALT CHLORIDE—
Sydney, 3 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Adelaide, 3 kgs., 1 cs.
Melbourne, 11 kgs.
Rouen, 18 cks., 1 cs., 1 kg.
Sydney, 1 cks., 15 kgs.

FORMALDEHYDE—
Haifa, 28 cs.

GLUE—
Canada, 50 bgs.
Montreal, 120 bgs.

MAGNESIA—
Montreal, 10 cs.

MAGNESIUM CHLORIDE—
Bombay, 78 drms.

MANGANESE ORE—
Sydney, 9 cks.

RED LEAD—
Pt. Said, 8 drms.

SALT—

Ghent,	3,200 sks.
Quebec,	1,600 bgs.
Montreal,	1,000 sks.
Quebec,	3,936 sks.
St. John,	115 t.

SALTCAKE—
France, 1,000 bgs.
Gefle, 1,543 t.

SIZE—
Belgium, 5 cks.
France, 50 brls.

SOAP—
Basra, 44 cs. ; Canada, 2 cs. ; Pt. Said, 5 cs. ; The Hague, 14 cs.

STEARINE—
Philadelphia, 50 bgs.

TANNING MATERIALS—
Unspecified
Melbourne, 20 cks., 15 bxs.

WHITE LEAD—
Pt. Said, 5 drms.

ZINC CHLORIDE—
Bombay, 6 drms.

NEWCASTLE-ON-TYNE

Week ending November 10.

ALUMINA—
Barcelona, 200 bgs.

AMMONIA—

Alicante,	190 t.
Barcelona,	1,027 bgs.
Christiania,	50 kgs., 20 cks.
Copenhagen,	20 brls.

ANTIMONY—
Bremen, 1 ck.

BLEACHING POWDER—
Copenhagen, 15 cks.
Gothenburg, 42 cks.

CAUSTIC SODA—
Christiania, 104 drms.

COAL TAR PRODUCTS—
Pitch
Antwerp, 595 t.
Gothenburg, 31 cks.

GLUE—
Copenhagen, 6 bgs.

LITHARGE—
Christiania, 16 cks.
Copenhagen, 6 cks.

MAGNESIA—
New York, 15 cs.

RED LEAD—
Bergen, 20 kgs. ; Copenhagen, 28 cks. ; Christiania, 32 cks. ; Gothenburg, 125 cks. ; Stettin, 5 t.

SOAP—
Christiania, 4 cs.

SODIUM SALTS (*otherwise undes.*)
Copenhagen, 63 drms., 7 bgs.

SODIUM SULPHITE—
Bergen, 50 bgs.
Gothenburg, qty.

ZINC OXIDE—
Gothenburg, 20 cks.

N. & S. SHIELDS.

Week ending November 10.

NIL.

PRICES CURRENT.

WEDNESDAY, NOV. 14, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23- / & 46/-		
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	90	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	5
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tarteric (crystals)	lb.	0	1	1
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	3
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	6	17	6
Pyridin	gallon	1	3	0
Tar, crude	ton	4	10	0
Tar, refined	barrel	2	4	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	11	0	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	69	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	10	6
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	81	0	0
China Clay (at Runcorn), in bulk	ton	50/- to 90/-		
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	0	0
Formaldehyde, 40%	ton	64	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	2	6
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	43	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	44	0	0
Lead Nitrate	ton	44	0	0
Lime Acetate (brown)	*ton	12	0	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	5	0
Litharge (British)	ton	45	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	3	1
Naphtha (Wood), Solvent	*gallon	0	6	0
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	0
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	23	0	0
Potassium Chlorate	lb.	0	0	2¾
Potassium Hydrate (Caustic Potash), 88/90%	ton	29	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	26	0	0
Potassium Hydrate (liquid), 50° Tw.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8½
Potassium Prussiate (yellow)	lb.	0	0	10½
Potassium Prussiate (red)	lb.	0	2	6
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	55/- & 52/-		
Sodium Acetate	ton	24	0	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2⅝
Sodium Cyanide (100% basis) for export	lb.	8d. to 8½d		
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	14	10	0
Sodium Prussiate	lb.	0	0	5¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	10	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	0	0
Sulphur (Roll Brimstone)	ton	8	0	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	3½
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	42	0	0
Copper	ton	63	5	0
Lead (Chemical Sheet), delivered	cwt.	1	17	6
Lead (Foreign Pig)	ton	31	2	6
Nickel	ton	130	0	0
Silver	oz.	0	2	9 5/16
Tin, English Ingots	ton	211	0	0
Zinc (Spelter)	ton	33	10	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	42	10	0
Linseed, Raw	*ton	45	10	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	12	0

* *Packages extra or returnable*; otherwise prices usually include packages

† Makers' prices for home consumption only.

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
The Export Trade in Sulphate	603
The New Source of Potash...	604
The German Reparation Default	604
Efficiency in Details	604
The Steam System in a Chemical Works	605
Italian Leucite	608
Institution of Chemical Engineers	610
The Problem of City Water Supplies	611
Sulphate of Ammonia Federation.	612
Holding Companies and Amalgamations	612
Correspondence	613
The Chemical Industry Club	614
The South Wales Patent Fuel Industry	615
The Markets in Gasworks Residuals	615
Vermilion Industry of Hong Kong	615
Items of Interest	616
Coming Events	617
Production of the Rare Metals	618
Fertiliser News	619
Parliamentary News	619
German Reparation Duty	620
Our Bookshelf	620
Cumberland Coking and By-product Industries	620
Gazette News	620
Reports of Companies	621
New Companies	621
Imports of Chemicals and Allied Products in October	622
Exports of Chemical and Allied Products in October	623
Legal Intelligence	624
South Wales Notes	624
Trade Inquiries	624
Thirty-five Years Ago	624
The Patent List:—	
Applications for British Letters Patent	625
Complete Specifications Accepted	625
Complete Specifications Open to Public Inspection before Acceptance	625
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	625
Abstracts of Latest Complete Specifications	626
Publications Received	626
Market Reports:	
London "Open Market" Report	626
London Metal Market	628
Manchester Chemical Market	628
Swansea Market Report	628
Liverpool Chemical Market	628
West of Scotland Chemicals	629
Imports of Chemical Products	629
Exports of Chemical Products	632
Prices Current	636

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CURRENT TOPICS.

THE EXPORT TRADE IN SULPHATE.

TO those who have followed the figures relating to the export trade in sulphate of ammonia, as published in the monthly trade returns, the encouraging results given by the chairman of the British Sulphate of Ammonia Federation, in his speech on Friday last, will occasion no surprise. This fertiliser is one of the few British products which have more than held their own in the world's markets. The period reviewed by Mr. D. Milne Watson was the last fertiliser year—from June 1, 1922 to May 31, 1923— and during this period the production of sulphate in this country increased by 50 per cent. Exports showed a gain of 58 per cent., and home deliveries a rise of 3 per cent. on the previous year. In times of trade depression like those this country has been and is still passing through, figures such as quoted above are most stimulating. These gratifying results are attributed by the chairman to the improved quality of the product marketed by the Federation, which, is to be inferred from Friday's speech, amounts to about nine-tenths of the total British output. That 70 per cent. of the production is of neutral quality is a matter for congratulation, meaning as it does a further narrowing down of the margin of loss due to the rotting of bags in transit, together with greater ease of application of the fertiliser to the land. But is it justifiable to accord to this improvement in quality the entire credit for the increased export trade? Has not the absence of American competition been a contributory factor? Was the loss of Japan as a market during 1921 and 1922 due entirely to low quality of the British material? The great sulphate slump in America in 1920 resulted in the purchase by Japan at the end of that year of very large quantities at a comparatively low price, with the consequence that the market became greatly overstocked, and the progress of dispersion lasted nearly two years. In the meantime, the United States coal and railway strikes caused a considerable reduction in output, leaving the world's markets open to the British producers. Credit must be given, however, to the very efficient propaganda work undertaken by the Federation, which is, as Mr. Milne Watson pointed out, bearing fruit during the current year. Exports have been very satisfactory over the past six months, but the trend of prices has been downward—in fact, export quotations are in

many cases below the controlled home price, a state of affairs which must result, sooner or later, in a lowering of the latter figure.

THE NEW SOURCE OF POTASH.

New, cheap, and plentiful supplies of potassium compounds would seem to be assured if the preliminary work that has been carried out on the utilisation of the Italian mineral, leucite, affords any indication. Perhaps we are wrong in using the word "preliminary," for, as Professor Hinchley pointed out before the Chemical Engineering Group on Friday last, the mineral is already being exploited industrially in France, alum and sodium silicate being produced at costs remarkably low compared with the costs by the usual methods. The probability of alum at £4. per ton, and silicate of soda of 40° Bé. at £2. 9s. per ton, is certainly disconcerting to present British makers. It will be all to the good of both users and makers, however, if further experience proves that these low production costs can be maintained. There is evidently no danger of supplies of leucite failing for centuries, even if called upon to supply the whole of the world's demands for potash, and absolute independence of German supplies should be gained at last. That the Germans themselves realised the danger of the competition of leucite was illustrated clearly by the incident related by Professor Hinchley, to whom thanks are due for having brought so vividly the potentialities of leucite before the British chemical industry. To a mineral from which potassium salts can be produced so cheaply and which has such a high content of available potash, the freight difficulty is not serious, and production costs in this country should not be much higher than those in France. Dr. Voelcker's conclusions on the value of finely ground leucite as a fertiliser are especially interesting and rather unexpected, for work on other potash-containing minerals has not produced very encouraging results. The suitability of leucite as a raw material for chemical manufacture depends upon the non-gelatinous nature of the silica residue left after treatment with acids. Its value as a direct potash fertiliser is probably also bound up with this factor, but the exact connection is not clearly evident as yet.

THE GERMAN REPARATION DEFAULT.

Those who still believe in the honesty and sincerity of the German Government, and who ascribe the greater part of the troubles of present-day Europe to the wanton aggressiveness of French militarism, will have received something of a shock at the latest development in the German policy. The German Government has repudiated completely its agreement, made under the London Ultimatum of May, 1921, as to the 26 per cent. reparation levy on all imports of goods of German origin into Great Britain. This repudiation was made in an Ordinance dated November 15, a translation of which we print on another page. Hitherto, the British importer has paid the German exporter 74 per cent. of the invoice values of the goods shipped, the British Customs authorities retaining the remaining 26 per cent. The German exporter has then recovered his balance of payment from the German Government. The latter Government has now declared its intention of paying no more, and if the British Government continues to levy the duty, the whole of the amount will have to come out of the pocket of the British importer, as it is obvious that the German shipper will increase his prices to cover the losses occasioned by the default of his own Government. The question of the enforcement of the agreement upon the German Government is one too big to enter upon here, though the episode should prove illuminating to those who argue in favour of withdrawing force and leaving the payment of war reparations to the honour of the German people. Fortunately, the silver lining said to be possessed by every cloud is clearly revealed in this instance, for so far as British chemical manufacturers are concerned the further rise in price of German chemicals, which would seem to be an inevitable consequence of the action of the German Government, will act as a welcome measure of protection. As we pointed out a fortnight ago, general economic conditions in Germany have to a very large extent destroyed the formidable nature of her competition in the British chemical market, and German prices have in some instances risen above world prices. The additional difficulties now placed in the way of the German exporter will increase, temporarily at least, the opportunities possessed by the British manufacturer, who, we have every confidence, will take the fullest advantage of the new conditions.

EFFICIENCY IN DETAILS.

Few chemists and chemical engineers will be inclined to disagree with the contention of our contributor, Mr. C. Elliott, that too little attention is directed to the distribution part of the steam system in the average chemical works. Bare piping and leaking joints, inefficient steam traps and unsuitable valves very often represent a loss of heat or power which in the aggregate is very large. There exist, of course, many works where this state of affairs does not hold good, and where minute attention to detail has brought its reward in the shape of greatly increased efficiency. Most establishments of any magnitude have now realised the necessity of scientific supervision and instrumental control of the steam-producing units of their plants, but the equally valid argument in favour of an efficient distribution system has not been so generally recognised. Mr. Elliott's article, although dealing at some length with the less obvious aspects of boiler control, is especially valuable for the suggestions given on the erection and upkeep of the steam distribution system. Mr. Elliott is a chemical engineer who has had many years' experience in the erection and running of plant for the manufacture of fine chemicals, and all the suggestions he gives have had their value proved in actual practice. Thus, in the method of pipe fitting whereby the usual threaded pipes and T-pieces are replaced by flanged pipes and welded branches, the latter method has been demonstrated to be, in most cases, as cheap as, and much more efficient than, the former.

THE STEAM SYSTEM IN A CHEMICAL WORKS.

NEGLECTED DETAILS THAT REDUCE EFFICIENCY.

By C. Elliott, B.Sc., A.M.I.C.E.

In a chemical works more than any other class of industrial undertaking, successful operation depends very largely upon attention to detail. Whilst this is generally realised so far as the actual handling and working up of the chemical products themselves are concerned, it is surprising how many details on the engineering side of the business are given scant if any attention by the engineer or manager responsible. There seems often to be little appreciation that, though these details are individually small, yet collectively they may assume very considerable proportions and may cause considerable loss and trouble, misfortunes which might have been avoided by the exercise of a little more forethought and care.

Steam Raising and Steam Distribution.

The steam-raising plant is in many cases a very important, if not the most important, centre radiating heat and energy in all directions through suitable mains. The purpose of this article is to present the view that considering their mutual importance and interdependence, the boilers and steam mains form a complete system, every detail of which should receive careful attention and consideration. The duty of a steam system is to deliver to every part of the works where required, an adequate supply of steam at the lowest possible cost of production and maintenance, with the least capital expenditure and with the least possible loss of pressure. Boiler-houses equipped with modern labour-saving devices but with the boilers working inefficiently, and efficiently worked boilers coupled to badly designed and faulty mains should be incompatible. The steam system is too often regarded as a detail instead of a collection of many details, each capable to a varying extent of giving considerable trouble if neglected and each worthy of attention if maximum overall efficiency is desired. There is a considerable amount of truth in the paraphrase "look after the details and the works will look after itself."

Boiler-house Efficiency.

The management of a boiler house in a chemical works does not differ essentially from that in any other industrial establishment, yet it seems strange that in many cases it should be so neglected when so much attention is given to the possibilities of improving the qualities and yields of chemical products. There is some excuse where the demand for steam is small and irregular or when the cost of steam is only a small proportion of the total cost of production, but even then the possibility of effecting considerable saving by efficient methods should warrant a greater amount of interest. Even if it is too much to expect that continuous efforts be made to maintain maximum efficiency in these cases, yet it is not unreasonable to urge that even a small amount of forethought and care will make appreciable difference. Even in large plants where the cost of steam is an important factor in the total cost of production, considerable neglect is often evidenced not only in the actual running of the plant, but also in regard to such matters as insulation of naked pipes.

The subject of boiler efficiency and the methods of obtaining it have been exhaustively treated by many writers to whom it is a constant source of inspiration, but whether the many panaceas proposed have been given a fair trial and whether the disease will be ever thoroughly eradicated from our industrial system as a whole, and from chemical works in particular, is open to question. A full examination of and discussion on all the many points which arise in a consideration of the steam system is impossible in the course of one article, and attention will therefore be drawn to some salient features only, in the hope that other matters will suggest themselves.

Factors to be Considered in Buying Coal.

Fuel is of course the heaviest item of expenditure in a boiler-house, but coal—our fuel in this country—is too often purchased in the cheapest market possible quite irrespective of its calorific value and its general value for steam-raising purposes. The burning of raw coal is rather a failure on the part of modern science which has performed such marvels in other fields, but the buying of coal by weight instead of calorific value is surely adding insult to injury, and it should be considered a disgrace to burn it inefficiently. Unfortunately very few collieries will sell on a thermal basis, but this does not prevent the user from testing his coal and ascertaining how much real combustible and how much ash he is buying.

The calorific value of a coal, however, as determined by more or less elaborate methods does not give the true economic value, for there are other factors to be considered. To a considerable extent the economic value of a given coal varies with the type of boiler and the method of firing. Thus a Lancashire hand-fired boiler might not do so well as one fitted with a mechanical stoker, rocking grate and forced draught or as a water-tube boiler with a chain grate stoker. The amount of ash and its tendency to clinker also affect the efficiency, for the air spaces may get badly choked, the draught and therefore the combustion checked, while cleaning the fire may be frequent and in the case of bad clinkering very difficult. The amount of ashes and their disposal often present very expensive troubles, and the frequency with which the flues have to be cleaned is an important item. Transport and handling costs of one ton of a poor fuel are exactly the same as for a good fuel. Thus, if these items amount to x shillings per ton, then the charge per 1,000B.Th.U. is 33 per cent. higher with a 9,000B.Th.U. than a 12,000B.Th.U. coal. There is also the fact that in general the evaporative value of a coal does not vary proportionately with the calorific value determined in the laboratory, for poor coals usually give less efficient results than good ones. In many of the poorer grades of coal, the sulphur content is high and is the cause of corrosion. This point is often neglected, but it is worth while ascertaining the amount of sulphur in the coal. These and other matters should be considered in the purchase of coal, and it might be remembered that it is often possible to buy a superior coal at almost the same cost as a poorer one because of the absence of a calorific selling basis. Those who test their coal and know its true economic value are the wisest, others are only buying a black material.

Mechanical Stokers, A Word of Warning.

The installation of mechanical stokers and various furnaces does in many cases enable poor fuel to be used advantageously and good fuel to be burnt more efficiently, but unless such devices receive proper attention and skilled supervision, they may become little better than hand firing. When new or when kept in a good state of repair and particularly when they are used intelligently they are capable of very excellent work, but when neglected the results are often very bad. To take one point, the steam nozzles employed to give forced draught should be examined frequently since the holes are liable to erode and enlarge in course of time with consequent waste of steam. As a general rule such jets use 4 to 5 per cent. of the amount of steam generated by the boiler, but the consumption may reach alarming figures if the nozzles are in bad order. With some stokers the repair bill is heavy, a point that is often disregarded, but on the whole the success of any type of mechanical stoking depends in a very great degree on the user.

From a national point of view, the poorer the coal that can be used the better, for it reduces the consumption of the superior grades, leaving these latter available for more dignified and useful purposes and it checks the waste of our diminishing coal reserves. From a practical economic point of view, there is a limit where the cost of handling, cleaning, depreciation, etc., counterbalances the saving obtained by the purchase of an inferior coal.

Regular Feed-water Supply.

A boiler may be regarded as a chemical plant consisting of a continuous still working under pressure, the product being steam which should be as pure as possible, the impurity being water. For the successful working of a continuous still, it is essential that the conditions should be kept as constant as possible and in the case of a boiler the feed should be as regular and continuous as possible in order that a constant water level may be maintained. The feed to the boiler should be as hot as possible in order that fuel may be economised, and very considerable saving may be effected by the use of feed-water heaters and economisers. Further to economise fuel and also to prevent damage to the boilers, the feed should be as pure as possible since scaling lowers the transmission of heat and the plates may get overheated. The discharge from steam traps is too often allowed to run to waste but being hot, and, more especially, pure, should be returned to the boiler. Condenser water which is hot but not pure is often produced in large

quantities, and this can be used as " make up " to maintain a constant level in the hot well, as shown in Fig. I., which is

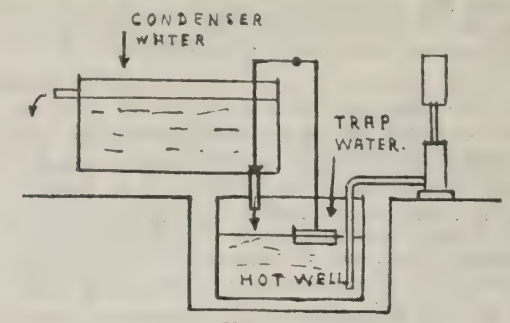


Fig. 1.

self-explanatory. The exhaust from steam engines would be valuable if it did not contain considerable amounts of oil, but it may occasionally be used after proper treatment which under certain circumstances may be worth while.

As already mentioned it is not proposed to discuss here all the many aspects of the working of boilers for maximum efficiency, but rather to point out that there are many factors and details which determine the overall and economic efficiency. Anyone who has been in charge of a boiler plant will appreciate that upkeep, depreciation, and repairs are considerable and that proper attention to all such matters is amply repaid by increased economy and safety and by reduced deterioration. The maintenance of a boiler in as clean a state as possible both externally and internally, the prevention of air, steam and heat leaks, the regularity of blowing off, the avoidance of careless slacking of ashes near the front end of a Lancashire and above the blow-cock, flue gas explosions and many other matters which will occur to the reader, are all comprised in the working of a boiler plant.

The Loss of Pressure in Steam Pipes.

Having discussed briefly some features in the boiler portion of the steam system, a few remarks will be made concerning that portion which completes the system—namely, the steam pipes. In the majority of cases the main steam pipes do receive a certain amount of care as they are usually of a permanent nature, but there are many exceptions and in the case of subsidiary lines neglect is the general rule.

The steam pipes should convey dry steam from the boilers to any point required with the minimum loss of pressure. This loss of pressure is due principally to three causes :—(1) Surface friction, which increases with the velocity of the steam ; (2) resistance due to change of direction of flow and irregular surfaces; and (3) condensation.

Concerning the first cause of loss, it is usual to consider an average velocity of 80 feet per second for ordinary low pressures decreasing to 60 feet per second for high pressures, 180 to 200lb. per sq. inch. Too high a velocity causes unnecessary frictional loss, but too low a speed causes excessive losses by radiation. Any saving in first cost due to the adoption of a high velocity and small pipes is lost by excessive friction. The second cause of loss can be minimised by careful design and the avoidance of sharp bends, elbows and so forth. The third cause can largely be counterbalanced by the insulation of all pipes, flanges, valves, steam traps and any other places where heat can escape. The amount of heat that can be lost through neglect in this respect is considerable. If the boilers are working at 60 per cent. efficiency using 12,000B.Th.U. coal and if the steam pressure is 150lb. per sq. in., one sq. foot of bare pipe will cause the burning of nearly 10cwt. of coal per year for no purpose.

In some works there are hundreds of square feet of bare surfaces, and in the aggregate the loss may be very considerable and in bad cases enormous. The writer believes in covering *every* place where there is heat leakage. Main steam pipes which would rarely be dismantled should receive permanent high-class insulation which is best supplied and applied by the makers, but purely temporary pipes, those which may be altered some time or other and many branch pipes, are just as well done by the works staff using a good insulating material which can be used over again and of which there is at least one excellent type. Neglect to insulate all bare pipes, etc., is a " penny wise pound foolish " policy.

The Use and Misuse of Superheated Steam.

In many cases superheated steam is very useful in preventing loss of pressure and in maintaining dry steam in long mains. With good practice, a continuous feed, and especially a constant water level and even firing, 98 per cent. of the " steam " from a boiler can be real steam and 2 per cent. water, but too often the amount of water is considerably greater. The water in the steam will be increasing continually the greater the distance the steam travels from the boiler, for no insulating material is perfect and condensation is always occurring. This water is usually removed by means of steam traps at suitable places, but the steam is not even then free from moisture. Superheated steam will ensure that dry steam is delivered to the mains and even a comparatively low superheat will be very useful in this respect, but loss of pressure is a matter that is often disregarded.

Although the superheating of steam has its uses in avoiding condensation, and in certain operations such as the distillation of glycerine, it should not be used to raise the temperature of steam to be used in closed steam coils and jackets of vessels when the pressure is not sufficiently high to give the desired temperature. Thus, suppose steam at 60lb. pressure and at 307° F. is not sufficient to distil a liquid with a boiling point of 320° F., and it is therefore superheated to 507° F. in the belief that since the temperature of the steam is now higher than the boiling-point of the liquid, distillation will proceed in a satisfactory manner. The distillation can be effected in this way, it is true, if economy is no object, but if economy is expected, then there is little appreciation of the properties of steam. In the case taken, for 1lb. of steam the latent heat plus the superheat is

$$898 + 0.48(507 - 307) = 994\text{B.Th.U.}$$

The temperature of this steam can only drop to, say, 327° F., somewhat higher than the temperature of the liquid, and therefore 1lb. gives up an amount of heat—

$$0.48(507 - 327) = 86.4\text{B.Th.U.}$$

No more heat can be given up, so it is impossible to extract the latent heat, and the steam leaves with an amount of heat—

$$994 - 86.4 = 907.6\text{B.Th.U.},$$

neglecting the heat of the water which is not available. The amount of heat usefully employed is therefore only about 8½ per cent. of what is available under other circumstances.

On the other hand, 1lb. of dry saturated steam at 122lb. pressure and at its normal temperature of 322° F. will give up its latent heat of 866B.Th.U.s, so that the steam consumption is one-tenth of that used in the first case. A case came under the writer's knowledge where two stills were worked using steam superheated in an independently-fired superheater, the saturated steam being supplied from a range of boilers working under a pressure which was too low for distillation purposes. By substituting a small vertical boiler at a higher pressure, one of the larger boilers was closed down. In other cases where this difficulty arises, it may be possible to reduce the boiling point of the liquid by applying vacuum or to use oil heating, and it is also possible to use superheated steam in the coils and to have an economical system by using the steam after it has left the still for other purposes, such as heating or boiling or even driving a steam engine.

Lay-out and Details of Mains.

The lay-out and design of steam mains and branch pipes are worthy of the greatest care, both for the sake of economy and of safety. Obviously, the main steam pipe should run so that the length of the individual branch pipes is a minimum and so that as far as possible each building supplied is independent of any other for its steam supply. It is also advisable to divide the main into sections by valves, as this not only facilitates repairs and alterations, but avoids having steam in the whole range unnecessarily. Steam pipes should slope in the same direction as the flow of the steam, a minimum gradient being 1 inch in 40 feet. Water cannot flow against the hurricane of steam moving at 40 to 50 miles an hour. If the steam main must rise as it gets further from the boilers, vertical lengths should be used to give this rise and care should be taken that a steam trap is installed at the lower end of each slope. Globe valves are commonly used in mains, but full-bore valves of the Hopkinson-Ferranti type are preferable, for they prevent the tortuous passage of steam which occurs in a globe valve and the loss of energy is negligible. If, however, globe valves are used they should be fixed with the spindle horizontal and not vertical, for if vertical the water can accumulate in the pipe up to the level of the valve seat unless a steam trap is put before the valve, a precaution which should be taken with all important valves no matter what the type

or position of the spindle. It is almost unnecessary to add that there is a wrong way and a right way for fixing a globe valve, that the screw spindle should be outside so that it can be seen and oiled and that renewable valve seats are a *sine qua non*.

Branch and Subsidiary Pipes.

Although a reasonable amount of care is probably taken with the steam mains, in the case of subsidiary pipes, the matter is frequently left to the discretion and care of the erector and very inefficient work is often the result. The steam mains would in most cases be of welded steel pipes made by a reputable firm, but branch pipes would be composed of pipe lengths and standard fittings, the chief advantage being that erection is facilitated since only straight pipes need be cut and occasionally bent, the fittings being supplied ready for use by the makers. On the other hand, the use of such fittings necessitates a large number of joints each of which is a potential leak, and stopping such leaks when they occur is often a trouble and entails either caulking, which spoils the thread, or remaking the joint, which entails dismantling. Rearrangement of plant or additions mean fresh connections to existing pipes and again dismantling to insert T's, valves, etc. It is also necessary to keep an adequate stock of standard fittings in the stores, and quite a considerable amount of money can be locked up in this way. Even if supplies are easily accessible from outside sources, the sudden exhaustion of simple fittings may mean the loss of valuable time while they are being obtained, and a fitter looking for another job or, more likely, "scowing."

An Improved Method of Pipe Fitting.

Le us consider in detail a pipe line with the usual standard fittings as shown in Fig. 2, which illustrates a subsidiary branch pipe for steam to the jackets of three vessels. A box for connecting the ends of two pipes involves 2 joints

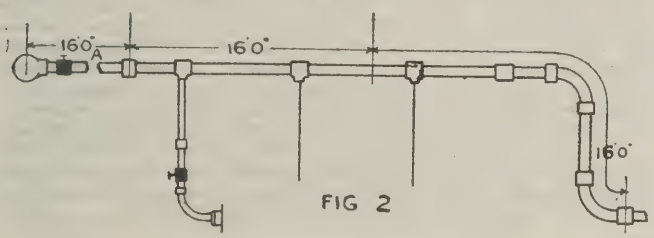


FIG 2

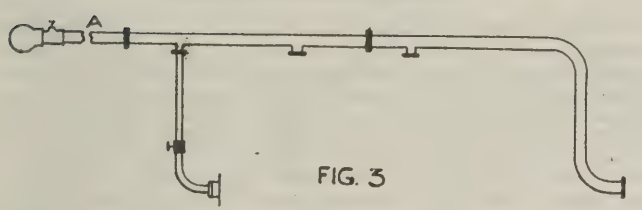


FIG. 3

and possibly 2 threads to screw on the pipe ends, a T means 3 joints and 3 threads, a bend 4 joints (two boxes are needed) and two threads, an elbow 2 joints and 2 threads, while a "longscrew" or "running joint" means one box, 2 threads and 2 joints. Longscrews are very apt to leak as there is no "vanishing" thread to enable the box to make a good joint and the locknut joint is often at fault. In Fig. 2 the total number of joints as shown is fifty, all of which may leak at some time or other. Many screwed joints will last for years without giving any trouble while some will leak very soon after they have been made, and unfortunately it is only after the pipes are connected up that the leaks show themselves.

The making of a good joint is so much at the mercy of the erector that there is no certainty that it is right. This is often not so much the fault of the erector as the difficulty often experienced of getting the she-thread started on to the he-thread due to the pipes not being in perfect alignment or to burrs on the thread, or again to faulty screwing of the pipe end. If through faulty work there is a dip in the pipes, water will collect there and the steam may hurl this along the pipe and probably provide another lot of joints to remake or repair. A pipe which is trying to look skywards is never a pleasant sight, though insulation covers up many such faults.

To insert a T in pipe A means cutting the pipe, inserting the T and also another running thread or longscrew fitting in order to connect up again. There is thus a further increase in the number of joints to 55. The insulation has to be removed and put back again (unless this is regarded as a detail and left undone), while "ten to one" some of the other joints in the pipeline are disturbed and leak sooner or later. Another way to insert the T would be to work back from long thread B which is, of course, worse, entailing more dismantling, remaking of joints, recovering with insulation and loss of time.

Threaded Joints Replaced by Flanged Joints.

If, however, threaded joints are avoided as far as possible for one-inch sizes and upwards and a welding plant and pipe bending machine are available or are purchased, an arrangement such as is shown in Fig. 3 is possible. Here are three lengths of pipe connected by flanges and with welded branches, the bends being eliminated by bending the pipe itself. The total number of joints in this case is 17 or a reduction of 66 per cent. on those in the alternative arrangement. To insert a T in A means taking down one length, uncovering the insulation at the desired spot only, welding in the branch and then slipping the pipe back again. Obviously time is saved and if still greater speed is required, a new pipe with a branch can be prepared and inserted in a very short space of time.

There is of course nothing new in this which is merely the application of everyday principles for the elimination of pipe joints, but in the writer's opinion and experience, there are many advantages. A flange that leaks is easily remade or may only need tightening up, whereas to tighten up a screw joint at one spot slackens another joint or joints somewhere else. With caulking the remedy is often worse than the disease. The preliminary measurements made by a fitter before an alteration, are exact with flanged joints since the flanges are visible, whereas mistakes are possible with threaded joints as the pipe ends are hidden.

Where the New System is Cheaper and Better.

Two flanges and bolts are dearer than one box (or socket), one or two of these being usually supplied (and charged for) with each pipe length to preserve the threads of the screwed ends. But taking a long view there is not so much in it as would appear at first sight. The flanges can be plain circles with a hole for the pipe and are therefore cheaper than the usual standard flanges which are screwed and have bosses. The pipes need no threads, simply plain ends and can be handled roughly as there are no threads to be damaged. There is always an allowance of about 4 per cent. on the net price of pipe lengths which have no sockets or threads. All the flanges can be drilled standard when they arrive, and each pipe length would have a flange added at one end when it is received. The cost of fittings such as T.s, bends, etc., are high compared with those made by welding and bending, especially in the larger sizes and there can be considerable saving in this way in addition to absence of leaks and ease of erection to say nothing of the reduction of the stocks of some fittings and the total elimination of others. For example a 3in. to 2in. T costing 11s. can be replaced by a flange and a small piece of pipe, probably otherwise waste, which would cost much less. When old pipes are taken down and cut to shorter lengths for another job, one end would be reserved for a branch in another pipe.

There are a great many other details which must be considered if the system is to be of service, such as the routine work in the welders' shop, special fittings, little "gadgets" to ensure speed and accuracy and so forth, but these cannot be entered into here. These will probably occur to the reader if he has been through the mill of apprenticeship in an engineering shop. The system is not a universal panacea and does not entirely replace screwed fittings, for it is not so useful for small pipes, although the writer has used welding in some cases for ¼in pipes, but bending in the cold and in the hot can be extensively employed. The idea has been successfully employed in some large plants, threaded joints being almost entirely excluded, not only for steam, but for compressed air, vacuum, and liquids. Carried to its logical conclusion welding plus bending means that only plain straight pipes and flanges need be bought, but it is probably better in most cases to run the two types of pipe lines together. To instal the system requires the co-operation of the foremen and fitters who have in a great measure to change their usual conception of pipe lines. Where very great speed is essential in erection work, say to meet a very urgent demand for a product, pipe

fittings are more suitable, but for ordinary work they can be largely cut out.

It might be mentioned incidentally that a portable welding plant is an exceedingly useful appliance in a chemical works and when the user gets accustomed to it, he wonders how he managed to do without it. For cutting girders, steel plates, repairing pin holes in coils and innumerable repair jobs it is a valuable and speedy aid.

The Importance of Steam Traps.

One of the chief causes of leaks is the presence of water in the steam pipes, and the resulting water-hammer effect set up may also be very dangerous. In view of their importance and utility steam traps are worthy of considerable care which they do not always receive. Expansion traps are useful under certain conditions, but for general purposes it is usually agreed that the float type is preferable. One finds that traps are very often too small for their work, that they and their drain pipes are not covered with insulating material, that they are rarely fitted with dirt interceptors and unfortunately they are in many cases only repaired when they are blowing through badly and sometimes not even then. A common omission is a valve between the steam main and the trap to allow of the latter being changed without closing down the main, while it is always advisable to let a trap blow through occasionally by using the attachment usually supplied. It is dangerous to have a defective steam trap on a main, while on coils and jackets it hinders the steam from doing useful work.

The value of the discharge from steam traps for boiler-feed purposes has already been mentioned, but it is not always recognised that when discharging there is a loss of water due to self-evaporation. Thus 1lb. of drain water under 160lb. pressure is at 370° F., and contains 163 units of heat more than it does at 212° F. When released from the trap, the pressure falls to atmospheric and the temperature to 212° F., resulting in the evaporation of 16 per cent. of the water. The addition of a few feet of pipe to the discharge enables this steam to be condensed, and this increases the amount of pure water for the boiler-feed.

A Plea for the Standardisation of Small Valves.

In a fairly large works, the number of valves can assume very great dimensions, but often very little attempt is made to see that they are all the same type. They are bought with no specification, just so many 1-inch valves and so forth, while only too often the pleadings of a traveller are so effective that an order is given on the strength of a few minutes conversation. On the arrival of the valves they go to the stores and are used in various places in the works. Their very existence is forgotten, and in a short time neither their source nor their good or bad qualities can be discovered. In the writer's opinion it is far better to obtain sample valves, several of each size, and thoroughly to test them in actual practice and after careful consideration of their relative merits in every way including cost, to adopt one type or a few types as standard. Even a good valve is not everlasting, but its life can be considerably longer if it has a renewable seat and if there are certain standards, the number of valves and seats kept in stock can be a minimum.

If, say, one type is adopted for high-pressure steam and another for low pressures, the latter can be a cheaper valve and, moreover, can be used for water, vacuum or compressed air. With the exception of the full-bore valves previously mentioned for use on steam mains, the writer has never found a satisfactory valve of this type for small sizes. Again, the thread of screw-ended valves never makes quite the same joint when it is used again; it gets slack and is apt to leak. In many cases it pays to have flanged valves, but as these are dear, a nipple and flange at each end is cheaper and satisfactory. A cemented joint can be used for the thread of the nipple in the valve and in the flange which, when set, is impregnable against leaks. The distance over all flanges can be kept exactly the same as the standard flanged valve of the same size.

There are a considerable number of other details about steam systems that can be standardised to great advantage, such as safety valves on low-pressure mains where the steam is supplied through reducing valves, the reducing valves themselves, pressure gauges, steam traps, etc., and in many cases these standard articles can be used on chemical plant, so that there is only one type of a fitting or valve in the whole works. It might be added that it is advisable to ascertain that the supply of the standard article is not likely to fail and that the articles as received are standardised in themselves.

Final General Considerations.

These considerations on the steam system could be expanded enormously, and there are many points that have been omitted altogether in the foregoing, but this article is intended to be mainly suggestive, for generally the prevailing circumstances must be considered and what is suitable for one works may not be satisfactory in another. Most of the points mentioned should be common knowledge, but are apparently forgotten or not fully appreciated in many cases. It is surprising how many firms know practically nothing about the cost of the steam that they are making, and how few realise what economies are possible in fuel and maintenance by a little forethought in the design and care in the supervision. The annoyance caused by small details can be vastly reduced by studying them in turn, and by standardising as far as possible both the methods employed and the articles themselves. It takes time and a certain amount of trouble to do so, but in the end there comes a smoothness of working and an overall economy which is a source of satisfaction. In a steam system, if the details are reduced to their "least common denominator" as it were, more attention can be devoted to the important matters of boiler efficiency, etc., by both manager and staff. If supervision is methodical, and of a routine kind, so much the better.

ITALIAN LEUCITE.

A PROMISING NEW RAW MATERIAL FOR CHEMICAL MANUFACTURE.

THE Chemical Engineering Group of the Society of Chemical Industry held its first meeting of the session at the Chemical Industry Club, London, on Friday, November 16. Mr. J. Arthur Reavell (Chairman of the Group) presided, and Professor J. W. Hinchley gave a talk on the possibilities of leucite, a material obtained from the lava deposits in Italy, as a source of potash. Professor Hinchley was only able to deal in a more or less cursory manner with the chemical aspects, but has promised a complete paper, dealing more in detail with these, and also with the chemical engineering side, at a later date. The importance of these deposits impressed itself very much upon those present, and Professor Hinchley referred to the subject as one in which the British public ought to take an interest.

A Ready Source of Potash.

Professor Hinchley said the total world output of potash was probably in the neighbourhood of one million metric tons per annum, and, having regard to the large proportion of this which was still produced by Germany, it was necessary that we should find as many other sources as possible. The igneous rocks of the earth's crust contained approximately 3 per cent. of potash, but unfortunately a large number are not very amenable to industrial application. In Italy, however, there is a source of potash, the mineral leucite, which is amenable and occurs in such quantities that the world's demands for many centuries can be met. Henry Washington has estimated that the lavas of Italy contain as much as 8,786 million metric tons of K_2O, a considerable proportion of which is capable of being utilised at a reasonable cost of production. Personally, Professor Hinchley believes that supplies to meet the world's demands for potash over a period of 500 years are at present available and visible in these lavas at a cost not greater than that of the potash obtained from the Stassfurt deposits.

Pure leucite contains 21.5 per cent. potash, 23.5 per cent. alumina, and 55 per cent. silica. The particular district of Italy with which Professor Hinchley dealt was the Rocca Monfina district, from which it will be easily possible, by means of a telpher system, to load ships at the coast, 12 miles away, so that the problem of shipping in 5,000-ton lots to this country will not be a difficult one. The mineral is crushed and is separated electro-magnetically at a very low cost. When crushed into a fine powder it is useful for many purposes. Dr. Voelcker, for instance, has been experimenting with it for a year or two as a fertiliser, and has found that powdered leucite is practically equivalent to soluble potash of the same composition for this purpose. Leucite, in a powdered form, is also useful for water softening, and it should be able to find a very large market.

Manufacture of Potash Alum from Leucite.

The exploitation of Italian leucite is due largely to an Italian, Baron Blanc, who, during the war, developed the potash industry in Italy, and the Societa Italiana Potassa is now in operation, the potash recovered being used in Italy very largely for agricultural purposes. One of the important features of granular leucite, is the fact that it can be dissolved in acids without obtaining the gelatinous silica which is the bugbear in dissolving ordinary silicates. Therefore, in any process of treating leucite on a commercial scale it must be handled in the granular form—and there is no difficulty about this,—leaving the powdered form available for agriculture. Probably the first process which could be applied commercially to leucite is the simple one of treating it with sulphuric acid, which has practically no vapour tension, and is easy to handle. By this means one obtains potash alum without any residue, and a plant for producing alum in this way is actually at work at Pierre Beniti, near Lyons, in France. From 4 tons of leucite it is possible to obtain 6 tons of alum, and Professor Hinchley understands that the cost of the production of alum in that particular plant is only 31 cents per kilo, or a little over £4. per ton. The sulphuric acid costs 18 cents per gallon in that district.

For the manufacture of the alum, a granular bed of leucite is placed in a suitable vessel, and treated with mother liquors from a previous operation, and these mother liquors are continually enriched with sulphuric acid whilst combination takes place. After two hours or so, the action becomes vigorous, and the whole of the potash has gone into solution, the bed of leucite remaining almost exactly the same volume as before, and consisting of a skeleton structure of silica. The temperature of the mother liquors rises to 90° C., and the volume of the charge can be so arranged that the liquor is saturated at about 70° to 80° C. The liquor is then withdrawn, and cooled down to 20° C., and the whole of the alum that has been formed by the attack of the acid is deposited as crystals. The amount of iron in the leucite is not very great, and it is possible to get very pure crystals of alum without resorting to any method of removing the iron.

Sodium Silicate from the Silica Residues.

Apparatus for the removal of the silica can be made in many different ways, and there is no difficulty in removing it by manual labour, but there is a simple method of removing such granular materials, which Professor Hinchley wondered was not used more in chemical works. This consists of an ordinary ejector connected to a steam pipe. The silica contains a large proportion of gangue, and it has been proposed to pass the material through rubber rollers, to dry it, and blow a current of air through it, and in that way the whole of the silica can be removed, leaving behind the larger particles of original gangue. The weight of silica which remains behind generally contains about 5 per cent. of gangue. The silica obtained has two molecules of water, after drying at 100°, and has interesting characteristics, the most important of which is that it is capable of being attacked at once by caustic soda or caustic potash, even when very dilute, with the formation of sodium silicate. The caustic soda is placed in a vessel provided with an agitator, and the silica is added slowly, while stirring. Since the action is exothermic, the temperature rises considerably, and there is no difficulty in producing a hot solution, which can be allowed to stand a short time for the separation of any gangue, if the crude silica residue has been used. This can be passed through a filter press, and an absolutely colourless, clear and transparent solution of sodium silicate is obtained, a very much purer material than that very often sent out. The cost of sodium silicate made at the Pierre Beniti works is 18 cents per kilo, or £2 9s. per ton, 40° Beaumé, 1.38 specific gravity.

Hydrochloric-acid Treatment a Pressing Chemical Engineering Problem.

The next process, which is not at work at the moment, but has been at work at Cengio, in Northern Savoy, is the hydrochloric-acid treatment, and on this point Professor Hinchley said that he looked upon treatment with hydrochloric acid as one of the problems that chemical engineers ought to get their noses down to. He did not know of a more wasteful method of handling hydrochloric acid and more unsatisfactory chemical engineering than can be found in our general methods of treatment with hydrochloric acid. At the same time, the problem is not a difficult one if we really make up our minds to solve it. The hydrochloric-acid process, which has been at work at Cengio, is due to Baron Blanc and Felix Jourdan, and by this process it has been possible to get practically pure potassium chloride, pure hydrated aluminium chloride, or, alternatively, hydrated aluminium oxide and silica. The plant consists of a short stoneware tower, in which the leucite is placed, and the solution is circulated continuously. As in the alum case, it is possible to work the process with mother liquors, so that, during the cooling stage, the temperature rises in the same way to 90° C., and, the whole of the potassium obtained by the action of the acid on the leucite could be crystallised out. The potassium chloride precipitated is generally yellowish in colour, but, by washing with washing waters from previous operations, it can be got as a white potassium chloride, as is the case at Pierre Beniti.

Hydrated Aluminium Chloride from Leucite.

The mother liquors contain iron, and it might be assumed that the liquor will get stronger, but Professor Hinchley said such was not the case. The first operation removed about the same amount of iron as was added by the addition of the leucite, and by care in this direction it is possible to use the method of passing the aluminium, before precipitation, through a bed of leucite, which is a cheap material, and in that way get rid of the iron entirely, and obtain a perfectly white precipitate of aluminium chloride. This aluminium chloride contains water, so that it cannot be used for the purposes where anhydrous aluminium chloride is required, but it can be used as a mordant. The material is pure, and it should be remembered that in its production no filter press has been used.

In treating one ton of leucite, 619,000 calories of heat are given out, and this has to be dissipated to a large extent, or it may be used for heating wash waters, but, in treating aluminium chloride, which requires heat, 139,000 calories are applied for the purpose.

Professor Hinchley believes that, once we get familiar with leucite, it will be applied in many processes not thought of to-day He himself could see the ammonia process actually being affected by the introduction of this material. For instance, after treating powdered leucite in an autoclave at about 200lb., and washing with caustic lime, 95 per cent. of the potash in the leucite is converted into caustic potash, and, after two treatments, a 12 per cent. solution of caustic potash is obtained, which, on evaporation, gives the caustic potash of commerce. This process is not at work on a commercial scale, to his knowledge. With regard to the handling of hydrochloric acid in these plants, he believed there was a new material made in this country which could replace earthenware for this type of plant. It was a rubber composition, and he hoped that when next he dealt with the subject he would get the person responsible for this material to read a paper on it before the Chemical Engineering Group.

Hydrochloric-acid Resisting Plant.

Dr. W. R. Ormandy said a material had been developed in Switzerland which had proved particularly useful in the conversion of wood cellulose into glucose by means of warm, fuming hydrochloric acid. This material would stand the action of concentrated fuming hydrochloric acid up to 60° C., and plant had been produced for using a saturated solution of hydrochloric acid in large quantities, the loss in each operation being under 7½ per cent., the whole of this loss being accounted for by the combination of the chlorine with certain by-products. If the people responsible for the operations in Italy could find a means for cheaply converting the hydrated aluminium chloride into anhydrous aluminium chloride, it would be of the greatest possible importance in relation to the refining and cracking of oils.

Dr. Voelcker on Leucite as a Fertiliser.

Dr. Voelcker said he did not hesitate to say that there is a big future for this new material He himself had been interested in it from the agricultural point of view. For a long time attempts had been made to ascertain where cheap supplies of soil-assimilable potash could be obtained from granites and other volcanic rocks, and agriculturists had endeavoured to find out whether there was any benefit in using these materials either finely ground, or after suitable treatment. Hitherto they had failed. He himself had tried many of these for many years at his own experimental place at Woburn, but had hitherto failed. He was inclined to believe, from his own experiments, that there would be considerable advantage in the use of certain silicates, because he had found a considerable benefit from the use of calcium silicate, and he had also found that the addition of burnt lime to the silica results, in many cases, in the partial

formation of silicates of lime in the soil, which is a material which possesses distinct fertilising value. He was now in his third year of his experiments with leucite. Comparative experiments with sulphate of potash were made on pot cultures of wheat and in the field with mangolds and potatoes. There was not very much difference in the results as between the two fertilisers. This year he had started a much wider series, and was enlisting the help of outside agriculturists for experiments on a field scale.

How the Germans Tried to Stop Developments.

Professor Hinchley, replying to the discussion, said he believed that the deposits in the Rocca Monfina district would last for 100 years, work as hard as we liked upon them. For many years before the war the Germans were watching these deposits very carefully, and the slightest move that took place towards their development they were prepared to checkmate. Baron Blanc sent samples of this material to a large firm in Germany who understood electro-magnetic separation, probably, as well as anybody in the world, and this firm reported that it was impossible to separate it electromagnetically. Fortunately, Baron Blanc did not believe them. If he had, nothing further would have been done, and the German potash syndicate would have been quite satisfied. The cost of the production of finely-comminuted leucite for agricultural purposes was half the cost of kainite or sylvinite.

INSTITUTION OF CHEMICAL ENGINEERS.

DISCUSSION ON THE ABSORPTION TOWER.

A MEETING of the Institution of Chemical Engineers was held at the Engineers' Club, Coventry Street, Piccadilly, W. 1, on Wednesday, November 14, Sir Arthur Duckham, the president, in the chair. Two papers were presented for discussion. These were: "A Study of the Absorption Tower," by M. B. Donald (Associate member) and C. W. Tyson; and "A Study of the Conditions of Constant Rate of Flow in Filter Presses," by M. B. Donald and R. D. Hunneman. The meeting was preceded by an informal dinner, attended by members and their friends.

The President said the Council of the Institution had not yet had an opportunity of completing arrangements for the future meetings, except, of course, that there would be a formal annual meeting next year.

Mr. Donald then read the paper on "A Study of the Absorption Tower." (See the *Chemical Trade Journal and Chemical Engineer*, November 17, p. 577).

Professor J. W. Hinchley (Hon. Secretary) asked Mr. Donald if he would say whether, in speaking of the velocity of gas relative to the tower in feet per second, he was taking into account the volume occupied by the spiral tiles and the coke packing. Mr. Donald replied that he was.

The President referred to the statement in the paper that the curves obtained confirmed some previous results by M. S. Salomon and W. S. Brackett, who worked on a similar tower filled with 3-in. tiles and with a concentration of SO_2 in the gas of about 18 per cent., and showed that the velocity of the gas produced a maximum effect at about 12ft. per second, and asked how far that figure could be taken with other gases. Did it vary considerably? If they were taking, say, CO_2 absorption, what was the variation, because that figure of 12ft. per second was a very useful one; it was useful technically, and was a very practical one to use.

Effect of Gas Velocity on the Partial Pressure.

Professor Williams said in the early part of the paper, Mr. Donald had drawn a distinction between Professor Donnan's results and his own, and had pointed out that there was a difference in concentration and a difference in partial pressure; but later on, in deriving his equations, he had said quite definitely that he had calculated his partial pressures on the assumption that Henry's law held over the range he was considering. He (Professor Williams) thought that was the whole point of disagreeing with Professor Donnan, that Henry's law did not hold with the conditions under which Mr. Donald was working. Then there was the point as to increase of "ka" with velocity. Again, if the velocity were increased, this would have an effect on the percentage of SO_2 in the exit gases, and Mr. Donald had not dealt with that. If the velocity were increased, the partial pressure of SO_2 with the exit gas would be considerably higher than with lower velocity. Therefore, they could not ascribe all the increase in the absorption coefficient to the increased velocity of the gas over the liquid. Then there was another point, with regard to the liquid film and the gaseous film. They had coke, spiral tube packing, and a plain water surface, and were comparing the coefficient of absorption in those three for given velocities of gas relative to the tower. It seemed to him that, by passing water over the three packings, they were bringing in another factor—namely, the effect of the surfaces over which the water was passing, on the turbulence of the liquid. He supposed that the same rate of water flow was used throughout.

Mr. Donald said it was, except in the case of the last of the three.

Professor Williams said that, even supposing that the rate of water flow was the same throughout, they would have very different liquid film conditions in passing over the three packings, and for that reason he did not think they could compare entirely the absorption coefficient against the velocity basis through the tower.

Mr. T. C. Finlayson asked whether Mr. Donald had, in his use of the word "absorption," differentiated between absorption in the sense of true solution, and absorption when chemical interaction took place between the gas and the liquid. The rates of solution of gases varied very considerably in different solvents, and therefore, with one solution they might have to allow longer time and different velocities of everything than if they were using another solution. Recently, some people in America who had been studying the absorption of gases in solution, had found that not only did the suitable velocity of the gas come in, but there was also a maximum or optimum value for the velocity of the solution through the gas. Taking a constant velocity of gas, they could then speed up the velocity of the solution, and obtain a maximum from the point of view of the velocity of the solution. He would like to know whether that also came into the fundamental study of the absorption tower.

Other Factors to be Considered.

Mr. Norman Swindin, speaking of the flow of gases in pipes and the heat transfer, said that the relation between the velocity of the turbulent flow and the streamline flow is 0.5. The relation between the average velocity and the film in turbulent flow is 0.84, which had resulted from the researches of Stamford. In recent work on heat transfer the same factors held good for the effect of the variation of temperature on the conductivity of heat, and velocity. Mr. Donald had mentioned only three factors affecting the rate of transfer across a tube, but there were a lot more—about 10. First, there were the gases, then the interface, then the film, another interface, the metal, another interface, film, another interface, and so on. All of them ought to be thoroughly studied before there was any attempt to give a formula, and then only for a pipe in which the heat could not flow laterally down the tube—a pipe made of glass or asbestos, or something of that sort, and not metal.

Mr. J. H. West said absorption towers could vary from a rain of drops of liquid down through the gas to bubbles of gas passing up through a solid column of liquid, and the packed tower was a sort of intermediate between the two. There was the possibility, where they had a rain of drops of liquid through a gas, that the outer surface of the spheres of liquid would become saturated with the gas, and the diffusion from the unsaturated middle of the drops—between the middle unsaturated part of the drops and the outside saturated surface of the drops—would be very much slower than the corresponding diffusion of the bubble of gas passing up through the liquid. As soon as the outside of the bubble became saturated, the diffusion through the middle would become very rapid. That, in the ordinary packed tower, might not be important, but it seemed to him to be a factor in the problem.

Relation of Vapour Pressure to Rate of Absorption.

Professor J. W. Hinchley said he would like to mention Professor Williams's question as to the difference between Donnan and Masson's ideas with regard to the measure of the force tending to bring a gas into solution, being a measure of the concentration or of the vapour pressure. In a case where a substance obeyed Henry's law, the concentration might be taken as a measure of the pressure. He believed that was a point which everybody, in discussing absorption towers, had not taken into consideration up to the present. He believed that, starting with low velocities,

there were a lot of things occurring, and continuing to occur, as the velocity rose—the velocity of the gas particularly—to the point where the effects disappeared; they disappeared at different points, according to the velocity and the temperature of the gases they were working with. Although the rate of transfer, say, of the gas to the liquid was proportional to the vapour pressure, that would only be true when a certain velocity was exceeded. Below that particular velocity, which was a definite one, that would not be quite correct, on account of the difference in densities of the gas itself and the admixed gas. With a pure gas he believed it would be quite true, but with a gas which contained air and an admixed gas or two, and where they were absorbing one constituent, he believed it would not be true at low pressures that the rate of passage of the gas into the liquid would be exactly proportional to the vapour pressure.

Mr. Donald's Reply.

Mr. Donald, in reply, said, with regard to the velocity of the gas producing a maximum effect of about 12ft. per second, he had merely put that in because he had thought it rather confirmed the results he and his co-author had got, both with the spiral tower and the coke-packed tower. With regard to the remarks of Professor Williams, he (Mr. Donald) did not think that the variation from Henry's law in the case of SO_2 would make a great difference in the logarithmic mean. Professor Williams had said that the increased velocity gave a greater pressure driving force than a lower velocity, due to the fact that there was more SO_2. "Ka" included driving pressure, so that they automatically ruled out driving pressure when applying "ka." "Ka" was in lb. SO_2/min/mm. Hg. pressure, and he had allowed for that increased pressure by including it in "ka."

He admitted that the packing had an effect on the turbulence of the liquor. This also replied to a question asked by another speaker, as to how much was due to "k" and how much was due to "a." It would be seen from the paper that for each packing and each spray the authors had calculated approximately—as far as they could, at any rate—the area of surface exposed. It would be found that a certain amount of it was due to the increased area, but that did not account for all of it.

As regards chemical action or true solution, he did not think chemical action would bother them very much. He did not mind how the SO_2 was in the solution; all he wanted to know was what the vapour pressure of SO_2 was over that solution. With regard to different solutions affecting the rate of transfer, that came under the same heading. The other factors mentioned, which he had not been able to put on as complete a basis as he would have liked to do; would probably have an effect; but that was for future experiment. Mr. Finlayson had quoted something about work done in the States. As regards the effect of velocity on heat transfer, he believed that had been very well cleared up by some work by Macadams and Cross. Reference had been made by Professor Hinchley as to the effects of low pressure, but he (Mr. Donald) and his co-author had done no work on that.

THE PROBLEM OF CITY WATER SUPPLIES.

TREATMENT METHODS ADOPTED BY LIVERPOOL.

THE 1923-4 session of the Liverpool Section of the Society of Chemical Industry was opened on Friday evening last at the new quarters—namely, the Overseas League, 14, Elliot-street, Liverpool, Dr. E. F. Armstrong, F.R.S., president of the Society, presiding. A trustee of the Hurter Memorial Fund having to be elected, Dr. J. T. Conroy was adopted.

Mr. Edwin Thompson, C.C., chairman of the Liverpool Section of the Society, said the next meeting would be a symposium on: "The Society of Chemical Industry and What it Stands for." Having been for some years associated with the Water Committee of the City of Liverpool, and more particularly with the Water Estate, he chose "Our Water Supplies" as the subject for that evening's paper.

Drawbacks of Rapid Filtration.

There were three chief ways of purifying water—namely, filtration, storage, and sterilisation. The slow sand filtration was the one most commonly used, and it had really never been surpassed. There were many styles of rapid mechanical filters, but they did not give first-class bacteriological results. With nearly all rapid filters a coagulant, usually aluminium sulphate, was used. The output of a rapid filter was about 150 to 200 gallons per sq. ft. per hour. Liverpool obtained most of its water from Lake Vyrnwy and all of the water passed through slow, sand filter beds at Oswestry. They were fortunate in not having to sterilise their water, and in having an abundant supply of exceedingly soft and remarkably pure water.

Sterilisation by Chlorination.

The best method of sterilisation was by chlorination. Sir Alexander Houston, one of the pioneers of the process, showed that the addition of 15lb. of chloride of lime to 1,000,000 gallons of Thames water, destroyed the microbes derived from previous sewage contamination far more effectually than passing the water through a reservoir containing 88 days' supply. It was usual now, however, when the water had to be sterilised, to use chlorine gas. One to two parts in 5,000,000 had been found sufficient to sterilise the water completely in an hour or so. When chlorinating water, taste was one of the main things to be avoided. The chlorinous taste usually occurred through over-chlorinating, and the iodoform taste through not chlorinating sufficiently. The latter could be removed by potassium permanganate in doses of 2 to 8lb. per 1,000,000 gallons. The most certain way to overcome the taste trouble was to super-chlorinate and then to dechlorinate with sulphurous acid. This was, however, an expensive method, unless it was absolutely necessary.

London's Water Supplies.

The sources of water supply for Glasgow, Manchester, Birmingham and London, were next referred to, the distances the water was brought being stated. The supply of water from London came from the rivers Thames and Lee, and from a great number of wells. In round figures the average daily supply to water London was 250,000,000 gallons. It required 274 engines of 43,417H.P. for the collection and distribution of this water, through 6,577 miles of pipes. When the Thames was in high flood, the chlorination treatment was discontinued temporarily and Staines reservoir water was used instead, but as this water had been stored for 6 to 9 months, it was in a very high state of purity. One advantage of storage was that it had quite an appreciable softening effect on water.

It was interesting to note the difference in the consumption of water per head in this country and in America. Here, we used from 30 to 40 gallons per head, per day, whereas, in America it was anything from 150 to 200 gallons per head, per day. Few water undertakings in this country had a large margin over their requirements, and he anticipated that in 10 or 12 years' time the consumption per head in this country will be materially increased, and that many water engineers will be faced with a difficult problem.

Difficulties Due to Suspended Solids.

Suspended solids in water added greatly to problems of filtration. Sea gulls were frequently a great trial to those in charge of reservoirs. The growth of plant and animal life; sponges, polyzoa, and mollusca in endless variety might get into the storage reservoirs and block the mains to an alarming extent. Fresh water mussels might suddenly appear, and minute crustaceans might appear in overwhelming quantities. Algæ, diatoms and many floating plankton forms of life were mentioned as other common sources of trouble, and methods of treatment to remove them were spoken of.

The Liverpool Supply System.

Mr. Thompson then next described the Lake Vyrnwy water supply system, illustrating his subject from this point by photographic views, maps, and diagrams. The entire watershed has an area of 123,150 acres. The lake is nearly 5 miles long and half-a-mile wide. The length of the dam from rock-face to rock-face is 1,172ft. The height from the river bed to the overflow is 84ft., and the greatest height of the dam from the foundation to the coping of the parapet wall, 161ft. The width of the base is 127ft. The water travels 18 miles to Oswestry, where there are 12 sand filter beds. It then travels another 60 miles to Liverpool.

CANADIAN PULP INDUSTRY.—The Quebec Government are to offer valuable timber limits on the Manicouagan River and its tributaries adjacent to water power for sale by auction. The successful bidder must erect a pulp mill within five years within eight miles of one of the 22 large towns and cities in the Province.

SULPHATE OF AMMONIA FEDERATION.

THIRD ANNUAL GENERAL MEETING.

THE third annual general meeting of the British Sulphate of Ammonia Federation, Ltd., was held on the 15th inst., Mr. D. Milne Watson, chairman of the company, presiding.

The Chairman said: In spite of the political troubles on the Continent, the average price for last year (June 1, 1922, to May 31, 1923) was about ten per cent. higher than for the preceding year. We are still suffering from high costs of production, and, in particular, from the high price of sulphuric acid. Before the war sulphuric acid could be bought at 25s. per ton. The very lowest price at which acid is now being sold, as far as I am aware, is 55s. per ton—120 per cent. more than the pre-war figure. Most of you, however, are still paying 60s. per ton—140 per cent. more, and many large consumers are still being asked 80s. per ton in some districts.

Increased Volume of Trade.

Our production last year was about 50 per cent. larger than for 1921-22. Our total exports show a gain of 58 per cent., and home deliveries an increase of 3 per cent. on the previous year. This expansion in trade is, I think, very satisfactory, and as we know that there has also been an increase in the quantity used in America, we can say with confidence that the demand for sulphate of ammonia is steadily increasing, year by year. The increase in exports of 58 per cent. following after a year in which we had experienced very severe competition from America, is, I believe, very largely, I might almost say entirely, due to the remarkable improvement in the quality of our output. About 70 per cent. of our production is now of acid free or neutral quality, and can, therefore, be sent to the most distant parts of the world without fear that there will be loss in weight on arrival due to rotting of bags. What is possibly of more importance is that it will arrive in a condition ready to put on to the land. We have been able to trace an immediate result of the adoption of this high standard of quality in markets like Japan, which in the last two years seemed to have been altogether lost to us. The fact that we have been able to increase our home sales in a year which is generally admitted to have been disastrous for farmers, is a tribute to our propaganda work, although here, again, quality has undoubtedly played a great part in helping us to maintain our position. We have made an arrangement to do joint propaganda with Buxton lime firms.

We have reduced our home prices for sulphate of ammonia by £2. 10s. 6d. per ton—about 15 per cent.—since last spring. Our present price is well below the pre-war price.

Propaganda and Administration.

While we are thus devoting, I think, adequate attention to the home market, which, I would remind you, is still our largest individual market, and absorbed last year no less than 41 per cent. of the total British production, we are by no means neglecting foreign countries. Our propaganda offices in Spain, Canary Islands, Portugal, Egypt, and Italy are doing educative work framed to suit the conditions obtaining in those countries. We have made special arrangements in Japan and Java in order to develop consumption in those important consuming countries; we are co-operating with the Propaganda Organisation in France; and we have in view large schemes of expansion in the Far East, about which I hope to be able to say more at our next meeting.

Our cost of administration last year was 1s. 4d. per ton—a reduction of sixpence per ton on the previous year. We hope the figure will be further reduced this year. Our cost of propaganda last year was 1s. 5d. per ton, and we are going to ask you to vote a sum equal to about 1s. 7d. per ton for this year. That makes a total of about 2s. 9d. per ton for administration and propaganda. We have recovered over £3,000. from railway companies in over-charges during the year.

An Appeal to Non-Members.

Notwithstanding the manifest advantages which our organisation has to offer, I regret to say there are still just a few makers in England—whose aggregate production does not amount to ten per cent. of the total output in Great Britain—who have not yet been able to make up their minds to join us. As regards these outside firms we feel that it would be only fair that they should share the small expenses of working the Federation, especially its propaganda expenses. Moreover, the Federation is giving an advantage in price to the home market, and we again think it would be only fair that this subsidy should be borne by all makers.

I was able at our last meeting to announce a notable accession to our strength in the membership of Synthetic Ammonia and Nitrates, Ltd. I am sure we all congratulate them most heartily on having reached the producing stage, and we are glad to welcome Colonel Pollitt as a member of our Council. I have another piece of good, and, I think, very significant news for you to-day. That is, that Canadian producers of sulphate of ammonia, representing a large proportion of the total output in that country, have decided to throw in their lot with us, and have joined the Federation.

HOLDING COMPANIES AND AMALGAMATIONS.

ARE THEY DESIRABLE DEVELOPMENTS?

IN a lecture entitled "Sixty Years of Company Development" which Mr. Herbert W. Jordan, the well-known authority on company registration gave before the Secretaries' Association, Ltd., on November 14, the lecturer stated that during the past few years development in company formation has been the most marked in the directions of amalgamations and capitalisations.

Many important amalgamations have been effected, either by the absorption of one company by another undertaking, the former company going into liquidation, or by the acquisition by the latter of a controlling interest in the former. The second course is more generally favoured now, and is resorted to very largely. By acquiring shares of a company carrying most of, if not all, the voting rights in a number of other companies a "holding company" obtains absolute control over the latter. Companies having controlling interests in other undertakings occupy a favourable position, as they possess the strength and stability of an amalgamation without sacrifice of the individuality of the constituent companies. By a judicious exercise of its powers the holding company can frequently create an organisation sufficiently strong to enable it to meet competition more effectively.

Admittedly, on such combines becoming powerful enough to be described as "trusts," they are sometimes apt to act in an oppressive manner towards competitors and to raise the prices of their commodities against the consumer, but the British public has an aversion to monopolistic systems, and is not likely to fail to impose its will on trusts that overreach themselves. An impartial investigation would, however, probably show that on the whole the formation of holding companies, not excepting those popularly regarded as trusts, have contributed materially to our national wealth (if the term be permissible in these days). During the later stages of the war and the boom period that followed its conclusion, trusts were afforded unlimited opportunities of fleecing the public if they were so minded. Nevertheless, the reports of the various committees on trusts appointed under the Profiteering Acts, 1919 and 1920, convey the impression generally that the operations of many combines and trusts were beneficial, and that few have been guilty of serious transgressions. To place hindrances in the way of the formation of holding companies would be a retrograde step, although it is not improbable that in course of time legislation may be needed to safeguard the interests of the community. Were it not for the existence of some of our larger holding companies and amalgamations of various kinds and the interlocking connections between companies carrying on industries related in varying degrees to the dominant undertaking—as in the case of the shipping industry—we should undoubtedly have lost much overseas trade. Whether or not the tendency to form trusts would be accelerated by the imposition of tariffs we need not stop to inquire; but, as Mr. Baldwin has said, the trust to beware of is the international one.

New Organic Insecticide.—A recent patent of the Chemische Fabriken vorm. Weiler-ter-Meer, Uerdingen, Germany (British Patent 203,904, of 1922), claims the use of chloro-tetrahydro-naphthalene as an insecticide.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

"FREE TRADE" AND THE BRITISH MARGARINE INDUSTRY.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—During the war there was a great shortage in this country of margarine and other essential fat foods. The raw materials for margarine (oil-seeds and oil-nuts) are largely produced in the British Empire, but owing to the "Free Trade" (for foreigners) policy of England these raw materials were (until prevented by the war) largely shipped to Germany and other foreign countries, to be milled and manufactured into oil or margarine for export to the British market.

By establishing their mills and works in a foreign country the millers and manufacturers obtain the benefit of *two* free markets—they have the great advantage of obtaining free entry to that foreign country's market, and can also dump their surplus production (free of duty) on the British market. This enables the foreign millers to run their mills always at full capacity, and thereby keep down their costs per ton of output and give full employment to their foreign workpeople. A British miller and margarine manufacturer, with his mills in Great Britain, is dependent on the British trade alone. The tariffs imposed by foreign countries prevent him from exporting his surplus production and working his mill at full capacity, so in slack times and low foreign wages and exchanges, like the present, he is compelled to run his mill at half capacity, and this fact increases his costs by at least £3. per ton on his output, and to that extent increases the cost of margarine to the British public, besides throwing half of his British workpeople out of employment, and making it quite impossible for him to compete successfully with his foreign rivals for the British trade.

When war broke out, the British Colonies found their nuts and oil-seeds unsaleable owing to the shortage of milling and manufacturing capacity in Great Britain, and the British public found themselves short of fatty foods owing to the impossibility of treating the superabundance of Colonial nuts then arriving in England. The foreign Governments prohibited the export of margarine for a time during the war, and this compelled several large foreign companies to establish mills and works in England, but latterly these foreign companies, from economic reasons, have again commenced to supply their British customers from their foreign mills and factories. The average imports of margarine into England are again over 1,200 tons per week.

If allowed to continue, the same economic causes will compel my company (Maypole Dairy Co., Ltd.) to close down part of our manufacturing operations in this country and again purchase a mill in a foreign country, where it will be profitable to manufacture our supplies for sale in the British unprotected market. It is a shortsighted policy to handicap the preparation of essential foods in England and force British millers and manufacturers either to close their British mills or to transfer their manufacturing operations abroad at a time when we have over 1,200,000 unemployed British workpeople. Our import laws should now be made to encourage British producers and manufacturers, who are more important and employ far more labour than merchants and distributors. The Free Trade (for foreigners) policy is unsuitable for present conditions.—Yours, etc.,

W. George Watson, Chairman
(Maypole Dairy Co., Ltd.).

November 19, 1923.

BRITISH EMPIRE EXHIBITION (1924).

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—It is well known to most people that at the forthcoming Exhibition next year at Wembley there will be shown a very complete representation of our present state of knowledge of natural science. The details of the arrangements perhaps are not so well known, and with a view to furnishing information to those already interested, and possibly enlisting the assistance of those who have not already offered it, I shall be glad to be allowed to make the following statement.

A committee of the Royal Society is dealing with an exhibit illustrating, so far as space permits, researches in various branches of pure science other than chemistry.

The Chemistry Exhibit is being organised by a committee of representatives of all the other scientific societies dealing with the science and application of chemistry. The two committees are working in the closest possible co-operation, having three members in common in order to prevent overlapping.

The space at the disposal of the committee is limited, but those who are able and willing to assist in the Chemistry Exhibit should communicate with Dr. Levinstein at 166, Piccadilly, W. 1, or any of the Conveners of Sections, with regard to exhibits dealing with chemistry. Subjects which are on the borderland of physics and chemistry, such as the structure of the atom, the inner structure of crystals and recent spectroscopic work, will be dealt with by the committee to which it is most appropriately referred. Arrangements will be made between the two committees to exhibit the work in its most appropriate place.

When the keys of the Exhibition were handed over on November 12 by the contractors to the Exhibition authorities, it was noticed that Messrs. Gaze and Co., of Kingston-on-Thames, had already commenced work on the Chemical Hall within the completed Palace of Industry.

The next meeting of the committee is to be held on December 19, and it is hoped that prior to this date sufficient information will be in the hands of each convener to enable him to make a close estimate of the amount of space he will require and the expenses which will be incurred in his section. It is essential that this date be adhered to, if the subsequent work is to be efficiently carried out.

The idea of having standard specimen bottles has been abandoned, and specimens will be shown in exhibitors' own bottles except in special circumstances. The importance of the scientific exhibits has already been well recognised by the Technical Press, and I am, therefore, encouraged to hope that the widest publicity may be given to the details of the arrangements which have already been made.—Yours, etc.,

W. J. U. Woolcock.

166, Piccadilly, London, W. 1,
November 21, 1923.

TARIFF REFORM AND INDUSTRY—THE LESSON OF THE PATENT ACT, 1909.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—It might be interesting to your readers to know that in the year 1909 an alteration was made to the then existing Patent and Designs Act, which was to the effect that articles patented in this country by foreign firms should be manufactured here.

We were very intimately connected with this matter in being instrumental in fixing up foreign firms with factories, etc., to work here, and our records show the following approximate figures:—

1. Value of land and premises acquired...	£367,000.
2. Amount expended in buildings, housing workpeople, etc.	£532,500.
3. Amount expended on plant, machinery, and equipment	£752,000.
4. Value of annual assessment on which rates were paid	£90,000.
5. Amount paid as rates per annum	£30,000.
6. Number of workpeople (male and female) employed, about	15,350.
7. Amount paid in wages per week, about	£17,600.
8. Number of foreign firms working	50.
9. Number of English firms manufacturing for foreign firms on royalty basis	35.

It must be borne in mind that the above analysis does not in any way represent the total benefit that accrued to England under this Act. The figures supplied are those which came under our special notice through dealing with the firms who established themselves here. We venture to think that what the Patents Act did to increase employment in the manufacture of patented articles, Tariff Reform will do for employment in our national industries.

An interesting sidelight on the present suggestions on Tariff Reform is before us as we write, by the applications received from Continental firms for establishing factories in this country if an alteration is made in our fiscal policy. We are quite confident there would be a great many works opened up here, which would mean a very considerable amount of labour being employed; money expended on land

and buildings; plant and machinery, with its attendant advantages to the community in general.—Yours, etc.,

Leopold Farmer and Sons,
Factory Specialists and Surveyors.

London, E.C. 2, November 16, 1923.

GLYCERINE PRICES.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Referring to Messrs. Higginbottom's prices current in your issue of November 16th inst., we wish to state that glycerine, chemically pure, Sp. Gr. 1.260, is £82. 10s. per ton for a 5-ton contract. This is the Association price, and there is no higher price anywhere in the country for the quantity named.

The price of £60. per ton for crude 80 per cent. glycerine is mentioned. This also is ridiculous. We believe we are absolutely correct in stating that the Glycerine Association, which controls the greater part of the British output, is quoting not more than £50. per ton. Yet it is possible to buy quantities at £48., and even £45. and less, according to the district, in this country.—Yours, etc.,

Geo. W. Phillips
(Managing Director),
Haller and Phillips, Ltd.

London, E.C. 2,
November 19, 1923.

[We are aware that £82. 10s. per ton is the price quoted by the Glycerine Association for 5-ton lots of chemically pure glycerine on contract. Our figure of £85. does not refer to such contracts, but is an average figure for smaller quantities. For quantities of glycerine less than 1cwt., for example, the Association price is £100. 10s. per ton in 28lb. containers. With regard to crude glycerine prices, and despite the assertions of our correspondents, we know definitely that considerable business is being done in the North of England to-day at £60. per ton naked at works. For some small parcels of 80 per cent. crude glycerine, indeed, a price of nearly £70. per ton is being obtained.—*Ed., C.T.J. and C.E.*].

ITALIAN CITRIC-ACID PRODUCTION.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—In connection with your monthly article, "Notes on the Italian Chemical Industry," we should like to draw your attention to a slight inaccuracy which has crept into the November 9 issue of your excellent journal. On page 553 your Genoa correspondent, when dealing with the Italian citric-acid industry, states that "at the present day there are only two citric acid works in Italy, one of which, the Società Goldenberg, was founded in 1909 at Palermo." As a matter of fact there are more than two factories. Our own company, which has a capital of 25,000,000 lire, is manufacturing tartaric acid, cream of tartar, Rochelle salts, tartar emetic, and many other chemicals, at its Milan works, whilst it also possesses two important works at Vercelli and Linate for the manufacture of citric acid. The first of these two latter works was established in 1916, and the second in 1921, and together they work up something like 2,500 tons of citrate of lime per year. We can claim to be the largest manufacturers of tartaric acid in the world, and are also able to supply citric acid in any quantity demanded.—Yours, etc.,

"L'Appula,"
Società per l'Industria Chimica Italiana.

Milan,
Via Tortona 27, November 15, 1923.

HYDRATED LIME IN ROAD TAR.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—The use of tar, either with road stone or for surface dressing, has been very much condemned of late. By the addition of hydrated lime to the tar the points raised against the use of tar for roads are overcome. The writer has found that the addition of hydrated lime (of extreme fineness and entirely free of caustic lime) to tarred stone or slag—

1. Eliminates the danger of damage to fisheries, vegetation, etc., caused by washings from tarred roads, as it absorbs the greater percentage of acids and oily matter;

2. Owing to its affinity for tar, tenacity and elasticity of the mass is produced, and therefore what is termed "cushioning" of the road brought about. The nearer the road approaches a rubber-like substance the better, as the two most important factors for a good road are springiness and elasticity, so as to withstand heavy traffic and climatic conditions respectively.

The use of hydrated lime in concrete also gives greater density and impermeability, besides a more easily worked mixture, which naturally considerably increases production, and yet it costs practically nothing.—Yours, etc.,

C. A. Longley.

London, S.E. 27,
November 15, 1923.

BLEACHING WITH HYDROGEN PEROXIDE.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—In Mr. Weber's paper on the above subject, reported in your issue of November 2, a remark is made about porcelain not standing wear and tear of bleaching plant. This may be correct so far as small porcelain vessels are concerned, but is not accurate in reference to the large porcelain-lined vats which we make, which will stand very much more severe action than any bleaching process, and preclude entirely the possibility of metallic contamination. For over eight years we have manufactured with success plant of this description, and the plant is fitted with iron outside and porcelain inside pipes, and ceratherm-porcelain centrifugal pumps.

We have had wide experience in the use of hydrogen peroxide, and have found that the greatest trouble has been the entry into the bleaching medium of any particles of metallic oxide which are serious enough on some fabrics to burn holes in them, and it was due to this problem that the development of ceratherm-porcelain pumps, vats, pipes, etc., was initiated.—Yours, etc.,

Guthrie and Co.

Accrington, Lancashire, November 16, 1923.

THE DISINFECTANT "IZAL."

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We are desirous of drawing your attention to one point in the interesting report on Disinfectants and Preservatives by Mr. S. N. Brown, F.C.S., in the *Chemical Trade Journal and Chemical Engineer* dated November 9. Mr. Brown is seriously in error when he mentions one of our products, "Izal," as being a reddish-brown liquid insoluble in water, and also suggesting that it is usually used as a 5 per cent. solution. The facts are that it is a pure white emulsion soluble in all kinds of water, soft, hard or brackish, and it is usually used at a dilution of 1 in 600. We should not dream of recommending its use at a strength mentioned by Mr. Brown.—Yours, etc.,

H. E. G. West (Chemical Manager),
Newton, Chambers and Co., Limited.

Thorncliffe, nr. Sheffield,
November 19, 1923.

THE CHEMICAL INDUSTRY CLUB.

The fifth annual meeting of the Chemical Industry Club was held in the Club Rooms, at 2, Whitehall Court, on Monday, November 12, Mr. A. Gordon Craig presiding. After the report of the Executive Committee and the accounts had been passed, Dr. W. R. Ormandy moved the election of Mr. J. Miller Jones and Dr. E. H. Tripp to the posts of honorary treasurer and honorary secretary, respectively. These appointments were approved unanimously, and hearty votes of thanks were accorded to the retiring officers, Mr. C. J. Goodwin and Mr. H. E. Coley. The rules, as revised during the past year, mainly through the labours of Mr. W. Cullen and Dr. A. Rule, were approved. Under the new regulations the Club is empowered to elect a president and a vice-president, to hold office for a period not exceeding two years, and Sir William Pope and Professor W. R. E. Hodgkinson were elected to fill these positions. A vote of thanks to Mr. Craig for his services as chairman of the Executive Committee during the past two years was passed with acclamation. Subsequently to the meeting, the Executive Committee appointed Mr. H. E. Coley to be its chairman for the ensuing year.

Arrangements for the Annual Dinner.

The speakers at the annual dinner of the Club, to be held in the Connaught Rooms, W.C., on Monday, November 26, will include Sir Lionel Phillips, Sir Arthur Duckham, Mr. F. W. Harbord, and probably Sir J. Cadman.

Those who still require tickets (15s. each, inclusive) should apply to the Secretary at 2, Whitehall Court.

THE SOUTH WALES PATENT FUEL INDUSTRY.

THE PROBLEM OF CHEAP PITCH SUPPLIES.

AN interesting account of how the patent-fuel manufacturers of South Wales have endeavoured to secure adequate supplies of cheap pitch is given by a correspondent in the *Times Trade Supplement* (Special "Industrial Wales" issue). He points out that of the three factors, cost of small coal, factory and overhead costs, and cost of pitch, which make up the total cost of production of patent fuel, the last-mentioned is the one most disproportionate to general market conditions, and is therefore the one in which most interest is taken by those within the industry.

The present price of pitch is well over three times the figure which may be taken as a fair average over a long period prior to the war. If pitch were obtainable at one-half of its present price it would make all the difference imaginable in the fuel position, while at the same time the tar distillers would, so the writer claims, be getting a price which would show a very fair relation to that obtainable before the war.

There are two ways of dealing with this difficulty. One is to reduce the percentage of pitch by modified methods of manufacture or by substituting some other material. These questions are engaging the attention of many people, within the industry and without. The other is to reduce the actual price of the pitch itself, and although this could easily be done, with the co-operation of the tar distillers, it is evidently too much to expect that they should be so disinterested as to accept from the South Wales fuel manufacturers one-half of the price which they can obtain for their product elsewhere.

First Purchase of American Coke-oven Pitch.

During the past year the fuel makers have taken two definite steps towards improving their position in regard to pitch. The first was the appointment of a single buyer to represent all the block fuel makers in the purchase of pitch. This was intended not as a ring or combine to fight the organisation of the tar distillers and chemical brokers, but as a means of avoiding competition between the fuel makers themselves; and therefore, as a method of bringing down prices, it could meet with only a very limited success. The second step was a determined effort to broaden the sources of supply, and it took the form of a purchase of a very substantial quantity of coke-oven pitch from the United States of America. This pitch was shipped during the spring of the present year; it was distributed between all the fuel works connected with the South Wales Patent Fuel Manufacturers' Association, and it sufficed to keep them at work for many months at a time when British pitch was not procurable except at totally prohibitive prices. This pitch proved to be of very fair quality; that is to say, it was inferior to the British fancy qualities, but superior to many British makes which are regularly used in South Wales; and the price was not much more than half the price of the British article.

This purchase for a time caused something like consternation in the ranks of the British dealers, but when it was found that no considerable additional quantities of suitable quality were forthcoming, matters gradually settled down, and by the end of the summer the dealers had the situation pretty well in hand once more. The transaction, however, had served its purpose; it had carried the industry over an exceedingly critical period and brought about a considerable, although only temporary, reduction in British prices; and signs are not wanting that the fuel makers will not be squeezed quite so hard again.

Outlook for the Near Future.

Two or three of the fuel companies united to follow up this success by sending representatives to the United States to investigate the whole position on the spot, and they ultimately purchased a further very large quantity of coke-oven pitch, but of a considerably harder quality than that customarily used in South Wales. Owing to this feature, this particular quality can be shipped all the year round, which is a great advantage, but as the temperature necessary to melt it cannot be attained in the ordinary fuel works plant, it has to be submitted to certain treatment before it can be used in fuel making. So far the plant for preliminary treatment is not at regular work, but it is understood that it has given satisfactory results in its trials, and that it will be put into regular commission as soon as the requisite auxiliary handling plant is installed. If the designers' hopes are realised, the quantity of British pitch required for South Wales during 1924 will be relatively small and should consequently be obtainable at a reasonable price. It is hoped to deliver the reconditioned pitch to the fuel works at a price substantially below the market price of British pitch. The whole position, therefore, as far as 1924 is concerned, turns very largely upon the degree of success attending the operations of the new plant. On the whole, it may be said that, as between the various companies concerned in the trade, some are better placed than others in regard to pitch, but that as far as the trade as a whole is concerned the pitch prospects for 1924 do not appear to show cause for grave anxiety.

THE MARKETS IN GASWORKS RESIDUALS.

MR. MILNE WATSON'S VIEWS.

IN the course of an inquiry by the Director of Gas Administration (Mr. H. C. Honey), on Wednesday, November 14, into an application by the London County Council for a reduction of the standard price—under the sliding scale—of the Gas Light and Coke Co., Mr. D. Milne Watson, the Governor of the Gas Light and Coke Co., gave some interesting information concerning the markets in residuals. He said the present export price of coke is not so good as it had been, for the reason that Germany, who used to export furnace coke, for a while became a buyer of British furnace coke, and that sent the price up.

Falling Prices for Furnace and Gas Coke.

Germany, however, had now ceased to be a buyer of British furnace coke. As a consequence, after the price of English furnace coke had increased under the influence of German buying—and with it the price of English gas coke,—the prices were now falling rapidly.

The price during recent weeks of English furnace coke had fallen to 33s. per ton, and whereas this year as much as 40s. per ton had been obtained for exported gas coke, at the present moment there were no buyers. The bottom had been knocked out of the market for the moment. When buying commenced again he expected a drop of at least 10s. per ton in gas coke. As a contrast, witness mentioned that during 1920 gas coke for export fetched up to £11. per ton. Again, gas companies were finding slack coal seriously competing in the market for breeze.

Pitch and Sulphate on the Downgrade.

As to tar, there were signs of a break in this market also. Pitch was at as high a figure as 190s. per ton in the first half of the year, but it had now sagged to 130s. Concerning sulphate of ammonia, as chairman of the Sulphate and Ammonia Federation he was sadly aware that prices are on the downgrade, and the Gas Light and Coke Co. estimated that the price of sulphate would be down to £13. per ton before the end of December next, and generally he did not see anything in the sulphate market to give much hope. There had been a very great increase in the output of sulphate all over the world, and the Germans had come into the export market with quite large quantities, with the natural result that prices had broken all over the world.

VERMILION INDUSTRY OF HONGKONG.

ONE of the oldest and best known of the Hongkong industries is the manufacture of vermilion, a pigment which is used by the Chinese for making varnishes, for colouring candles and paper, and for stamping and writing purposes. The annual output in Hongkong is estimated to be about 20,000 cases of 50 catties each (66⅔lb.), the total value being approximately 1,800,000 Hongkong dollars. Of the total output of 20,000 cases, about 10 per cent. is for local use in Hongkong, 10 per cent. for exportation to the United States and Europe, and 80 per cent. for exportation to Canton, Fatshan, and the neighbouring districts. The exports to the United States and Europe are small in consequence of the competition of coal-tar dyes, which are much cheaper. The present market price for vermilion in Hongkong is 90 Hongkong dollars per case, or 180 dollars per picul (1 picul = 133⅓lb.). There is only one grade of Chinese vermilion, made of a mixture of mercury and sulphur in the proportion of 100lb. of mercury to 90lb. of sulphur. The sulphur employed is secured from the near-by Provinces of South China. About 20,000 flasks of mercury are annually used in the Hongkong industry.

ITEMS OF INTEREST.

Fuller's Earth Deposit in Wales.—It is announced that a large deposit of fuller's earth has been discovered at Corwen, capable of producing 60 to 70 tons per week.

Russian Duty on Imported Coal.—The Soviet Government announces that it intends to introduce a new Customs tariff. Among its provisions is a higher duty on coal for the protection of Russian coal from British competition.

Change of Address. — Joseph Evans and Sons (Wolverhampton), Ltd., state that they have changed their London Office address from Salisbury House, London Wall, to Craven House, Kingsway, London, W.C. 2; telephone No., Gerrard 7044; telegraphic address, "Dryosbo, Westcent, London."

Unemployment Decreasing. —The number of persons on November 5, 1923, recorded on the live registers of the Employment Exchanges in Great Britain was 1,244,000. This was 11,996 less than in the preceding week, and 241,878 less than the figure recorded on January 1, 1923.

British Iron Production in October.—The production of pig iron in October amounted to 592,600 tons, compared with 558,600 tons in September and 481,500 tons in October, 1922. There were 188 furnaces in blast at the end of the month, a decrease of two compared with the preceding month, and a total decline of 35 since the end of May.

Pluviusin Products in Spain. — We learn that at the Barcelona Trade Exhibition a gold medal was awarded to Mr. R. M. Nosworthy of Calle Valencia, Barcelona, owing to the good quality of the P-V Brand Leather Cloth, for which Mr. Nosworthy has the sole sale for Spain on behalf of the British Pluviusin Company Limited, of Manchester, a Nobel Industries concern.

Belgian Glassworks Activity.—The glassworks in Belgium are passing at present through a period of unprecedented prosperity. Very important orders have lately arrived from China and Japan. The earthquake has opened an extensive market for window-pane manufacturers. Several ovens which were extinguished a year or two ago have now been relighted, and the construction of at least half a dozen new ones has been decided on.

Spanish Chemical Trade.—Imports of chemical products during the first six months of 1923 amounted in value to 163 million pesetas, an increase on the previous year of 47 millions. The principal items responsible for the increase were creosote, colouring materials, paints, sulphur, nitrate of soda, ammonium sulphate, superphosphates, tanning extracts, and pharmaceutical specialities. Exports of chemical products increased from 60 to 63.6 million pesetas in value, and of minerals and ores from 63 to 78 million pesetas.

Match Manufacture in India.—In order to assist small manufacturers of matches in Bihar and Orissa to overcome the many difficulties they are at present experiencing, the local Government have engaged Mr. A. P. Ghosh, who has been trained in Japan, Sweden, Germany, and England, to make an investigation and submit a report. He will examine all the forests of the Province, test the various woods available, and advise on the most likely sites for factories. He will inspect the existing match factories in the Province and advise on their defects. He will also draw up plans and specifications for a small demonstration factory, and advise where it should be located.—*The Indian Trade Journal.*

Non-Metallic Minerals in Canada.—A special report has been prepared by the Canadian Dominion Bureau of Statistics (Mining, Metallurgical, and Chemical Branch) on the consumption of prepared non-metallic minerals in Canada. Though extensive deposits of crude materials are known to exist in Canada, and though these deposits are in certain cases being worked, the bulk of the supply has been derived from importations. The present report, which has been prepared with a view to exploring the possibility of establishing plants in Canada to produce the bulk of the quantities demanded by Canadian industries, contains an excellent statistical summary of the present Canadian position in such things as barytes, calcite whiting, dolomite, corundum, felspar, fluorspar, gypsum, lime, magnesite, mica, iron oxides, asbestos, sulphur, silica, tripoli, talc, etc. Copies of the report may be obtained by readers interested on application to the Office of the High Commissioner for Canada, Kinnaird House, Pall Mall, London, S.W. 1.

Industrial Developments at Halesowen.—Plans have been passed by Halesowen (near Birmingham) Rural Council for the extension of a vinegar factory in that locality, also a new oil and varnish factory.

Chemical Works Fatality.—On Wednesday, two men employed in filling detonators with fulminate of mercury at the Middlestone (Durham) Works of G. I. Webb and Co. were killed as a result of an explosion in the detonator house.

World Coal Production.—According to the U.S. Geological Survey, the world coal production during the first six months of 1923 amounted to 666,000,000 metric tons, of which the United States contributed 294,261,000 tons (44 per cent.), and the United Kingdom 143,051,000 tons (21.5 per cent.).

British Manufacture of Candles.—Lever Brothers, Ltd., control a great part of the business of candle manufacturing in this country, and are marketing a candle of a new type. It is moulded into a triangular shape, with fluted sides, and it is claimed that it gives a 10 per cent. better illumination than the familiar round candle of commerce.

Business Notices.—Mr. L. H. Hartland-Swann, C.B.E., has joined the board of Lever Bros., Ltd., and been appointed a managing director of the company. He is also chairman of International Icilma Trading Co., Ltd., of Vinolia Co., Ltd., and Blondeau et Cie, Ltd. Mr. Hartland-Swann will devote his attention chiefly to the toilet companies associated with Lever Bros., Ltd

Microchemical Test for Lead.—Lawrence T. Fairhall, of Harvard University (*Jour. Biol. Chem.*, 1923, 57, 455-461), has studied the hexanitrite microchemical test for lead. This test depends on the crystallisation of regular rectangular plates or cubes of the hexanitrite of potassium, copper and lead from an aqueous solution. The test will reveal the presence of as small an amount as 0.001 milligramme of lead in 15 c.c. of a solution containing a considerable amount of other inorganic salts.—*J. Fr. Inst.*

Institution of Engineering Inspection. — We have received from the Institution of Engineering Inspection Incorporated, Palace Chambers, Westminster, London, S.W. 1, a leaflet describing the activities of the Institution, and also a list of fixtures arranged for the Session 1923-1924. We note that a number of interesting visits to works have been arranged, including one to the Inspection Department, Royal Arsenal, Woolwich, on December 5, and one to the Kodak Works at Wealdstone on January 10.

Tariff Notes.—According to the Board of Trade *Journal*, the text of the recent amendments to the New Zealand Customs shows that inorganic acids (n.e.i.), also benzoic, carbolic, citric, formic, gallic, lactic, oleic, oxalic, picric, pyrogallic, crude pyroligneous, salicylic, tannic and tartaric acids may be admitted duty free.—The Dominican export duty on lime juice cordial is reduced from 6d. to one penny per gallon.—A duty of 50 cents per lb. has been imposed on alum imported into the Federated Malay States, except under certain conditions.

Research On Enamelled Cast Iron.—The American Bureau of Standards has received a number of specimens of typical enamelling castings, and these are now being enamelled with several commercial cast-iron enamels. The chemical analysis of the castings has been made, and the Bureau also proposes to make up typical bodies of cast iron in its metallurgical department. The speciments thus obtained will also be analysed chemically and enamelled. An attempt will be made to correlate the blistering of the enamel and the chemical composition of the cast iron, with the object of obtaining a good commercial cast iron which will not produce blisters.—*The Engineer.*

The Sharples Super-centrifuge.—Four years ago the United Water Softeners, Ltd., became sole licencees for the Sharples Super-Centrifuge. The business has grown to an extent which has rendered the original organisation entirely inadequate, and has necessitated the formation of a separate company to deal exclusively with the Sharples business. This company has now been formed under the title of Super-Centrifugal Engineers, Ltd. No change in the directorate or management has been made, the directors of United Water Softeners, Ltd., remaining directors of the new company, but the Board has been strengthened by the inclusion of Mr. P. T. Sharples, the President of the Sharples Company of America, and of Messrs. A. H. Keable and Z. A. Toula, Technical Directors.

Sulphate of Copper Production. — The production of sulphate of copper in 1922 was higher than in 1921 in France and the United Kingdom; but, whereas the French production show a notable increase on the pre-war output, the yield of the United Kingdom showed a great decrease. The United States figures for 1922 are not available, but those for 1921 indicated a great diminution in production, especially in comparison with 1913. Data relative to the Italian yield in 1922 is also not available, it may be taken, however, states the International Institute of Agriculture, that the recent growth of manufacturing plant now gives Italy the lead as regards copper-sulphate producing capacity.

Oxygen for Blow-pipe Purposes.—In a discussion of the relative merits of electrolytic and atmospheric oxygen for blow-pipe purposes, *Industrial Gases* says that extensive experiments show: (1) If the quality of the oxygen is the same, the results obtained should be identical whether electrolytic or atmospheric oxygen is used. (2) A superiority of 0.5 per cent. in the quality of oxygen represents a saving of about 10 per cent. in the quantity. This difference does not, however, appreciably affect either the speed or the quality of the cut. (3) As between electrolytic oxygen of 99 per cent. purity and atmospheric oxygen of 98.5 per cent. purity the price of gas is the only important factor. If that is the same, then the electrolytic oxygen has a 10 per cent. advantage. These observations apply only to modern motor-driven cutting machines..

Industrial Methane.—Methane from the Rombacher mines in Coblenz and from the Fritz Hamm Gesellschaft in Dusselsdorf, compressed in the usual steel containers to 150 atmospheres, has, states the *Colliery Guardian*, recently been put on the market. This methane is entirely free from carbon monoxide, and is said to be generally useful as a cooking and lighting gas for soldering purposes, for the autogenic working of metals, as well as the autogenic cutting of iron. On account of its high calorific value and its extremely favourable kindling and compression points, methane is also useful as a material for gas motors, especially for vehicles. In the chemical use of methane, many prospects offer themselves. It is proposed to obtain sulphur from gypsum by reduction with methane, to produce methyl alcohol from methane, with methyl chloride as an intermediate product, and from atmospheric nitrogen by the use of methane or its cleavage products to prepare cyanogen products.

French Company News.—The annual general meeting of Les Etablissements Poulenc Frères was held in Paris on October 30 under the chairmanship of M. Gaston Poulenc The report and accounts for the year ending June 30, 1923, which were adopted unanimously, show a net profit of 6,128,014 francs, an increase of 3,914,843 francs over the previous year. A dividend of 45 francs per share (exclusive of taxes and payable on November 5) was declared. Total production of the firm shows an increase of 38 per cent. over 1921-1922. More than half a million francs has been allocated to the research fund, and 926,727 francs have been allocated to the depreciation and mortgage accounts. The Chairman stated that the business of the company had not been interfered with to any extent by the Ruhr occupation. Replying to a shareholder, he also stated that France had nothing to fear from the reappearance of Germany as a competitor in the chemical markets.

Hamburg Paraffin and Wax Market.—His Majesty's Consul-General at Hamburg has forwarded to the Department of Overseas Trade the following information based on a report appearing in the *Hamburger Fremdenblatt*, of November 2: Paraffin has been rising in price, stocks being very short, and the demand extremely brisk. American paraffin blocks 50—52° C. were quoted at 9.25 dollars, and paraffin shavings 50—52° C. at 8 dollars per kilo., undutied ex-quay. Galician paraffin is no longer on the market. Business in ceresin was quiet as before. Prices for common natural yellow ceresin 54—56° C. were 11 dollars, and for white 12 dollars, per 100kilos. undutied. Japanese wax was much in demand, as the information from Japan pointed to shortage of stocks. The first three qualities were quoted at 82s. per cwt. spot, and 77s. to 78s. for delivery. Demand for carnauba wax was quiet; fat grey realised 88s. spot, and current grey 85s. Sales of beeswax were limited. West African realised 96s. to 98s. per cwt., and East African 100s. per cwt. undutied. (Duty amounts to 15 gold pfennings per kilo for Japanese wax, and 10 gold pfennings per kilo. for all other kinds).

COMING EVENTS.

Society of Chemical Industry (Glasgow Section).—Meeting, **Friday, November 23,** at **7.15 p.m.,** at 39, Elmbank Crescent. Paper: "Artificial Resins: Their Preparations and Uses," by Dr. H. Hepworth.—**(Manchester Section):** Annual dinner, **Friday, November 23,** at **7.30 p.m.,** at the Queen's Hotel.

West of Scotland Iron and Steel Institute. — Meeting, **Friday, November 23,** at **7 p.m.,** at the Royal Technical College, George Street, Glasgow. Paper: "Effects of Time and Temperature on High Speed and Similar Steels," by W. E. Woodward.

Institute of Chemistry (Bristol Section).—Meeting, **Saturday, November 24,** at Exeter. Papers by A. Marsden and F. Southerden.

Faraday Society.—Meeting, **Monday, November 26,** at **3 p.m.,** at the Institution of Electrical Engineers, Victoria Embankment. Discussion: "Electrode Reactions and Equilibria."

Hull Chemical and Engineering Society.—Meeting, **Tuesday, November 27,** at **7.45 p.m.,** at the Hull Photographic Society's Rooms, Grey Street. Paper: "Recent Advances in Colloid Chemistry," by A. V. Slater.

Society of Chemical Industry (Birmingham Section).—Meeting, **Tuesday, November 27,** at **7.15 p.m.,** at the University, Edmund Street. Papers: "Acceleration of Vulcanisation by Xanthrates, and the Influence of Metallic Oxides as Activators," by Dr. D. F. Twiss and F. Thomas; "An Important Variable in Raw Rubber," by Dr. D. F. Twiss and F. B. Jones.

Society of Dyers and Colourists (Leeds Junior Branch).—Meeting, **Monday, November 26.** Paper: "Works Filtration," by Dr. Forster.—**(West Riding Section):** Meeting, **Thursday, November 29.** Paper: "The British Dye Industry," by Dr. H. Levinstein.—**(Midlands Section):** Meeting, **Thursday, November 29,** at Nottingham. Paper: "Bleaching with Hydrogen Peroxide," by I. E. Weber.

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, November 30,** at **7 p.m.,** at 36, George Street.

Society of Chemical Industry (Liverpool Section).—Meeting, **Friday, November 30,** at **6 p.m.,** in the Clubrooms of the Overseas League, 14, Elliott Street. Discussion: "The Society of Chemical Industry and What it Stands For," to be opened by Dr. E. F. Armstrong.

Society of Chemical Industry (London Section).—Meeting, **Monday, December 3,** at **8 p.m.,** at the Chemical Society, Burlington House, Piccadilly, W.

Institution of the Rubber Industry (London Section).—Meeting, **Monday, December 3,** at **8 p.m.,** at the Engineers' Club, Coventry Street, London, W. Paper: "Accelerators," by Major V. Lefebure.

Society of Public Analysts. — Meeting, **Wednesday, December 5,** at **8 p.m.,** at Burlington House, Piccadilly, W.

Society of Chemical Industry (Bristol Section).—Joint meeting with the Institute of Chemistry, **Thursday, December 6,** at **7.30 p.m.,** at the University, Woodland Road. Paper: "Some Reminiscences of an Alkali Inspector," by R. D. Littlefield.

Society of Dyers and Colourists (Bradford Junior Branch).—Meeting, **Thursday, December 6.** Paper: "Wool Dyeing in the Piece," by H. Mitchell.—**(Scottish Section):** Meeting, **Friday, December 7.** Paper: "Wetting Power and Its Application to Industry," by W. H. Nuttall.

Society of Chemical Industry (Manchester Section).—Joint meeting with the Institution of the Rubber Industry, **Friday, December 7,** at **7 p.m.,** at the Textile Institute, 16, St. Mary's Parsonage. Papers: "Methods to be Adopted in Comparing the Activity of Various Accelerators," by S. Martin; "The Analysis of Rubber Vulcanisation Accelerators," by Dr. T. Callan and N. Strafford.—**(South Wales Section):** Meeting, **Friday, December 7,** at **7.30 p.m.,** at the Technical College, Cathays Park, Cardiff. Paper: "Coke Ovens," by T. G. Watts, to be followed later by a visit to the Maritime Coke Works, Pontypridd.

PRODUCTION OF THE RARE METALS.

REDUCTION OF THE CHLORIDES BY SODIUM.

THE success which has attended the production of metallic titanium (*J. Am. Chem. Soc.*, 32, 330; 1910) has led to the belief that other metals might be prepared in coherent form by the reduction of their anhydrous chlorides by sodium. The method has been tried out by M. A. Hunter and A. Jones (who presented an account of their work at the general meeting of the American Electrochemical Society at Dayton, Ohio, in September) with the chlorides of beryllium, chromium, uranium, vanadium, and zirconium with varying degrees of success. The main difficulty lies not in the reduction itself, but in securing enough of the anhydrous chlorides to reduce. If sufficient quantities of the chlorides were available, the authors do not doubt that all of the metals mentioned could be obtained in metallic form. With the limited quantities of the chlorides which have been prepared on a laboratory scale they have succeeded in obtaining beryllium, chromium, and zirconium in a more or less granular form, but with uranium and vanadium, metallic powders only with varying degrees of purity have been produced. Further details for each metal are given under the headings of the separate metals.

The Reduction Bomb.

Three types of reduction bombs have been made during the progress of the work. A small bomb was first constructed for preliminary investigations, where small quantities only of material were available for reduction. This was made from a solid-steel cylinder 12.7 cm. (5in.) deep and 7.6 cm. (3in.) in diameter. The second bomb had a capacity ten times that of the first small bomb. It had an outside depth of 16.5 cm. (6.5in.), and an inside depth of 12.7 cm. (5in.), and outside diameter of 10 cm. (4in.), and an inside diameter of 7.6 cm. (3in.). A third type of bomb, much simpler in construction and quite as effective in operation has been designed by L. E. Barton, of the Titanium Alloys Manufacturing Co., and was used in some of the later experiments. The cavity in the cylinder is closed by a slightly tapered plunger, which is held in position by a heavy cap threaded on the outside of the cylinder. A copper gasket is rendered unnecessary by this construction, and the chief source of weakness in the earlier bombs is thus entirely removed. A larger bomb has since been constructed by the Titanium Alloys Manufacturing Co. embodying the same principle in maintaining a tight joint between the lid and cylinder by means of perfect contact between two steel surfaces carrying a slight film of oil. In this larger bomb a 5lb. batch of metallic material can be made.

The operation of the bomb involves no novelty whatever. The requisite quantity of materials were introduced as rapidly as possible into the bomb. When the materials to be reduced were liquid below the reduction temperature, the sodium was introduced in large lumps. Where the materials were known to have melting points in excess of the reduction temperature the materials were introduced in successive laminæ with sodium. The bomb, after closing, was placed in a roughly constructed chamber built up of brickwork, and was heated by two blast lamps. The completion of the reduction was indicated by the sudden rise in temparature of the bomb. On cooling, the material remaining in the bomb was soaked with alcohol to remove traces of sodium still unused, and finally washed with water and dried in alcohol and ether.

Beryllium.

Beryllium oxide was extracted from beryl, and chlorinated after mixing with lamp black. The chlorination proceeded very slowly, and much time was required to produce enough chloride for reduction. When the oxide was converted to beryllium carbide under the electric arc, the chlorination proceeded much more rapidly. The beryllium chloride was freed from iron by sublimation and transferred as rapidly as possible to the reduction chamber. In this way 88 grammes beryllium chloride were reduced with 60 grammes sodium. After reduction the contents of the bomb were washed free from sodium chloride. A considerable amount of a light blue-black flocculent precipitate was removed by levigation. The residue consisted of small rounded grains of beryllium. The theoretical yield of beryllium was 9.8 grammes. Only 3.58 grammes were recovered in the coherent form, a recovery of only 36 per cent.

The beads recovered from the reduction were found to contain 99.6 per cent. beryllium. The beads of pure beryllium possessed a silver-like lustre, and when cold could be flattened easily under the hammer. The specific gravity of this material was 1.793. The melting point taken in hydrogen was found to be 1370° C. The beads could not be burned completely in air, thus showing a considerable resistance to oxidation. They were readily brought into solution by hydrochloric acid, whereas in cold concentrated nitric acid the beads did not dissolve. If large quantities of pure beryllium oxide or of beryllium chloride were available, there is no doubt that coherent metallic beryllium could be prepared by this method in considerable quantity, thus giving an opportunity for the further study of this interesting metal.

Chromium.

While chromium is not to be considered among the rarer metals, it is not ordinarily met with in the pure condition. The violet chromium chloride can, however, be obtained commercially in reasonable amounts, and can be readily reduced by sodium to metallic chromium. Of this chloride 350 grammes were reduced by 154 grammes of sodium. The largest pellet from the reduction weighed 11 grammes. The theoretical yield of chromium was 117 grammes. Sixty-seven grammes of coherent metal were obtained, a recovery of 57 per cent. of coarse metal. The material analysed 99.86 per cent. chromium. The specific gravity of the pure chromium was found to be 6.29 and 6.40 in two experiments. The metal is insoluble in hydrochloric or sulphuric acid in the cold, but dissolves readily in either when hot. In nitric acid the metal remains unattacked.

Uranium.

The reduction of metallic uranium by sodium was first carried out by Peligot in 1869. Attempts at obtaining the metal in coherent form by this method, using large quantities of the material, were not successful. In one experiment 308 grammes uranium chloride (UCl_5) were reduced by 120 grammes sodium. The theoretical yield is 177 grammes. Since 167 grammes of metal were recovered the yield is 94 per cent. The metal is produced in powder form only, no coherent metal being obtained. The fine powder is readily oxidised in air. One sample which analysed 99 per cent. uranium was found a year later to contain 89 per cent. The colour had meanwhile changed from dark grey to green, indicating the formation of uranium oxide.

Vanadium.

The metal vanadium has been recovered from the tetrachloride and trichloride by reduction with sodium. Its preparation from the liquid tetrachloride is difficult by reason of the great pressures which are developed in the bomb, due probably to the decomposition of the tetrachloride under the effect of heat. The solid trichloride can be reduced without difficulty. Seventy-two grammes of the liquid tetrachloride gave 11.87 grammes vanadium on reduction, a recovery of only 63 per cent. On the other hand, 38 grammes of the trichloride gave 11.67 grammes of residual metal, a 93 per cent. recovery. The powder obtained contained 95 per cent. of vanadium metal. No coherent grains of vanadium were obtained showing that the heat of reduction was not sufficient to melt the metal from the small amounts of material used. If carried out on a larger scale the pure metal could undoubtedly be obtained in coherent form. The specific gravity of the powder obtained was found to be 5.97.

Zirconium.

Zirconium chloride can be readily reduced by sodium. In one experiment 324 grammes of the chloride were reduced to zirconium metal. The theoretical yield is 126 grammes. Of this amount 96 grammes of metal only were obtained, a yield of 76 per cent. The material was found to contain 93.2 per cent. zirconium. The specific gravity of the product was found to be 5.29.

Zirconium has also been prepared by the reduction of potassium zirconium fluoride (Berzelius' method). Five hundred and twenty-three grammes of the double fluoride were reduced by 150 grammes sodium, giving 174 grammes of an air-dried metallic product containing 95.9 per cent. of zirconium metal. A second run on the same amount of material gave 43 grammes of a coarse product analysing 96.2 per cent. of zirconium and 107 grammes of fine powder analysing 97 per cent. zirconium. No large coherent pellets were obtained in either case, the heat of reduction not being sufficient to melt the metal. Subsequent attempts to melt the powder have met with no success, so that it is impossible at this time to indicate whether the metal is malleable at high temperatures.

FERTILISER NEWS.

Nitrate of Soda. — During the first half of the current month, shipments from Chile totalled some 60,000 tons, of which the United States took almost one-third, and Europe (including Egypt) the remainder. This low figure, as compared with the corresponding period of last year—viz., 153,000 tons,—is in the main attributable to the strikes at the shipping ports. Iquique is still affected; indeed, a Government Commission has gone there to investigate the situation, but it is understod that settlements have been arrived at in Pisagua and Tocopilla. Production during October reveals a considerable increase for the month, the output reaching 175,000 tons, leaving stocks at the end in the neighbourhood of 966,000 tons, compared with 1,405,000 tons same date last year, and 671,000 tons in 1913. Deliveries from ports in Europe are larger than last year for the fortnight, 22,500 tons against 20,000 tons. European stocks are therefore increased to 255,000 tons as at the 15th inst., which with 169,000 tons afloat, makes a visible supply of about 424,000 tons. Sales by the Association have revived to the extent of 90,000 tons during the fortnight, total sales thus amounting to 1,390,000 tons for the current fertiliser year, against 1,023,000 tons a year ago. Official announcements state that the European market has been rather more active lately, but it is likely that the rapidly changing political events on the Continent, notably the decision of the Germans to discontinue payments under the Reparation Recovery scheme, will result in a restriction of markets. Some business is reported in c.i.f. parcels at about £11. 16s. per ton for near arrival up to £12. 2s. 6d. for December-February shipment.

Rothamsted Station Report. — The recently published report of the Rothamsted Experimental Station at Harpenden, covering the years 1921 and 1922, deals in part with the investigations into fertiliser values. Much valuable data are contained in the statistical tables at the end of the report, and the following broad conclusions will be of interest to fertiliser manufacturers. Experiments indicated that urea has a value between that of nitrate of soda and sulphate of ammonia, but in addition, it has two attractive features—it is highly concentrated and it exerts no harmful influence on the soil. Ammonium chloride, it was found, is generally about 5 to 10 per cent. less effective than ammonium sulphate containing the same amount of nitrogen. Certain experiments on the new basic slags and mineral phosphates are also recorded, the general result up to the present, being that the high soluble slags are quicker in action and more effective than those of low solubility, but the low solubility slags are more effective than their solubility indicates. In 1922, field experiments were made with magnesium sulphate, the results indicating that while apparently ineffective in ordinary conditions, it has, in certain farming conditions, a considerable fertilising value.

General Notes.—According to official information a good deal of business has been done by New Zealand in the importation of high-grade phosphate rock from Nauru and Ocean islands, the actual quantity brought into the Dominion during the past financial year being 51,430 tons. The accounts of the commissioners controlling the business are made up for a different period, their trading year ending on June 30. For the ten months ending April 30, 1923, the importations into New Zealand comprised 16.96 per cent. of the total output.

There has been a brisk demand by Latvian agriculturists for artificial fertilisers. The Latvian Government had set aside a sum of about 280,000 lats for granting loans to farmers for the purchase of fertilisers, but this amount was quickly exhausted, and additional credits will probably be granted.

One of the large chemical manufacturers of the North is putting on the market a waste lime which has been dried and pulverised, containing about 80 per cent. carbonate of lime, or 44.8 per cent. of calcium oxide, the remainder being water, at a price of 5s. per ton, states the *Journal* of the Ministry of Agriculture.

The statistics supplied of recent operating results of the American Trona Corporation indicate that this potash-producing enterprise is at length working on a profit-earning basis. For the first four months of 1923 production of potash and borax showed a large increase; and at the same time costs were appreciably lower. This improvement in operating practice, coupled with an increased demand for the company's product, has resulted in an operating profit during the first nine months of the current year of 81,000 dollars, as against an operating loss of 335,000 dollars for the year 1922. Further, it is stated that the indications point to this rate of profit being maintained during the remainder of the year. These results are considered especially encouraging in view of the exceptionally low price to which potash has fallen in America this year, owing to severe German competition.

Exports of fertilisers and fertiliser materials from the United States expanded 32 per cent. in value and 27 per cent. in quantity during the first nine months of 1923 as compared with the corresponding period of 1922, having risen from 13,082,630 dollars (707,738 tons) to 17,210,449 dollars (896,332 tons). The demand for sulphate of ammonia advanced 28 per cent. from 7,076,650 dollars (120,959 tons) in the first nine months of 1922, to 9,087,848 dollars (124,600 tons) in the first nine months of 1923. Of the foreign countries receiving sulphate of ammonia from the United States, Japan took two-thirds of the total, and Cuba and Hong Kong each one-tenth. Shipments of phosphate rock in the period increased 10 per cent. from 4,442,948 dollars (535,920 tons) to 4,872,544 dollars (673,467 tons). Superphosphates to the value of 409,602 dollars (32,153 tons) were shipped to foreign countries. Gains were also made in the exports of prepared fertiliser mixtures, 670,747 dollars (14,427 tons) having been exported.

PARLIAMENTARY NEWS.

Food Preservatives.

In the House of Commons, on Thursday, November 15, Mr. Barnes asked the Minister of Health whether he has received resolutions from local authorities expressing the opinion that the use of chemical colouring matters and preservatives in food constitutes a menace to the community, and calling upon the Ministry of Health to exercise without delay power which it already possesses to safeguard the public in this respect; and whether he will state what action he proposes to take?

Sir W. Joynson-Hicks: Yes, I have received a number of resolutions to this effect. The subject is at present being investigated by a Departmental Committee appointed by my predecessor, and I do not propose to take any action in the matter until I have considered the Committee's Report.

Anglo-Persian Oil Company.

Mr. Chamberlain, replying to Lieut.-Col. Hodge, said: A proposal for the acquisition of the Government holding in the Anglo-Persian Oil Company has been under consideration for some time. No decision has yet been reached, but I can assure the hon. member that no step is contemplated by the Government which would have the effect of jeopardising the supply of oil fuel for the Navy and Mercantile Marine

Mr. Shinwell asked the Prime Minister whether he can now state what negotiations have taken place with regard to the sale of the Government holding in the Anglo-Persian Oil Company; and whether, in the event of Government co-operation in the affairs of the Anglo-Persian Oil Company being withdrawn, steps will be taken to safeguard the interests of the shale and oil industry in Scotland?

Mr. Chamberlain: As has been stated, an offer has been received by His Majesty's Government, and in considering it the point raised by the hon. member will be taken into account with all other relevant factors.

Mr. Shinwell: Will the right hon. gentleman give a definite assurance that, so far as the industry in Scotland is concerned, it will be maintained?

Mr. Chamberlain: I cannot give any such assurance.

Trinidad Pitch Lake Concession.

Mr. Ormsby-Gore, replying to Mr. A. M. Samuel, said: The Trinidad Pitch Lake was first leased on July 12, 1888, and, with the approval of the then Secretary of State, an extension to 1930 was granted by a deed dated July 28, 1891. The present owners of the concession, who are a company under American control, have been in negotiation with the Governor of Trinidad for a further renewal, and the matter is now under the consideration of the Secretary of State. I cannot undertake that the decision will be postponed. The Pitch Lake concession is not regarded as a suitable matter for public tender, but the Secretary of State will, of course, be prepared to consider any offer made for it.

GERMAN REPARATION DUTY.

REPUDIATION BY THE IMPERIAL GOVERNMENT.

THE following ordinance concerning suspension of the payments for refunding reparations dues raised by the English Government has been promulgated from Berlin under date November 15, 1923, and signed by President Ebert, Prime Minister Stressemann, Minister of Industries, Koeth, and Finance Minister Luther:—

On the basis of Article 48 of the Constitution of the Empire, I decree the following for the restoration of public security and order within the confines of the Empire:—

Paragraph 1.

All payments, mentioned in the Table of Payments appended to Article IX. of the London Ultimatum of May 5, 1921 (*Reichsgesetzbl*, 1921 S., 761), in respect of the refunding of the reparation dues raised by the English Government on the basis of the German Recovery Act, 1921, are suspended. No claim whatsoever can be admitted against the German Empire on account of the suspension of these payments.

Paragraph 2.

The decision contained in Paragraph 1 does not apply to reparation dues in respect of contracts which were already concluded when this Ordinance came into force, provided that the said contracts are submitted to the Peace Treaty Office (Friedensvertrag-Abrechnungsstelle, G.m.b.H., Charlottenburg, Berlinerstr. 17), accompanied by a sworn copy of the contract, and also by the G.R. receipt issued by the British Government not later than March 31, 1923, within a period of two weeks within the coming into force of the Ordinance.

Paragraph 3.

In so far as the reparation due is admitted, payment will be made at the option of the Empire in cash in the currency obtaining at the time, or in other bonds of the Empire. The Imperial Finance Minister is empowered to issue the necessary orders for the execution of this Ordinance.

OUR BOOKSHELF.

Systematic Organic Chemistry. Cumming, Hopper, and Wheeler. London: Constable and Co.; 25s. net.

Organic chemistry being one of the most highly systematised of the exact sciences, a text-book which approaches the subject from any other aspect than that of strict systematic treatment labours under a definite disadvantage. Nevertheless, there is always the danger of such systematic works losing what we may term the "human element" and degenerating into mere compilations of names, formulæ, physical constants, and methods of preparation. The authors of the present volume have, however, mainly as a result of their industrial experience, succeeded in preserving the general interest and readability of the book without sacrificing systemisation to any extent. A special effort is evident throughout to present as many examples as possible of the preparation of compounds of any one type. Paucity in this respect has in the past been all too frequent. The linking of carbon to carbon, gaseous elements and sulphur to carbon, occupy about 312 pages. Dyes, drugs, electrolytic preparations, decompositions, analysis, group estimations, etc., are all sections presented in a very able manner. We are confident that the volume will receive a cordial welcome from all concerned in the teaching and study of organic chemistry.

Organic Chemistry (Molinari) (Part II., Vol. II.). Translator, Thomas H. Pope, B.Sc., A.C.G.I., F.I.C. London: J. and A. Churchill; 30s. net.

In general and industrial circles few modern works secure the general approbation and high esteem which that of Molinari so deservedly holds. Possibly it is the most practical and informative work we have, never hesitating to pass from the pure scientific to descriptive, manufacturing and plant detail, applications, uses, commercial statistics, and a host of other details not to be found elsewhere. Prominent features in Part II., Vol. II., are the sections on Sugar; Coal Tar Products; Tanning; Celluloid; Dyes; Silk; and Artificial Silk. Chemistry and its relation to all industrial activity is always presented in Molinari with the maximum of helpfulness.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

Business in the hematite pig-iron and steel trades in the district between Workington and Carnforth is now of such a satisfactory character as to leave no doubt that in January next the coal and coking industries will be subjected to a pressure heavier than they have experienced since the slump in 1920. There is a good deal of forward buying being done in the iron market by consumers in other parts of the country, and to their requirements have to be added those of the steelmakers at Workington and Barrow, who expect their mills to be engaged three weeks in four during the first quarter of next year. How the collieries and coking plants are then to respond to the call that will be made upon them is not quite clear. It is true that the ovens are not at present working at their maximum pressure, but they are at all events using up so much of the output of smalls that practically none can be spared for the market. All the round coal is being easily disposed of. A large proportion—about 10,000 tons weekly—is being shipped to Ireland, and the remainder is being sold in the local landsale market. In January, however, this trade will be even brisker, and there will assuredly be a larger demand for industrial fuel, though it is doubtful whether production can be materially increased. It is not generally realised that since the Whitehaven strike there has been a shortage of labour. There is no change in coke prices to local smelters, the figure being 25s. to 27s. 6d. per ton, and none will take place until after the next ascertainment of the price of hematite iron. Bessemer mixed numbers have risen 7s. 6d. per ton in the past few weeks to £5. 17s. 6d. per ton, delivered Glasgow and Sheffield, and coke-makers will in due course benefit from the appreciation of values. There is very little coke being shipped to the Continent. Of the residuals, crude benzol and tar are moving away fairly well, but sulphate of ammonia is on the slow side. East Coast coke supplies this week are 9,900 tons.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Acid Products, Ltd., Bradford. — Registered October 30, mort., securing £960. and any further advances, to Halifax Permanent Benefit Building Society.

Dixon and Cardus, Ltd., Southampton, oil and cake manufacturers, etc.—Registered November 2, deb., to Lloyds Bank, Ltd., securing all moneys due or to become due to the bank.

Organam, Ltd. (late Elstree Chemical Works (1922), Ltd.), London, E.C.—Registered November 3, £2,000. debs. (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £300.

SATISFACTIONS.

Morris and Griffin, Ltd., London, E.C., chemical manufacturers.—Satisfaction registered November 1, all moneys, etc., registered July 22, 1921.

Reliance Fuel Company, Ltd., London, E.C.—Satisfaction registered November 3, £700., registered September 6, 1921.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Gazeland China Clay Company, Ltd.—S. H. Smith ceased to act as receiver. November 3.

Lead Mines of Wales, Ltd.—Resolved November 5: That the company be voluntarily wound up. E. A. Ashton, Moorgate Station Chambers, Moorfields, London, E.C., liquidator.

Oxide, Ltd., Brentford.—R. Carpenter, Midland Bank Chambers, North Street, Brighton, appointed receiver. October 24.

DISSOLUTION OF PARTNERSHIP.

(Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.)

Whiteley and Co. (Joe Maurice Whiteley, Bertram Hilton, and Wm. Ellis), 103, Longwood Road, Huddersfield, chemical manufacturers and dealers. November 5. Debts by J. M. Whiteley, who continues. (November 9.)

REPORTS OF COMPANIES.

Lagunas Nitrate Syndicate, Ltd.

The annual meeting was held in London on Tuesday last, Sir Robert Harvey (the chairman) presiding. The Chairman, in moving the adoption of the report and accounts, said: The gross profit of £50,130. 1s. 6d. compares with last year's figure of £48,402. 5s. 5d., and by the deduction of debenture interest, London expenses, income-tax, corporation profits tax, and provision for stoppage expenses, is reduced to £22,496. 3s. 3d., which has been applied to the redemption of debentures.

The quota allocated to this oficina has been slightly increased. The south oficina was reopened in August, 1922. The monthly working returns have been regular, and show an improvement on previous results. A considerable quantity of potassium nitrate has been produced, all of which has been sold at a good premium. The market for this commodity appears, I am glad to say, to be expanding, and we look forward to making further sales at remunerative prices.

In our opinion, propaganda work should be extended not only in new countries, but in the old ones, particularly in the United States, which offers a practically unlimited area for operations. This, of course, will involve a larger expenditure. To-day the producers are actually contributing nearly £200,000. per annum, while the Chilean Government grants only a yearly subsidy of £40,000. In view of the large revenue derived by the Government from the direct duty of over 5s. on each metric quintal of nitrate shipped, the indirect duties on imported articles required by the oficinas, and the importance to the country generally of this industry, it would seem as if the aforesaid grant should be very materially increased.

The present combination comes to an end on June 30 of next year, and negotiations for its renewal will shortly commence. Certain modifications in the statutes may probably be advocated, and the English companies must be given ample time to consider any proposed alterations.

India Rubber, Gutta Percha, and Telegraph Works Company, Ltd.

The net profit for the year ended August 31 amounted to £96,344. This result follows net losses of £94,406. and £445,461. respectively for the two preceding years. The preference dividend required £12,500., a sum of £39,278. is added to reserve (last year a sum of £75,000. was transferred from reserve), and, including £3,592. brought forward, there is left a disposable balance of £48,158. The directors propose to pay a dividend of 5 per cent., free of tax, on the ordinary shares (against nil), and £10,658. is carried forward. The accounts include an E.P.D. refund (the amount is not given), but apart from this they show that the gradual improvement of the position has been maintained. The directors state that the allocation to reserve, raising it to £180,000., has been made after carefully considering the position of the assets in France arising from the abnormal exchange rates.

British Cotton and Wool Dyers' Association, Ltd.

The directors report that the profits for the half-year to September 30 last, including income from investments, etc., after charging administration expenses, £4,456. for specific depreciation, and £32,736. for repairs and renewals, and providing an estimated amount in respect of income-tax, corporation profits tax, and other contingencies, amounted to £75,929. From this have to be deducted audit fee and other professional charges £691., interest on first mortgage debenture stock £12,400., debenture-holders' trustees £100., and amount transferred to depreciation fund (which now stands at £202,500.) £12,500., leaving the profit for the period at £50,238. The amount brought forward at March 31 last (after deducting £5,250. voted at shareholders' meeting) was £37,132., which makes a credit balance on profit and loss account of £87,370.

Esperanza Nitrate Company, Ltd.

The report for the year ended June 30 states that the oficina, which was closed in June, 1921, was not reopened until April, 1923. The trading profit for the year was therefore derived from the realisation of nitrate stocks brought over from the previous year, from sale of a portion of the quotas allocated to the company, by the association, and from the sale of iodine. There was a net profit for the year of £2,807., which has been applied in reducing the construction account to £64,551. There is still a debit in the balance-sheet on profit and loss account of £89,551.

Pan de Azucar Nitrate Company, Ltd.

The report for the year to June 30 states that the balance brought forward was £44,393. After charging the whole of the expenses incurred during the stoppage and cost of reopening the oficina, there was a loss for the year of £1,423., leaving an available balance of £42,970. The directors propose to pay a dividend of 15 per cent., and to carry forward £30,491. The manufacture of nitrate at Pan de Azucar was not resumed until June 1 last, and the trading profit shown above was derived from the realisation of remaining nitrate stocks, from the sale of a portion of quotas allocated to the company, and from the sale of iodine.

Pena Copper Mines Company, Ltd.

Report for 1922 states: Losses on sales of produce, less interest, registration fees, and sundry other credits, after charging £7,707. for depreciation, amounted to £5,074., plus London expenses, income tax, and French dues and charges, £8,813., and interest on loans, £3,546., making loss for year of £17,433., which, deducted from balance brought in, £37,906., leaves to be carried forward £20,473

DIVIDENDS.

Cassel Cyanide Company, Ltd.—Final dividend of 6d. per share, making 9d. per share, less tax, for the year. This is the same as for the previous year.

Natal Ammonium Company, Ltd.—Accounts for two years to September 30, 1922, show loss for period, after charging interest, etc., of £51,886., increasing debit balance brought forward to £70,787.

Ilford, Ltd. — Dividend of 8 per cent. on the ordinary share capital for the year ended October 31. This is the fifth year in succession for which the ordinary shareholders have received 8 per cent.

Chloride and Electrical Storage Company, Ltd.—Interim dividend of 5 per cent. actual, less tax, on ordinary.

Eastman Kodak Company of New Jersey.—Regular dividend of 1.25 dollars per share and also an extra dividend of 1.25 dollars per share on the common stock, payable on January 2.

Birmingham Aluminium Company, Ltd.—Net profits for the year ended July 31 were £10,945., and £23,757. was brought forward. A dividend of 6 per cent., free of income-tax, is proposed on the ordinary shares, carrying forward £22,723.

Dominion Glass Company, Ltd.—Quarterly dividend of 1¾ per cent. on common stock, payable January 2 Last year, dividend same.

NEW COMPANIES.

African Pioneer Agency, Ltd. — Private company. November 7. Capital £10,000. To search for oil, mines, minerals, etc. Solicitors: Arthur Benjamin and Cohen, 23, College Hill, London, E.C.

C. Smethurst, Ltd.—Private company. Capital £8,000. Bleachers, dyers, and sizers. Office: Heady Hill Dye Works, off Bury New Road, Heywood.

Featherstone Hammond Partners, Ltd.—Private company. Capital £12,600., in 12,000 £1 preference and 12,000 1s. ordinary. Technical, consulting, and expert advisers, chemists, analysts, etc. Office: 28, Victoria Street, Westminster, S.W.

Gas Generators and Industrial Furnaces, Ltd. — Private company. Capital £5,000. Solicitors: Braund and Hill, 6, Grays Inn Square, W.C.

Harpic Manufacturing Company, Ltd.—Private company. Capital £10,000., 2s. shares. Manufacturing chemists, druggists, etc. Solicitors: Soames, Edwards and Jones, Norfolk Street, London, W.C

Key Products, Ltd.—Private company. Capital £100. Chemical manufacturers, etc. Address: The Haven, Wivenhoe, Essex.

T. Saville Whittle (Export), Ltd.—Private company. Capital £10,000., in £10. shares. Exporters of chemicals, drugs, etc. Office: 19, Lloyd Street, Albert Square, Manchester.

Thames Bank Chemical Works, Ltd. — Private company. Capital £100. Chemical manufacturers. Office: 92, Ealing Road, Wembley.

Vidrox, Ltd.—Private company. Capital £6,000., in 1s. shares. To acquire a secret process or processes for glazing tiles, bricks, etc. Solicitor: C. E. Brown, 4, Flowergate, Whitby.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN OCTOBER

(Concluded from page 586.)

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of Oct., 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended October 31.			Value. Month ended October 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
GUMS and RESINS:						
Arabic and Tragacanth ..... cwts.	6,463	3,478	7,164	16,340	18,883	21,967
Kauri ..... ,,	295	2,191	4,506	2,410	6,950	20,788
Rosin ..... ,,	100,243	144,313	131,226	81,577	103,141	84,577
Shellac, Seedlac, and Sticklac ... ,,	6,722	3,526	5,198	107,168	52,520	77,214
OILS, FATS and GREASES:						
Animal (except Marine Animal): Not Refined						
Tallow:						
From France .... tons	—	—	—	—	—	—
,, China ..... ,,	—	—	—	—	—	—
,, U.S.A. .... ,,	360	91	38	18,750	3,620	1,425
,, Uruguay .. ,,	155	10	228	5,701	1,128	8,365
,, Argentine Republic ,,	960	1,097	2,322	42,191	41,758	88,719
,, Australia .. ,,	1,319	2,223	457	58,598	79,239	18,332
,, New Zealand ,,	706	1,786	728	36,344	64,198	25,133
,, Other Countries ,,	339	162	279	14,894	6,805	10,650
Total ..... ,,	3,839	5,399	4,048	176,278	197,048	152,624
Fish (and Marine Animal)..... ,,	1,992	1,278	2,853	70,820	47,670	107,576
Mineral, Crude Petroleum..... galls.	15,432,616	24,570,320	31,907,825	253,142	318,816	182,912
Vegetable, other than Essential:						
Castor Oil ..... tons	35	475	365	1,191	23,955	18,109
Coconut Oil, Unrefined ..... ,,	7,972	2,777	2,333	103,282	108,926	98,327
Cotton-seed Oil, Unrefined ..... ,,	386	12	43	17,283	1,509	1,664
Linseed Oil .... ,,	8	814	303	474	30,437	13,079
Olive Oil, Unrefined ..... ,,	346	219	100	25,499	13,043	5,690
Palm Oil, Unrefined ..... ,,	7,612	5,084	4,159	266,806	156,467	150,245
Palm Kernel Oil, Unrefined ..... ,,	50	—	4	2,613	—	210
Rape-seed Oil ... ,,	96	110	38	5,356	4,734	1,797
Soya Bean Oil . ,,	2,594	3,083	2,554	90,671	120,493	86,940
All other Sorts .. ,,	1,489	1,255	679	69,263	56,041	15,122
SOAP STOCK ..... ,,	69	—	—	1,909	—	—
STEARINE:						
From Belgium .. ,,	64	57	91	4,287	3,006	4,676
,, Other Countries ,,	432	110	237	26,537	6,044	10,559
Total ..... ,,	496	167	328	30,824	9,050	15,235
BONES for Manure tons	64	663	735	548	4,132	5,494
TANNING SUBSTANCES, not elsewhere specified:						
Barks for Tanning cwts.	28,805	73,294	15,620	14,127	33,425	6,652
Sumach ..... ,,	14,489	11,609	9,642	10,596	7,322	8,816
Gambier ..... ,,	6,314	8,822	3,241	9,352	15,070	6,545
Myrobalans ..... ,,	22,091	64,355	23,621	9,106	23,620	8,782
Valonia ..... ,,	14,672	2,100	6,350	8,888	1,283	3,128
Other Sorts ..... ,,	1,010	2,347	433	728	1,585	180
BORON MINERALS (including Borate of Lime, Borate of Magnesium, and Boracite .... tons	892	319	1,757	14,531	5,712	26,879
FERTILISERS:						
Guano, Raw ... ,,	2,350	5,900	27	24,228	21,250	272
Phosphate of Lime and Rock Phosphate ..... ,,	29,256	22,272	21,181	94,131	45,270	45,623
SULPHUR, CRUDE.. ,,	497	6,059	7,982	3,015	27,196	31,987
FERTILISERS, not elsewhere specified:						
Basic Slag..... tons	8,490	15,487	9,008	44,389	67,720	24,685
GELATINE, GLUE, and SIZE..... cwts.	6,213	9,268	12,020	35,915	41,874	42,967

Articles.	Quantities. Month ended October 31.			Value. Month ended October 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
STARCH, DEXTRINE, FARINA, and POTATO FLOUR:						
Rice Starch ..... cwts.	7,985	5,943	8,125	12,707	9,765	11,235
Other kinds of Starch ..... ,,	103,048	228,886	196,367	76,748	152,337	133,893
Dextrine and Farina or Potato Flour cwts.	31,923	63,785	75,242	37,234	63,213	54,732
Total ..... ,,	142,956	298,614	279,734	127,689	225,315	199,860
COPPER ORE (including Regulus, Matte, Precipitate, Cement, Copper, and Scale):						
From Portugal... tons	—	—	—	—	—	—
,, Spain ..... ,,	3,115	693	3,216	159,456	36,195	181,871
,, Mexico ... ,,	—	—	—	—	—	—
,, Peru ..... ,,	38	—	—	1,088	—	—
,, Chile ..... ,,	20	28	568	800	933	9,120
,, Cape of Good Hope ... ,,	56	—	—	1,118	—	—
,, Australia .. ,,	28	2	14	308	50	475
,, Other Countries ,,	—	172	737	—	4,711	20,321
Total ..... ,,	3,257	895	4,535	162,800	41,889	212,087
IRON PYRITES (including Cupreous Pyrites) tons	21,030	37,299	28,273	51,993	76,776	57,173
MANGANESE ORE . ,,	3,164	62,320	76,336	22,588	192,800	203,679
SILVER ORE, including the value of the Silver contained in Argentiferous Ores and Metals ..... val.	—	—	—	38,642	35,829	33,512
TIN ORE and CONCENTRATES:						
From S. America tons	840	3,092	4,671	71,239	251,778	516,312
,, Brit. South Africa ... ,,	—	76	—	—	7,680	—
,, Other Countries ,,	684	677	872	60,850	60,651	95,985
Total ..... ,,	1,524	3,845	5,543	132,089	320,109	612,297
LEAD, PIG and SHEET:						
From Spain ..... tons	1,051	2,206	1,355	23,311	53,816	36,058
,, U.S.A. .... ,,	1,450	250	2,077	34,238	6,150	54,703
,, Mexico .... ,,	—	3,349	100	—	81,795	2,500
,, Australia .. ,,	855	10,255	1,088	19,625	258,008	30,279
,, Other Countries ,,	2,866	4,208	4,112	66,617	102,889	106,393
Total ..... ,,	6,225	20,268	8,732	143,791	502,658	229,933
MERCURY ..... lb.	10,202	367,049	179,779	1,000	55,501	21,566
TIN: Blocks, Ingots, Bars and Slabs:						
From Straits Settlements and Federated Malay States .... tons	1,946	760	610	304,035	124,113	124,453
From Australia .. ,,	50	133	175	7,865	22,595	35,638
,, Other Countries ,,	1,739	75	236	272,068	12,750	47,773
Total ..... ,,	3,735	968	1,021	583,968	159,458	207,864
ZINC, CRUDE (i.e., Cakes Slabs, Blocks, etc.) tons	11,078	6,179	13,104	286,668	189,597	414,133
Manufactures, not elsewhere specified (including Rolled Sheets, Plates, and Discs) tons	1,294	1,217	1,599	43,191	46,269	59,257

TIN EXPORTS FROM MALAYA.—It is officially reported from Kuala Lumpur that 3,447 tons of tin were exported from the Federated Malay States during October, as compared with 3,026 tons in September and 2,837 tons in the corresponding month of last year. The total export for the ten months of the current year is 30,989 tons as against 29,277 tons last year and 28,211 tons in 1921.

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN OCTOBER.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month of October, 1923, compared with 1921 and 1922. As from April 1, 1923, the export trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended October 31.			Value. Month ended October 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):				£	£	£
ACIDS:						
Sulphuric ..... cwts.	1,533	898	2,707	2,752	1,229	3,252
Tartaric (including Tartrates not elsewhere specified) ,,	878	1,277	2,422	8,747	8,046	14,956
AMMONIUM COMPOUNDS:						
Chloride (Muriate) tons	356	450	266	15,747	14,687	9,548
Sulphate—						
To France..... ,,	3,477	1,141	3,359	42,916	19,897	50,141
,, Spain and Canaries .... ,,	1,435	4,221	6,499	20,910	73,013	88,308
,, Italy ..... ,,	25	358	949	400	6,252	14,269
,, Dutch East Indies ..... ,,	4,441	2,376	4,305	63,946	38,539	65,841
,, Japan ..... ,,	500	—	3,646	6,500	—	60,860
,, British West India Islands (including Bahamas) and British Guiana ,,	288	132	1,094	3,673	2,231	15,144
,, Other Cntries ,,	1,392	1,431	6,735	18,729	24,619	99,906
Total ..... ,,	11,558	9,659	26,587	157,074	164,551	394,469
BLEACHING POWDER cwts.	8,861	22,325	31,918	7,925	13,335	16,272
COAL TAR PRODUCTS, not elsewhere specified:						
Anthracene..... cwts.	—	—	3,960	—	—	2,210
Benzol and Toluol galls.	24	5,906	424,599	8	954	21,423
Carbolic Acid ... cwts.	5,150	13,454	15,694	9,376	29,031	44,178
Naphtha ..... galls.	3,411	2,486	29,456	696	333	2,299
Naphthalene .... cwts.	892	4,908	21,314	1,181	2,354	15,218
Tar Oil, Creosote, etc. ..... galls.	804,780	500,655	7,250,372	37,556	17,056	299,932
Other Sorts ..... cwts.	13,996	18,342	38,061	9,548	10,793	27,364
Total ..... val.	—	—	—	58,365	60,521	415,924
COPPER, Sulphate of ..... tons	442	842	340	12,652	21,768	8,619
DISINFECTANTS Insecticides, Weed-killers and Sheep and Cattle Dressings, except Tobacco Offal, containing no Dutiable Ingred'nt cwts.	21,959	35,311	48,279	61,747	88,823	120,879
GLYCERINE—						
Crude ..... cwts.	892	120	9,643	3,393	448	25,154
Distilled ..... ,,	2,885	8,216	9,653	18,380	34,901	37,551
Total ..... ,,	3,777	8,336	19,296	21,773	35,349	62,705
POTASSIUM COMPOUNDS:						
Chromate and Bichromate ..... cwts.	778	1,801	3,815	2,631	5,271	9,743
Nitrate (Saltpetre)						
British prepared ,,	867	1,373	1,735	2,143	2,891	3,740
Other Sorts..... ,,	1,715	2,911	3,810	16,788	20,683	22,873
Total ..... ,,	3,360	6,085	9,360	21,562	28,845	36,356
SODIUM COMPOUNDS:						
Carbonate (including Soda Crystals, Soda Ash, and Bi-carbonate) .. cwts.	379,486	381,299	375,804	138,640	123,555	107,183
Caustic ..... ,,	91,852	113,608	145,967	107,993	115,011	122,486
Chromate and Bichromate ..... ,,	3,366	1,785	5,190	9,343	4,205	10,394
Sulphate, including Saltcake ... ,,	24,344	264,772	187,031	13,612	53,117	43,297
Other Sorts..... ,,	48,493	44,746	42,132	79,360	85,593	54,548
Total ..... ,,	547,541	806,210	756,124	348,948	381,481	337,908
ZINC OXIDE ..... tons	166	172	240	6,061	6,315	9,550
CHEMICALS, all other sorts ..... val.	—	—	—	247,096	231,479	332,126
DRUGS, MEDICINES, and MEDICINAL PREPARATIONS:						
Quinine and Quinine Salts ... ozs.	112,676	235,011	194,149	24,833	28,785	24,066
Opium, Dried and powdered in the United Kingdom lb.	36	98	4,575	50	70	3,724
Other Sorts..... val.	—	—	—	196,812	199,051	278,142
Total ..... ,,	—	—	—	221,695	227,906	305,932

Articles.	Quantities. Month ended October 31.			Value. Month ended October 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
DYES and DYESTUFFS (except Dye-woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning Products of Coal Tar ..... cwts.	6,291	4,237	16,224	69,710	56,892	130,684
Other Sorts..... ,,	6,345	4,799	4,819	10,873	7,998	7,587
Total ..... ,,	12,636	9,036	21,043	80,583	64,890	138,271
PAINTERS' COLOURS and MATERIALS not elsewhere specified:						
Barytes, Ground (including Blanc Fixe) . cwts.	302	5,322	8,148	270	2,879	3,207
White Lead (Basic Carbonate) ..... ,,	12,911	15,019	15,988	32,603	34,875	35,637
Paints and Colours Ground in Oil or Water ..... ,,	16,632	20,272	31,909	47,792	48,345	75,707
Paints and Enamels Prepared (including Ready-Mixed) ,,	15,853	19,544	36,089	58,440	63,927	117,508
Other Sorts..... ,,	38,211	41,523	63,582	91,135	91,036	124,055
Total ..... ,,	83,909	101,680	155,716	230,240	241,062	366,114
CANDLES ..... cwts.	9,792	8,618	19,817	32,089	24,631	38,507
OILS, REFINED—						
*Lubricating Mixed galls.	—	28,657	83,530	—	4,436	9,976
Petroleum:						
Lubricating .... ,,	391,443	718,895	831,693	68,120	85,336	97,404
Other Sorts..... ,,	863,351	12,646,687	5,436,938	52,442	202,381	99,980
SOAP, not containing Spirit:						
Soft ..... cwts.	1,603	844	1,716	3,196	1,679	2,789
Hard: Household and Laundry, in bars and tablets:						
To China..... cwts.	70	176	1,633	264	616	4,130
,, Other Foreign Countries ... ,,	24,853	20,695	27,855	63,534	44,933	57,235
,, British South Africa ..... ,,	6	273	108	29	725	320
,, British East Indies ..... ,,	30,344	26,044	34,818	69,261	50,523	67,188
,, Other British Possessions . ,,	33,236	26,519	36,090	83,765	55,520	72,971
Total ..... ,,	88,509	73,707	100,504	216,853	152,327	201,844
Toilet (including Shaving) ..... ,,	4,297	5,371	6,158	50,098	50,643	64,712
Polishing and Scouring ..... ,,	623	905	2,185	1,887	2,429	6,687
Soap, not elsewhere specified . ,,	3,237	2,181	7,411	15,840	12,248	35,468
Total of Soap ,,	98,269	83,011	117,974	287,874	219,326	311,500
VARNISH ..... galls.	67,864	92,410	130,564	46,789	53,892	71,017
WAX: Paraffin Waxcwts.	19,714	9,068	17,448	26,458	10,059	18,313
OIL-SEED CAKE:						
Cotton-seed Cake. tons	223	193	77	2,008	1,159	1,121
Linseed Cake .... ,,	163	213	675	2,166	583	8,010
Rape-seed Cake . ,,	2	—	284	52	—	1,596
Soya Bean Cake.. ,,	5	480	1,191	75	5,207	11,253
All other Sorts .. ,,	2,574	1,078	5,861	24,595	7,368	40,851
Total ..... ,,	2,967	1,964	8,088	28,896	14,317	62,831
OILS and FATS, refined, edible—Animal (except Marine Animal), refined:						
Lard ..... tons	213	35	44	11,871	2,734	4,023
,, Imitation .. ,,	31	35	149	2,207	2,197	7,647
Vegetable (other than Essential), refined:						
Coconut Oil ..... ,,	164	98	173	9,175	5,106	8,840
Cotton-seed Oil .. ,,	532	1,140	895	30,631	47,137	40,479
Olive Oil ..... ,,	6	8	14	2,643	2,337	3,608
Palm Oil ..... ,,	104	35	56	4,654	1,265	2,181
Palm Kernel Oil . ,,	213	25	197	12,012	880	8,649
All other Sorts .. ,,	518	383	1,157	26,875	16,856	47,090
Total ..... ,,	1,781	1,759	2,685	100,068	78,512	122,517
SALT (other than Table Salt):						
To Sweden ..... tons	1,858	2,526	2,717	6,957	7,412	8,796
,, U.S.A. ..... ,,	460	475	415	2,317	1,671	1,696
,, Nigeria ..... ,,	6,907	2,818	6,134	37,270	11,836	24,963
,, Brit. E. Indies ,,	7,755	5,831	11,571	23,326	11,761	23,301
,, Australia..... ,,	172	156	407	548	814	1,520
,, New Zealand . ,,	2,071	1,507	2,537	9,746	6,145	9,465
,, Canada ..... ,,	4,748	5,608	3,570	15,186	15,139	7,868
,, Other Countries ,,	4,172	4,210	6,699	16,129	12,063	19,824
Total ..... ,,	28,143	23,131	34,050	111,479	66,841	97,433

* Included in "Oils, Refined: Petroleum—Lubricating" prior to 1922.

(To be concluded.)

LEGAL INTELLIGENCE.

THE TRANSPORT OF ZINC ASHES.

A. H. Brandt and Co. and F. W. Vogel and Co. *v.* L. B. and R. P. Shipping Company, Ltd.

The Court of Appeal, composed of Lords Justices Bankes, Scrutton, and Atkin, on November 19 concluded the hearing of the case of Brandt and others *v* Liverpool, Brazil and River Plate Steam Navigation Co., Ltd., upon the defendants' appeal from the judgment of Mr. Justice Greer (*C.T.J. and C.E.*, May 4, 1923, page 550), holding that A. H. Brandt and Co., merchants, of London, one of the two alternative plaintiffs, were entitled to recover damages from the defendants for delay in the carriage of a consignment of zinc ashes from Buenos Ayres to Liverpool.

Messrs. Brandt and Co. brought the action to recover damages for alleged breach of contract contained in a bill of lading dated March 23, 1920, and for the return of £748. paid under protest, and, in the alternative, by Messrs. F. W. Vogel and Co., the shippers of the goods, under the bill of lading for the same relief against the defendants, the owners of the s.s. Bernini. The plaintiffs alleged that the defendants, having received from the shippers on board the Bernini at Buenos Ayres in March, 1920, 6,000 bags of zinc ashes, wrongfully discharged 5,620 of the bags at that port, and only forwarded the same after unreasonable delay in s.s. Cavour, which left Buenos Ayres on July 15, 1920, and that the plaintiffs, in order to get delivery, were compelled to pay £748., the amount of the alleged expense for reconditioning the goods at Buenos Ayres between the time of the discharge and the time of their reshipment on the Cavour, in respect of which the defendants claimed a lien.

The case for the defendants was that they were justified in discharging 5,620 bags at Buenos Ayres, because they had become wet by rail before they received them; that the goods heated in the hold, and that it was for their own preservation and for the protection of the other cargo in the same hold that they should be discharged and reconditioned; that they were guilty of no unreasonable delay in dealing with the goods; and that they were therefore not liable for the consequences of any delay in the carriage of the goods to Liverpool. Defendants also counterclaimed for £167, the difference between £915., which they alleged to be the actual cost of reconditioning modified by the rate of exchange at the time they sent forward the claim and the £748. which had been paid to them in discharge of their lien.

Mr. Justice Greer gave judgment for the plaintiffs, A. H. Brandt and Co., for the return of the money they had paid under protest, £748., and damages for failing to carry the goods on board the Bernini and deliver them in due course on the arrival of the vessel in Liverpool, such damages to be assessed. His lordship also gave judgment for the same plaintiffs on the counterclaim, and dismissed the claim of Vogel and Co. with costs. From this result the defendants now appealed.

The main question in the case was whether Brandt and Co. were entitled to sue the shipowners, and at the conclusion of the arguments their lordships decided this and other points in favour of Brandt and Co., and dismissed the appeal with costs.

SOUTH WALES NOTES.

(Specially Contributed.)

There has been further improvement in the tinplate trade, and orders from abroad are coming in steadily. The returns for October show a large increase in exports, over 16,000 tons more than for October, 1922, the main increase being accounted for by Japan, who last year bought only 249 tons, compared with 5,203 tons this year. It is confidently anticipated that there will be no serious trouble with the engine-drivers and stokers in connection with the notice to cease employment. The spelter trade is buoyant, the galvanised-sheet trade being very good, Japan again being the foremost market. A well-known spelter works near Swansea, it is currently reported, is again to come into operation. Several well-known commercial men are arranging to take over the factory and to instal new machinery. The patent-fuel trade is in a better condition. During the last few days an appreciable quantity of pitch has been purchased much below the published market quotations. Cokes continue to be in good call, and the ovens are increasing output. By-products, taken collectively, are now a strong market, and there is every appearance of still further progress being made. At the moment, however, there is little demand for sulphate of ammonia. Tar is in less call, but business is fairly good for the refined qualities.

Among the imports for the week were 27 tons zinc ashes and 10 tons superphosphates from New York, 4½cwt. olive oil from Bilbao, to Cardiff; 3cwt. nitrate of ammonia from Rouen, 1,865cwt. nickel oxide from Montreal, 20 tons calcium carbide from Antwerp, 200cwt. potassium sulphate and 295cwt. barytes from Hamburg, to Swansea. Exports included the following: 480 tons sulphate of ammonia to St. Hellan and 26 tons soda ash to Buenos Ayres, from Cardiff; 15cwt. white lead to Calcutta, 10 tons white zinc to Bombay, 10 tons white lead, four tons china clay, 90cwt. painters' colours to Buenos Ayres, from Newport.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

United Kingdom.

The Director-General, India Store Department, Branch No. 14, Belvedere Road, Lambeth, S.E. 1, requires supplies of copper sulphate. Tenders by November 30. Tender forms obtainable from above.

Tenders are invited for supply of 30,000 gallons of refined tar for road dressing, for the Epsom Rural District Council. The tar to be supplied at Gas Company's works, or in barrels at Tadworth, Ewell, and Cobham Stations. Tenders, on contractor's own forms, to be addressed to the Chairman of the Council before November 29.

Brazil.

A Rio de Janeiro firm is desirous of obtaining the representation of British firms for tinplate and industrial chemicals, etc. (Ref. No. 556.)

Spain.

A commission agent of Barcelona is desirous of securing the representation of a British manufacturer of drugs, pharmaceutical and industrial chemicals. (Ref. No. 546.)

Switzerland.

A Swiss firm at Geneva desires to secure the representation of British manufacturers of pharmaceutical products or proprietary medicines. Correspondence in French. (Ref. No. 547.)

Czecho-Slovakia.

An agent at Prague desires to secure the representation of British merchants dealing in aluminium, ferrosilicon, tin, zinc, phosphate, nickel, and various alloys. (Ref. No. 533.)

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," November 24, 1888.)

The Chemical Trade.—The makers of bleaching powder met in Liverpool on the 1st inst., and decided to prolong their Association's existence. The importance of the announcement is not at first apparent; but it may be said that that Association practically includes the whole of the makers of bleaching powder in the United Kingdom, and it is through its operations that the position of the chemical trade has been so greatly changed. The newer process of manufacture of soda threatened the existence of that older process with which the Tyne has such an honourable record; but the older process had a by-product not included in those of the newer. That by-product gives us the bleaching powder of which the Association regulates the price, and which has given greater financial aid to the makers of alkali. It seems to be the belief of chemical makers now that alkali is more able to take care of itself, and that next year it will command much higher prices. Still, in the meeting at Liverpool they decided to continue the Association, which they believe has done them such good service. But they continue it from month to month to merge it in one which will regulate the decomposition of salt, and thus affect the various products that flow thereout.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 5 to 10 (inclusive).

Sulphuric Anhydride. Audianne, P.; and Bachalard, G. 28,156.
p-cymene from Monocyclic Terpenes. Austerweil, G.; and Peufaillet, L. 28,190.
Vulcanising Caoutchouc and Synthesising Rubber Compounds. Benson, M. 27,738.
Condensing Acid Fumes During Concentration of Sulphuric Acid. Calder, W. A. S.; and Chance and Hunt, Ltd. 28,388.
Filter Funnels. Coman, V. W. S. 27,754.
Liquid Glue. Cooper, R. E. 28,019.
Press Trays for Clay. Copeland and Sons, W. T. 28,206.
Pure Alcohol. Coppée, E. 27,804.
Separation of Volatile Liquids. Coppée, E. 27,943.
Cellulose Derivatives. Dreyfus, H. 28,008.
Sintered Magnesite and Magnesite Bricks. Harr, K. 27,977.
Alkali Sulphides from Thiosulphates. Jackson, W. J. Mellersh-(*Koppers Co.*). 27,774.
Cooling Molten Fats. Keevil, F. E. 28,139.
Solvent Recovery. Lacy, S. A. de. 28,018.
Electrical Precipitation. Lodge-Cottrell, Ltd. (*Metallbank-und Metallurgische Ges.*). 27,876.
Emulsions or Solutions of Tar. Low, L. W. 28,065.
Separation and Fixing of Constituents of Air. Palacin, N. F. O. 27,931.
Aqueous Emulsions of Rubber. Pratt, W. B. 28,062.
Dispersal of Mineral Raw Materials by Chemical Action. Reitmair, O. 27,785.
Dehydrating Alcohol for Carburetting. Ricard, Allenet, et Cie. 27,791.
Pigment Colours. Roth, K. A.; and Sanders, L. A. 28,281.
Fused Cement. Soc. Anon. des Chaux et Ciments de Lafarge et du Teil. 28,296 and 28,297.
Removal of Water from Peat. Techno-Chemical Laboratories, Ltd.; and Testrup, N. 28,077.
Soaps, Perfumes, and Disinfectants. Villain, P. 28,047.
Bituminous Binding Materials. Westrum, L. S. van. 28,177.
Colloidal Emulsions. Whittelsey, T. 27,930.
Pharmaceutical Mercurial Preparations. Wohlgemuth, J. 27,952.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1*s. in stamps to the Comptroller, Patent Office Sales Branch,* 25, *Southampton Buildings, Chancery Lane, W.C.* 2.

1922.

Effecting Intimate Contact of Gases and Liquids. Wright, S.; and Meldrums, Ltd. 12,024. **206,174**
Extraction of Oil from Vegetable Fruits and Nuts. Moseley, L. H.; Dyke, F. M.; and Lever Brothers, Ltd. 12,892. **206,181**
Condensing the Acid Fumes Evolved During the Concentration of **Sulphuric Acid.** Chance and Hunt, Ltd.; Calder, W. A. S.; and Palmer, W. H. 21,012. **206,229**
Charcoal. Hillier, S. 21,280. **206,245**
Paint. Rimmer, H. A. 21,308. **206,247**
Extraction of Zinc. Hansgirg, Dr. F. 21,738. **186,589**
Base-exchanging Compounds. Hilditch, T. P.; Wheaton, H. J.; and Crosfield and Sons, Ltd., J. 22,091. **206,267**
Porous or Absorbent Material. Hilditch, T. P.; Wheaton, H. J.; and Crosfield and Sons, Ltd., J. 22,093. **206,268**
Nitrogen-assimilating Fertiliser. Jorgensen, P. 30,569. **206,363**
Sodium Compound. Cocksedge, H. E. 31,184. **206,372**

1923.

Artificial Silk. Farbenfabriken vorm. F. Bayer and Co. 335. **194,666**
Cellulose Structures from Viscose Solutions. Glanzfaden Akt.-Ges. 11,237. **206,449**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1918.

Oxidation of Ammonia. Partington, J. R. 16,537. **205,856**

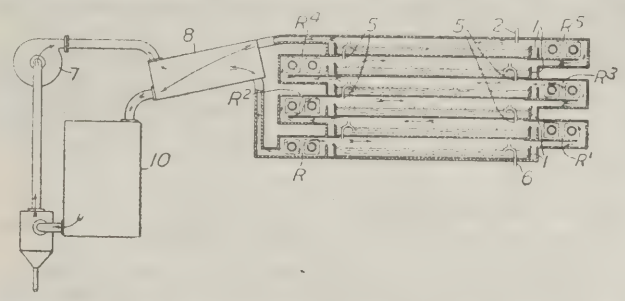
1923.

Condensation Products from Phenols and Aldehydes. Bakelite Ges.; and Hessen, Dr. R. 9,522. **206,469**
Liquid-tight Coating on Porous Bodies. Soc. Anon. Le Carbone. 12,715. **206,471**
Purifying Hydrocarbons. Barrett Co. 25,292. **206,484**
Emulsions of Bismuth Salts. Hoffmann-La Roche and Co., Akt.-Ges. F. 25,478. **206,487**
Dyestuffs of the Azine Group. Soc. Anon. des Matières Colorantes et Produits Chimiques de Saint-Denis; Wahl, A.; and Lantz, R. 26,154. **206,488**
Urea. Soc. des Produits Azotes. 26,164. **206,489**
Oxides of Nitrogen. Ramsay, H. G. A. 27,052. **206,498**
New Organic Compounds of Mercury. Albert, Dr. A. 27,376. **206,507**
Condensation Products. Pollak, F. 27,613. **206,512**
Dehydrating Alcohol for Carburetting Purposes. Soc. Ricard, Allenet, et Cie. 27,791. **206,516**
Colloidal Emulsions. Whittelsey, T. 27,930. **206,520**

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Acetic-acid Distillation. British Cellulose and Chemical Manufacturing Company, Ltd., London; and W. Bader, Spondon, near Derby. British Patent **204,196,** of 1922.

Volatile constituents of a liquid mixture are separated by heating the liquid to a temperature below its boiling-point while it is covered with a thin layer of a liquid, such as oil, which floats upon and is immiscible with the liquid, and preferably has a higher boiling-point, and continuously removing the vapours by a gas or air current passed over the surface. The composition of the vapours is determined mainly by the solubility of the constituents in the oil. The gas or air may be used as heating-agent for the liquid, and it may be cooled, compressed or liquefied to separate the vapours. As applied to the distillation of dilute acetic acid, the liquid is passed in succession through trays 1 from an



inlet pipe 2, through overflow pipes 5, to an outlet pipe 6, and the surface of the liquid in each tray is covered with a thin layer of a high-boiling petroleum distillate, for example, spindle oil. Air from a blower 7 is passed through a heat exchanger 8, and over a radiator R which brings its temperature to about 100° C. and then in succession through the horizontal spaces between the trays, radiators R^1 . . R^5 being used to maintain its temperature at about 100° C. The vapour-laden air passes through the heat-exchanger 8 to a condenser 10 and is returned to the blower 7. In treating acetic acid of 30 per cent. strength a distillate of 60 per cent. strength is obtained. A second treatment will yield acid of 80 per cent. strength and a third treatment, acid of 92.95 per cent. strength.

Dyeing Cellulose Acetate. J. Y. Johnson, London. (Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany.) British Patent **204,280,** of 1923.

Cellulose esters, particularly cellulose acetate silk, are dyed with the bisulphite compounds of insoluble or difficultly-soluble azo dyes. In an example, cellulose acetate is dyed golden-orange from a bath containing the bisulphite compound of benzene-azo-β-naphthol and acetic acid.

Sulphuretted Dyes. R. B. Ransford, London. (L. Cassella and Co., Ges., Frankfort, Germany.) British Patent **204,108,** of 1922.

New sulphur-containing products are prepared by condensing a *p*-arylquinone of the benzene or naphthalene series, or a halogen derivative thereof, with an *o*-aminoarylmercaptan or an equivalent thereof such as an *o*-aminoarylthiosulphonic acid, an *o*:*o*-dinitrodiaryldisulphide, an *o*:*o*-diaminodiaryldisulphide, or the product of the action of disulphur dichloride on an aromatic amine or the transformation product of such a substance described in Specifications 17417/14 and 18292/14; alternatively a corresponding *p*-hydroquinone may be oxidised together with an *o*-aminoarylmercaptan. By treatment with sulphurising agents these compounds yield dyestuffs which dye particularly vegetable fibres from the vat or sulphide bath in shades fast to washing, chlorine, and light. Examples are given.

Dyeing Cellulose Acetate. R. Clavel, Basle, Switzerland. British Patent **204,179,** of 1922.

In the production of azo dyes upon cellulose acetate silk, films, etc., the development is effected at temperatures of from 75° C. to boiling-point; the application of the bases may be effected at the same high temperatures or not; the bases and developers may be applied in separate baths or in a combined bath; the diazotisation is effected in a separate bath at ordinary or low temperatures.

Washing-compositions. A. G. Bloxam, London. (Akt.-Ges. für Anilin-Fabrikation, Treptow, near Berlin.) British Patent **204,077**, of 1922.

A solid washing agent comprises a mixture of a bisulphite compound of an aldehyde or ketone, acting as a fibre protector, and soap or one or more alkaline compounds such as alkali carbonate, borate or silicate or the soap and alkaline compounds may be used together. *Reference has been directed by the Comptroller to Specification* 12283/11.

New Vat Dyestuffs. J. Y. Johnson, London. (Badische Anilin and Soda Fabrik, Ludwigshafen-on-Rhine, Germany.) British Patent **204,241**, of 1922.

New vat-dyestuffs dyeing or printing in grey to blue-black shades are prepared by the action of hydroxylamine on a dibenzanthrone compound; a solution of hydroxylamine as obtained by the electrolytic reduction of nitric acid may be used. The products are possibly aminodibenzanthrones and their sulphuric acid solutions take up nitrous acid in quantity corresponding with a monoamino compound; the dyestuff isolated from this solution dyes cotton in more bluish shades. In examples a solution of dibenzanthrone in sulphuric acid is acted upon with hydroxylamine sulphate or hydrochloride in the presence of copper sulphate, or with hydroxylamine sulphate alone. Specification 16538/04 is referred to.

Purifying Hydrocarbons. A. E. Dunstan, Sunbury-on-Thames. British Patent **204,078**, of 1922.

Liquid hydrocarbons containing unsaturated bodies are purified by treatment in the liquid state with chlorine water or a solution in water of hypochlorous acid, and the product is treated with alkali to convert the chlorinated bodies into ethers and so produce a liquid suitable for use as a motor fuel. The chlorinated bodies may be isolated by steam distillation, treated with alkali, and the ethers produced added to the hydrocarbon liquid. Highly-cracked gasoline may be subjected to a preliminary treatment to polymerise the more active unsaturated hydrocarbons—*e.g.*, it may be filtered through bauxite or other mineral adsorbent, or treated with mineral acid or with anhydrous chloride of aluminium or zinc. In an example, a gasoline containing 0.3 per cent. of sulphur is agitated with a solution of hypochlorous acid containing 35.5 grammes of chlorine per litre until absorption ceases. The product is boiled gently with dry shaked lime, until the chlorine is substantially eliminated, and is then distilled.

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Boron Carbides. Hartstoff-Metall Akt.-Ges., Berlin. (Assignees of E. Podszus, Berlin.) British Patent **204,337**. Convention date, September 20, 1922.

Boron carbides having a greater proportion of carbon that has B_6C, such as B_3C are obtained by fusing a mixture of boron, boron carbide (B_6C) or boron nitride with the requisite quantity of carbon. The product is rapidly cooled to prevent decomposition with the separation of graphite. The process may be effected under pressure, which facilitates the solution of the carbon. To increase the strength of the product small quantities of metals having a high melting-point such as tungsten or titanium or the carbides of these metals may be added.

PUBLICATIONS RECEIVED.

The Evolution of Bleaching.—By S. H. Higgins, M.Sc. Reprint from the *Journal of the Textile Institute*; Vol. XIV.; Nos. 8, 9, 10.

Institution of the Rubber Industry.—Second Year Book (1923), containing list of members, papers, etc. Session 1922-23. Faraday House, 10, Charing Cross Road, London, W.C. 2. Pp. 448; **price 5s.**

China.—Department of Overseas Trade Report on the Industrial and Economic Situation (to June, 1923), by Mr. H. J. Brett, Commercial Secretary to H.M. Legation, Shanghai; together with a report on Chinese Turkestan, by Mr. C. P. Skrine, H.M. Consul, Kashgar. London: 1923: H.M. Stationery Office; price 1s. 6d. net.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals. — The tone of the spot market is hardening as a result of the German default in payment of the reparation levy of 26%, to which we refer on another page. The future trend of prices is likely to be towards higher values. **Acetic Acid,** 80% technical, £46. to £47.; 80% pure, £47. 10s. to £48.; 98% glacial, £60. in casks and £72. per ton in glass demijohns, ex wharf London; dealers' prices are fully maintained at these figures, and the market is very steady; business has again been limited. **Acetone,** British Government specification, about £124. per ton, in drums; the spot position is very steady, although business has been poor. **Alum,** lump, £10. to £10. 10s. per ton, in casks; importers are offering at about these figures, with the demand still small. **Arsenic,** Cornish white powdered, £63. to £64. for Cornwall, about £68. f.o.b.; business is much quieter, but the market stands quite firm, and no reaction is looked for. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; dealers continue to quote at this price, with the demand small. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; prices on spot are perhaps a shade firmer this week, with business slow. **Barium Chloride,** 98—100%, £14. 15s. to £15. per ton; the spot position is firming up, and may advance to the higher figure quoted here. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P. crystals, about 1s. 5d. per lb., less 5%; the improved state of this market reported last week has not been sustained; the position is again dull and unsteady. **Cream of Tartar,** 99—100%, about 85s. per cwt.; business remains slow, but prices are being steadily maintained. **Epsom Salts,** commercial quality, about £4. 10s. to £4. 15s. per ton, in bags; business remains slow, with prices unchanged. **Formaldehyde,** 40% volume, about £65. per ton; prices quoted are dearer here, and the position generally is firmer. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton; prices quoted are about the same, but business remains slow and small. **Lead Acetate,** brown, about £43.; white, about £43. 10s. per ton; spot supplies are small, and Continental offerings are limited and dearer. **Litharge,** imported, about £36. per ton; dealers' prices are rather firmer, with business somewhat better. **Lithopone,**

30% Continental red seal, £23. to £24. per ton; dealers prices are advancing in consequence of firmer conditions on the Continent. **Ammonium Chloride,** grey galvanising, £31. per ton; this higher rate is about the lowest price now quoted, and the tendency is towards still higher spot rates. **Nickel Sulphate,** home trade, single and double salts, £38. per ton; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at these rates. **Oxalic Acid,** 5¾d. to 6d. per lb.; the market has again been almost inactive, and prices are none too steady. **Carbonate of Potash,** 90—92%, about £25. 10s. to £26.; 96—98%, about £28. per ton; as a result of the unsettled state of Germany, prices on spot are much firmer, and tend to go still higher. **Chlorate of Potash,** crystals and granular, 2¾d. to 3d. per lb.; dealers are meeting with little inquiry for this article; prices are unchanged. **Caustic Potash,** 88—92%, £31. to £32. per ton; the spot position is certainly firmer, and the market is likely to advance still further in the near future. **Permanganate of Potash,** commercial quality, about 9d. per lb.; business has been slow here, with quoted prices about level on the week. **Prussiate of Potash,** yellow, about 10½d. per lb.; dealers offering British material continue to quote at about this rate, but business does not seem to have been anything great of late. **Sulphate of Potash,** 90%, £11. per ton; there is no change in this article to record. **Mercury,** about £10. per bottle of 75—76lb.; the spot position seems quite steady, and business has been better of late. **Red Lead,** imported, about £36. 10s. per ton; dealers' prices are dearer, with the market quite steady. **Salammoniac,** dog-tooth crystals, fully £50.; medium, £44. to £45.; fine white crystals, £28. to £29. per ton; spot supplies are now rather limited, and supplies from the Continent are doubtful; dealers' prices for actual stocks here are dearer, and stand very firm; higher prices are expected. **Saltcake,** home trade, about £4. 10s. per ton; this item is very steady, and most supplies have been taken up. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; dealers continue to quote at these old prices, with not much business coming their way. British makers' prices for domestic consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; and 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary according to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags free; British makers' price to home trade only, carriage paid quoted; dealers are offering at competitive rates. **Bichromate of Soda,** home trade, 4½d. per lb.; British makers' continue to quote at this figure, carriage paid; dealers' prices are about the same. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers' price for home trade is slightly dearer. **Soda ash,** 58% light alkali, £7. 10s. per ton, in bags; British makers quote at this price for home trade only, packages free, carriage paid in Great Britain; their prices for export vary as to destination. **Hyposulphite of Soda,** pea crystals, about £15. to £15. 10s. per ton; commercial quality, fully £10. to £10. 10s. per ton; owing to the position on the Continent, dealers offering imported material are asking higher rates, but prices mentioned are at present very irregular. **Nitrate of Soda,** 96%, £13. 5s. per ton, f.o.r. or f.o.b.; prices are about the same on a steady market. **Nitrite of Soda,** 100%, about £26. 10s. per ton; there is no further change in price to record here; market steady. **Prussiate of Soda,** about 5½d. per lb. as quoted by dealers offering British material; this market remains dull, and is rather weak. **Sodium Sulphide,** 60—62% solid, about £14.; ditto, broken, about £15., in drums; the spot position remains dull, but prices may harden a little, owing to the position on the Continent. **Tin Crystals,** about 1s. 3½d. per lb.; there is no change to record here. **Tartaric Acid,** B.P. crystals, 1s. 1½d. per lb., less 5%; the spot position remains dull and rather weak, with the price quoted more or less nominal. **White Lead,** imported, about £43. to £44. per ton; higher prices are being mentioned by dealers, with little doing. **Zinc Oxide,** B.P., £52.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers' continue to quote at these unchanged rates.

Pharmaceutical Chemicals.—The spot market in fine chemicals stands very firm indeed, and business has again been active. Reports from the Continent, especially Germany and France, point to an acute shortage by the end of the year. Spot holders are now very firm in their quotations. **Acetanilid,** crystals and powder, 2s. 6d. to 2s. 9d. per lb.; the spot position is again firmer, with supplies limited; business for home and export account has again been active. **Acetyl-Salicylic Acid,** B.P., 3s. 9d. per lb.; the spot price is fully maintained at this level; business has been very active, and spot supplies are now small. **Benzoic Acid,** N.P., 3s. 6d. to 3s. 9d. per lb.; this price is quoted by dealers, but there is some difficulty being experienced in obtaining import licences, although the material is badly wanted here. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. per lb.; dealers continue to quote at this figure, but there is not much doing. **Salicylic Acid,** B.P., 2s. 4d. to 2s. 6d. per lb.; this item is firmly held at these rates, and business has again been good. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; this article is tending to firm up to the higher figure quoted. **Amidopyrin,** about 15s. per lb.; business is still small, but prices as quoted are steady. **Ammonium Bromide,** B.P., 8d. to 8¼d. per lb.; on spot little material is being offered below these figures, and the tendency is certainly towards still higher rates. **Benzonaphthol,** about 5s. per lb.; there is very little interest shown in this article; dealers' quotations are unchanged. **Betanaphthol,** resublimed, about 2s. 6d. per lb.; dealers continue to quote at this higher figure, but business has been slow. **Benzaldehyde 03,** about 3s. per lb.; the spot position is steady, but rather quiet. **Calcium Lactate,** 2s. to 2s. 3d. per lb.; this market is firming up, and the higher price is likely to obtain by the end of this week. **Chloral Hydrate,** duty paid, about 4s. 3d. per lb.; the spot position is fully maintained, and tends to advance again. **Creosote,** B.P., about 2s. 6d. per lb.; this spot price is fully maintained, and any movement will be to higher rates. **Creosote Carbonate,** about 8s. 6d. per lb., nominal; no interest is shown in this article. **Guaiacol Carbonate,** about 13s. per lb.; the spot position is very firm, and some opinions favour still higher prices to come. **Hexamine,** about 4s. 3d. to 4s. 6d. per lb.; the tendency here is for the spot price to firm up to the higher price quoted; supplies are short, and little is offering from the Continent. **Hydroquinone,** 4s. 3d per lb.; most of the offers at 4s. per lb. have been taken up, and the higher price mentioned now governs the market. **Methyl Salicylate,** 2s. 10d. to 3s. per lb.; prices on spot are firm at these levels, and an advance is not unlikely. **Methyl Sulphonal,** about 25s. per lb.; the spot position now seems to have reached this unusually high rate, and very little is offering cheaper. **Paraformaldehyde,** 3s. 9d. per lb.; dealers quote firm at this rate, and a fair volume of business has been done. **Paraldehyde,** 1s. 7d. to 1s. 8d. per lb.; the tendency here is for the spot position to move up to the higher price quoted. **Phenacetin,** 7s. 6d. per lb.; it is difficult to locate supplies on spot offering below this figure; higher prices are expected. **Phenazone,** about 8s. 6d. per lb.; some spot holders are now looking for 8s. 9d. per lb., and this price will probably obtain at the end of this week. **Phenolphthalein,** 8s. 3d. to 8s. 6d. per lb.; still further advances are recorded here, and there is very little offering on spot. **Potassium Bromide,** B.P., crystals and granular, about 7½d. per lb.; at this level the spot position is now very firm, and some good business has been transacted; it is considered likely that higher prices will obtain before long on spot. **Potassium Permanganate,** B.P., about 9½d. per lb.; dealers' quoted prices are firm at this level, but there has not been much doing. **Potassium Sulphoguaiacolate,** about 7s. per lb.; the market remains dull, with quoted rates unchanged. **Resorcin,** about 6s. per lb.; spot holders continue to offer at this price, and are doing a fair business. **Salol,** about 4s. 3d. per lb.; dealers holding spot supplies are not willing to sell much below this higher figure. **Sodium Benzoate,** about 2s. 9d. per lb.; dealers are offering at this price; not much inquiry at present. **Sodium Bromide,** B.P., crystals and granular, fully 8d. per lb.; this item is now firm on spot, and there is every evidence of still further advances in spot prices; business has again been brisk. **Sodium Diethylbarbiturate,** about 18s. per lb.; the spot price is the same as last week, with the market dull. **Sodium Salicylate,** B.P., crystals 3s., powder 2s. 10d., per lb.; dealers holding spot stocks are very firm at these rates, and have been doing a good volume of business; supplies are now very limited, and higher prices are expected. **Sulphonal,** about 20s. per lb.; the spot price is now steady at this rate, and some fair business has been done. **Terpin Hydrate,** about 1s. 9d. per lb.; dealers continue to quote at this rate, with the market dull. **Thymol,** 15s. 6d. to 16s. per lb.; dealers quoting at these figures for spot supplies.

Coal-tar Products, Intermediates, Etc.—With the exception of pitch, which is again easier on a dull market, the

products in this section show no change on the week. Business throughout has been quiet and small in volume. Many items as quoted are not at all steady. **Aniline Oil,** 9d. to 9½d. per lb.; at these rates the position is fairly steady, but business is lacking. **Aniline Salt** 9½d. to 10d. per lb.; prices quoted are level on the week, with the market quiet. **Beta-naphthol,** 1s. 1d. to 1s. 2d. per lb.; although this market is dull, prices may harden a little. **Benzol,** about 1s. 3½d. to 1s. 4d. per gallon, f.o.r. makers' works, in buyers' packages; makers continue to quote at about these prices, but business is slow, and prices rather easy. **Toluol,** 1s. 8d. to 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; this market has again been dull; quoted rates are unchanged. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon, drums extra; dealers prices are level on the week, with the market dull. **Naphtha,** about 1s. 2d. per gallon; at this quoted rate the market is rather weak, with business slow and small. **Solvent Naphtha,** 90/160, about 1s. 2d. per gallon, drums extra; a further reduction in price is notified, with the market still quiet. **Heavy Solvent Naphtha,** 90/190, 1s. 2d. per gallon, drums extra; dealers have made a further cut in their quoted prices, but so far business remains poor. **Burning Oils,** crude, No. 3, 8½d.; No. 2, 8d. per gallon, barrels free; dealers' prices are maintained at these old levels. **Special Oil,** for Diesels and motors, 10d. per gallon, barrels free; the market is steady at this unchanged rate. **Creosote Oil,** about 9½d. per gallon, f.o.b.; dealers are offering at this rate, with the market steady, but not very active. **Carbolic Acid,** crystals, about 1s. 1½d. per lb.; dealers' prices are close up to this level; business continues to drag. **Naphthalene,** about £19. per ton; this market may recover its recent decline in value before long; crude, £5. to £11.; crystals, £23.; powder, £17.; balls, £24.; tablets and candles, £28. per ton, packages free. **Disinfectants,** 3s. 9d. per gallon, barrels free; the market is unchanged. **Pyridine,** 22s. per gallon; the spot price is well maintained at this level, and tends to advance slightly. **Hexamethylene,** 3s. 9d. to 4s. per gallon; this article is dearer on spot, with the market moving up to the higher rate quoted. **Pure Methyl Alcohol,** about £90. per ton, in drums, ex wharf London; dealers' prices are steady on a quiet market. **Pitch,** about 130s. per ton, f.o.b. East Coast; this market has remained dull, and prices are much easier on the week; the demand has been disappointing.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £61. to £61. 2s. 6d., cash; £61. 12s. 6d. to £61. 15s., three months; electrolytic, £66. 10s. to £67. **Tin:** Standard, £223. 7s. 6d. to £223. 10s., cash; £224. to £224. 2s. 6d.; three months; Straits, £223. 17s. 6d.; English, £224. 2s. 6d. **Lead,** soft foreign, £30. 5s., prompt; English, £32.; chemical sheet, 37s. 6d. per cwt. for 2-ton lots, delivered. **Spelter,** prompt, £32. 7s. 6d.; hard, £27. 5s. **Antimony,** English regulus, 99%, £35. 5s. to £35. 10s.; special brands, £42. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. 15s. to £9. 17s. 6d. **Bismuth,** 10s. **Platinum,** £29. per oz.; scrap, £27. **Wolfram,** spot, 12s. to 12s. 3d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** prices as a whole are unchanged, with a firm tendency: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

Business generally continues on the dull side both on home and export account, with few alterations in value to record. For alkali products prices are steady at recent rates, and makers fairly well engaged with orders. So far, nothing has been done regarding next year's contracts. **Bleaching Powder,** softwoods, dull at £11. 5s. on rails. **Glauber's Salt,** easy at 70s., carriage paid. Roasted **Saltcake,** slow of sale at £4. 10s. per ton. Recovered **Sulphur,** firm at £5. 5s. on rails, in bulk. **Chlorates** have a higher tendency; **Potash** at 3d., and **Soda** 2¾d., per lb. **Bichromates** unaltered. Demand for **Copper Sulphate** continues slack, and price nominal at £25., f.o.b. **Phosphate** and **Hyposulphite of Soda** are dull; **Nitrite** is firm at £26. 10s., ex store. White powdered **Arsenic** continues in short supply, and Cornish make quoted at £70., delivered. Yellow **Prussiate of Potash,** steady at 10½d., delivered; **Soda,** 5¾d. per lb. **Carbonate** and **Caustic Potash** have an upward tendency. **Acetic Acid** and **Acetate of Soda** are moving off fairly well. Brown **Acetate of Lime** scarce, and price advanced to £14. 10s. per ton; grey, firm at £22. per ton. **Acetone,** £124. Miscible **Wood Naphtha,** 6s. per gallon. **Lead Salts** are higher on account of the scarcity of foreign supplies: White **Acetate** at £44.; brown, £45.; and **Lead Nitrate,** £44. per ton. Green **Copperas** is in steady request. **Oxalic Acid,** dull at 5¾d. per lb. **Permanganate of Potash,** 8½d., carriage paid.

SWANSEA MARKET REPORT. Wednesday.

Tinplate prices are very firm, and based on £1. 3s. 1½d. per standard box, f.o.b. **Galvanised Sheets** in good demand, with an upward tendency at £19. 2s. 6d. per ton, f.o.b. **Copper** firmer, with prompt at £61. 2s. 6d. per ton, and three months £61. 12s. 6d. **Tin** firm, with moderate buying at £219. 12s. 6d. per ton cash, and £220. 2s. 6d. three months. **Lead** rather easier; prompt, £30. 2s. 6d. per ton; forward, £28. 12s. 6d.; English, £32. **Spelter** shows good inquiry; prompt, £32. 7s. 6d. per ton; forward, £32. 11s. 3d. **Zinc Sheets** in fair demand at £39. 12s. 6d. per ton, on rail makers' works. **Sulphate of Copper,** dull at £25. 12s. 6d. per ton, less 5%, in casks, f.o.b. **Sulphate of Ammonia,** very steady at £14. 15s. per ton for home requirements; some export business passing at £14. 2s. 6d. per ton, f.o.b. **Nitrate of Soda** quiet, with prompt at £13. 7s. 6d. per ton, f.o.b. **Bone Meal** rather neglected at £9. 2s. 6d. per ton, f.o.b. **Pitch** easier, with some buying at £6. 3s. 6d. per ton, delivered docks. **Creosote** very steady, and in good demand at 8¾d. per gallon. **Benzol** in strong demand, and dearer at 1s. 4½d. per gallon, and crude at 9¾d. **Arsenic** in better inquiry, with dearer quotations; white powdered at £64. 12s. 6d. per ton, f.o.b. **Oxalic Acid** slow at 6½d. per lb. on rail. **Copperas** in fair demand at £2. 3s. 6d. per ton, including delivery London or equal. **Sulphuric Acid** meets with steady demand at unchanged quotations. **Seed Oils** firmly held, with raw **Linseed** at £2. 6s. 3d. per cwt., and boiled £2. 8s. 3d. **Cottonseed Oil,** common edible £2. 3s. 3d., and deodorised £2. 6s. 3d., per cwt. **Rape Oil** steady; refined, prompt, £2. 6s. 3d. per cwt. **Cod Oil** quiet; Newfoundland, prompt £2. 5s 1½d., and English £1. 14s. 3d. per cwt., at docks. **Coconut Oil** firm, with Ceylon at £2. 6s. 8d. per cwt. **Castor Oil,** very firm at £2. 13s. 9d. per cwt., net, in barrels. **Palm Oil** quietly steady; Lagos £37. 17s. 6d. prompt, and £37. 12s. 6d. forward; softs £37. 10s. prompt, £37. 7s. 6d three months; mediums £37. 11s. 6d., and hards £37. 17s. 6d., prompt, per ton. **Turpentine** easier; American, prompt, £3. 13s. 10d. per cwt. **Olive Oil** steady, with small offers at £67. 17s. 6d. per ton, ex ship. **Coal** somewhat irregular, with good outlook: Best Admiralty smokeless, £1. 7s. 6d. to £1. 8s. 6d.; seconds, £1. 6s. to £1. 7s.; ordinaries, £1. 5s. 6d. to £1. 6s.; Monmouthshire black vein, £1. 4s. 6d.; all per ton, f.o.b. **Anthracite** active, best large £2. 6s., seconds £1. 15s. 3d.; Paris and French nuts, £2. 17s. 6d. per ton, f.o.b. **Patent Fuel,** firm and unchanged. **Cokes** are a strong market; export, £2. 5s. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, in trucks, at ovens.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Inquiries for chemicals of the heavier class, for use in the United Kingdom, have been made on a very fair scale, special interest being shown in supplies likely to be available, and prices for such supplies, in the early part of 1924. In the export department business has been more active, and shipments have been fairly heavy. **Bleaching Powder** has been rather more in demand; for spot lots and for export, £11. 5s. per ton is quoted; special prices, according to requirements, being quoted in contracts. **Chloride of Calcium** has been in moderate demand, and is £5. 12s. 6d. per ton. **Caustic Soda** has had a quietly steady sale on home-trade account, and a fair shipment for export; the price of spot, for home-trade use, is £19. 7s. 6d. per ton; special terms are quoted for contracts, according to requirements. **Bicarbonate of Soda** has sold somewhat freely on home-trade account, and has had a steady but moderate shipment to foreign ports; it is £10. 10s. per ton, carriage paid, to users in the United Kingdom. **Soda Crystals** have been rather more in request for home-trade use, but have been quiet in the export branch; they are £5. 5s. per ton for use in the United King-

dom, carriage paid. **Nitrate of Soda** has had a quietly steady sale, and is £13. 5s. to £13. 10s. per ton. **Borax** has been more in request for home-trade use; commercial crystals are £25. per ton, and powdered £26.; higher grades are—crystals £29. per ton, powdered £30. per ton, and superfine £31. per ton, in 2cwt. bags, carriage paid in the United Kingdom. **Saltcake** has had a steady inquiry for home-trade use, and supplies for early deliveries have been light; the price is £4. 10s. to £5. per ton for use in the United Kingdom, and £5. to £6. per ton for export. **Bichromate of Soda** has had a moderate sale, and is 4¾d. per lb., c.i.f., to stated ports. **Ammonia Alkali** continues in rather good request for home-trade uses, and has had a heavy shipment for foreign ports; it is £7. 10s. per ton for spot, f.o.r. at works, and £8. per ton for export, varying according to destination; for contracts special prices are quoted. **Hyposulphite of Soda** has been rather more in demand; it is £10. per ton in 2cwt. bags for commercial, and £15. per ton for photographic. **Sulphide of Soda** has had a fair inquiry, and the price has hardened; it is £14. 15s. to £15. 15s. per ton for solid, and £9. 2s. 6d. to £9. 17s. 6d. per ton for crystals. **Chlorate of Soda** has been very quiet, and is 3d. per lb. **Phosphate of Soda** has moved but slowly, and is £14. 10s. to £15. per ton. **Prussiate of Soda** has been but little called for, and is 6d. per lb. **Yellow Prussiate of Potash** has been quieter, and is 10½d. to 11d. per lb. **Red Prussiate** has been inactive, and the price has eased; it may be given as 2s. 9d. per lb. **Carbonate of Potash** has had a moderate sale, and is £25. to £27. per ton. **Nitrate of Potash** has again sold with some freedom, and is £29. to £30. per ton. **Chlorate of Potash** has been quieter, and is 3½d. to 4d. per lb. **Caustic Potash** has been in fair request, and is £29. to £30. per ton. **Permanganate of Potash** has been in very fair demand, and is 9d. to 9¼d. per lb. **Bichromate of Potash** has been rather more in request, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has had steady inquiry; first quality is £57. per ton, second quality £54. per ton. **Sulphate of Ammonia** continues to meet with but little inquiry for home-trade use, but has been shipped more freely on foreign account; neutral of 25¾% is £14. 15s. per ton, and ordinary of 25¼% £13. 12s. per ton. **Carbonate of Ammonia** has sold rather freely, and is 4d. per lb. **Muriate of Ammonia** has been in moderate demand, and is £32. per ton. **Magnesia** has had a quietly steady sale; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been rather more in demand; it is £11. per ton for home-trade use, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been but little called for, and is £8. to £11. per ton, according to quality. **Sulphur** has been in very fair demand; flowers are £10. per ton; roll is £8. 10s. per ton; rock is £8. to £8. 10s. per ton; and American, £5. 10s. per ton. **Tartaric Acid** has been quieter, and is 1s. 1d. to 1s. 1½d. per lb. **Cream of Tartar** has been in quietly steady demand, and the price has been easier; it may be given as £4. 8s. to £4. 10s. per cwt. **Boric Acid** has been steadily called for; commercial is £48. per ton, and powdered £51.; B.P. grades are £54. to £60. per ton. **Citric Acid** has been more inquired for, and the price has hardened; it is 1s. 5d. per lb. **Oxalic Acid** has again had a slow sale, and is 6d. per lb. **White Acetate of Lead** has had a fair inquiry, and is £42. to £43. per ton. **Sulphate of Copper** has moved but slowly for home-trade use or for export, and quotations have been somewhat lower; the price may be given as £25. 10s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has again been in fair request on home-trade account, and has been more inquired for on American account; supplies of English white powdered are light; the price has consequently varied within a wide range; it may be given as £63. to £69. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

Some improvement is to be noted in the home market during the past few days, though the volume of trade is not large on account of the uncertainty as to the future. Arsenic is a much stronger market, but lump salammoniac has been reduced in price. Prices on the whole are steady. Export inquiry still continues to be of small dimensions. Quotations, net at Glasgow, are as follows:—**Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, scarce and dearer at £68. 10s. per ton on spot; an improving market. **Barium Chloride,** £14. 10s. per ton; at this price the market remains steady; foreign imported material offered round £13. 10s. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, carriage paid in the U.K., makers' prices; demand rather poor. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities competing strongly. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted below this figure. **Citric Acid,** 1s. 5d. per lb., less 5%; a little business about. **Copper Sulphate,** £26. 15s. per ton, less 5%; a rather neglected market. **Cream of Tartar,** £4. 2s. 6d. per cwt. for 99% at Glasgow; quotation steady, and inquiry small. **Lead Acetate,** white, £42. 15s. per ton on spot; brown, more inquiry at £45. per ton; Continental material offering at cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at much under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. per lb.; at this reduced price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £55. and £52. 10s. per ton respectively; crystals, £48. 10s. per ton; at these unchanged quotations the market keeps steady. **Saltpetre,** £1. 11s. 6d. per cwt., net; a better market, with quotations unaltered; fresh arrivals are cheaper. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex-store; the spot market remains fairly steady, with but little demand. **Sodium Bicarbonate,** £9. 15s. per ton, in 2cwt. bags; £11. 5s in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid,** 1s. 0¾d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending November 17.

BARYTES—
Antwerp, 100 bgs.
Hamburg, 36 cks., 300 bgs.

CARBON BLACK—
Gothenburg, 20 bgs.

CREAM OF TARTAR—
Genoa, 100 brls.

DYESTUFFS (NATURAL)—
Logwood
New York, 170 cks.

FERRO VANADIUM—
New York, 60 kgs.

GLUCOSE—
Hamburg, 200 brls.

GUANO—
Algeciras, 2,032 bgs.

IRON OXIDE—
Malaga, 40 brls.

KIESELGUHR—
Hamburg, 404 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 72 drms.

MANGANESE ORE—
Calcutta, qty.

OCHRE—
Calcutta, 100 bgs.

POTASH SALTS (*otherwise undes.*)
Antwerp, 2,000 bgs.. and qty.

POTASSIUM CARBONATE—
Hamburg, 9 brls.

SALT—
Hamburg, 200 bgs.

SILICO MANGANESE—
Gothenburg, 10 cs.

SOAP—
New York, 550 cs., 40 pkgs.

SODIUM SULPHATE—
Hamburg, 250 bgs.

STEARINE—
New York, 105 brls.

TALLOW—
Dunedin, 70 cks.
Wellington, 75 cks.

TANNING MATERIALS—
Sumac
Valencia, 123 cs.
Wattle
Mombasa, 2,309 bgs.

WAX (MINERAL)—
New York, 44 bgs.

ZINC OXIDE—
Antwerp, 80 brls.

GOOLE.

Week ending November 17.

BARYTES—
Antwerp, 150 bgs.

FORMIC ACID—
Hamburg, 111 crbys.

GLUE—
Antwerp, 60 bgs.

KAINIT—
Bremen, 250 t.

MAGNESITE—
Amsterdam, 100 bgs.

POTASSIUM SALTS (*otherwise undescribed*)—
Bremen, 1,500 bgs.

TRICHLORETHYLENE—
Hamburg, 7 cks.

GRANGEMOUTH.

Week ending November 17.

CHEMICALS (*otherwise undescribed*)
Antwerp, 20 brls.
Christiania, 40 kgs.

FERRO SILICON—
Antwerp, 146 brls.

MAGNESITE—
Christiania and Drammen, 204 bgs.

MANGANESE—
Antwerp, 200 cs.
Rotterdam, 191 bgs.

SODIUM NITRATE—
Christiania and Drammen, 78 cks., 10 bgs.

TALLOW—
Christiania and Drammen, 270 brls.

ZINC DUST—
Antwerp, 5 cks.

GRIMSBY.

Week ending November 17.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 45 pkgs.
Christiania, 6 cks.

GLUE—
Antwerp, 58 pkgs.

KAINIT—
Antwerp, 155 t.
Hamburg, 226 t.

MAGNESITE—
Hamburg, 201 bgs.

HULL.

Week ending November 17.

ACETIC ACID—
Ghent, 2 t.

CALCIUM CARBIDE—
Christiania, 5 t.
Christiansund, 47 1 c.
Sundsvaal, 275

CAUSTIC POTASH—
Hamburg, 14 t. 18 c.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 10 cs.; Copenhagen, 232 galls.; Ghent, 2 t.; Hamburg, 5 t.; Rotterdam, 9 t. 11 c.

COAL TAR PRODUCTS—
Naphthalene
Hamburg, 2 t. 5 c.

DEXTRINE—
Amsterdam, 9 t. 17 c.

DYESTUFFS (NATURAL)—
Logwood
New York, 7 t. 16 c.

FERRO CHROME—
Trondhjem, 25 t.

FERRO MOLYBDENUM—
Dunkirk, 3 t.

FERRO SILICON—
Christiania, 25 t.; Gothenburg, 100 t.; Gravosa, 50 t.

FERTILISERS (*otherwise undes.*)
Christiania, 10 t.

GLUE—
Antwerp, 1 t.

KAINIT—
Antwerp, 380 t.

LEAD NITRATE—
Rotterdam, 5 t. 7 c.

ROSIN—
Iggesund, 9 t.; Malaga, 34 t. 10 c.
Valencia, 11 t.

SALT—
Hamburg, 30 t.

SOAP—
Genoa, 14 t.
Hamburg, 1 t. 12 c.

SULPHUR—
Catania, 30 t.

TALLOW—
Christiania, 12 t.

TANNING MATERIALS—
Sumac
Palermo, 7 t. 6 c.

TAR (WOOD)—
Danzig, 12 t.

LEITH.

Week ending November 17.

BARYTES—
Antwerp, 250 bgs.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 100 bgs.; Antwerp, and Ghent, 20 cks., 200 t., 1,000 bgs.; Hamburg, 121 cs.; Rotterdam, 16 cs.

CARBON—
Newport News, Baltimore and Norfolk, 10 cs.

CRYOLITE—
Copenhagen, 600 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 5 cks.

FULLER'S EARTH—
Newport News, Baltimore, and Norfolk, 400 bgs.

GLUCOSE—
Amsterdam, 10 cks.

GLUE—
Hamburg, 82 bls.

LITHOPONE—
Amsterdam, 80 cks.

OCHRE—
Newport News, Baltimore, and Norfolk, 640 brls.

RED LEAD—
Amsterdam, 13 cks.

SALT—
Antwerp, 80 bgs.
Hamburg, 400 bgs.

SOAP—
Copenhagen, 6 cs.; Iceland, 7 cs.
N. York, Philadelphia, & Halifax, 600 bxs.; Rotterdam, 15 bxs.

TARTARIC ACID—
Amsterdam, 50 kgs., 6 cks.

WHITE LEAD—
New York, Philadelphia, and Halifax, 22 cks.

LIVERPOOL.

Week ending November 17.

ACETATE OF LIME—
Canada, 271 bgs.
U.S., 2,044 bgs.

ACETIC ACID—
Holland, 15 cks.

ACETONE—
Czecho-Slovakia, 48 drms.

ALUMINIUM SULPHATE—
France, 290 bgs.

AMMONIUM CHLORIDE—
Germany, 29 cks.

AMMONIUM NITRATE—
Germany, 481 cks.

ARGOLS—
France, 692 bgs.

ARSENIC—
Australia, 30 cks.

BARIUM SULPHATE (BLANC FIXE)—
Germany, 9 cks.

BARYTES—
Germany, 350 bgs.

BISMUTH ORE—
Bolivia, 5 t.; W.C. Africa, 5 t.

BORATE OF LIME—
Chile, 14,251 bgs.

BORAX—
U.S., 1,000 bgs.

CARBON BLACK—
U.S., 100 cs.

CAUSTIC POTASH—
Germany, 75 drms.

CHEMICALS (*otherwise undescribed*)
U.S., 30 cs.

CREAM OF TARTAR—
France, 42 kgs.

CRYOLITE—
Denmark, 550 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Canada, 2 kgs., 1 ck.

DYESTUFFS (NATURAL)—
Cutch
Belgium, 20 bgs.
Quercitron
U.S., 5 cks., 300 bxs.

GELATINE—
Belgium, 20 bls.
Germany, 10 cs.

GLUE—
France, 40 bgs.
U.S., 30 brls.

GLYCERINE—
Holland, 11 drms.

HYDROGEN PEROXIDE—
Germany, 1 crby.

IRON OXIDE—
France, 66 cks.
Spain, 20 brls.

KIESELGUHR—
Algeria, 1,100 bgs.
U.S., 22 t. 11 c.

LITHOPONE—
Germany, 20 cks.
Holland, 8 cks.

MANGANESE ORE—
W.C. Africa, 178 t.

METHYL ALCOHOL—
U.S., 40 drms.

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 39 cks.

OCHRE—
France, 20 cks.

PARAFFIN SCALE—
U.S., 1,835 brls., 150 cks.

PARAFFIN WAX—
U.S., 6 drms.

PITCH (*otherwise undescribed*)—
Y.S., 300 sks.

PLUMBAGO—
France, 9 t. 17 c.

POTASH SALTS (*otherwise undes.*)
Germany, 20 cks.

POTASSIUM CARBONATE—
Germany, 31 brls., 60 cks.

ROSIN—
U.S., 1,700 brls.

SALT—
Germany, 5 t.

SALTPETRE—
Germany, 28 kgs.
Holland 20 kgs., 4 cks.

SILICEOUS EARTH—
U.S., 1,000 bgs.

SOAP—
Australia, £1,800.; France, £235.; U.S., £1,535.

SODA—
France, 10 cs.

SODIUM ACETATE—
Belgium, 40 cks.

SODIUM NITRATE—
Chile, 2,989 bgs.

SODIUM PERBORATE—
Germany, 66 drms.

SODIUM SILICOFLUORIDE—
Germany, 10 dbl. bgs.

SPERMACETTI WAX—
Chile, 84 cs.

TALLOW—
Argentine, 26 pps., 277 brls.
Brazil, 274 brls., 232 pps.

TANNING MATERIALS—
Chestnut
Belgium, 71 cs.
France, 250 cks.
Divi Divi
India, 22 pkts.
Gambier
Java, 59 cs.
Myrabolans
India, 154 bgs.
India, 1,268 pkts., 504 bgs.
Quebracho
Argentine, 224 bgs.
Sumac
Sicily, 1,100 bgs.
Spain, 566 bgs.

TAR (*otherwise undescribed*)—
Russia, 80 brls.

TURPENTINE—
Sweden, 5 brls.; U.S., 298brls.

VANADIUM ORE—
S. Africa, 97 t.

WAX—
U.S., 50 cs.

WHITE LEAD—
Holland, 100 drms.
U.S., 46 cks.

ZINC OXIDE—
Belgium, 8 cks., 16 brls.
Holland, 23 cks.

ZINC WHITE—
Holland, 200 drms.

LONDON.

Week ending November 17.

ACETIC ACID—
Germany, 17 crbys.
Canada, 510 demijhns.
,, 112 pkgs. V. Blagden

ACETONE—
Germany, 1 t.

ACETYL CHLORIDE—*
£346.

ACETYL SALICYLIC ACID—*
£129.

ALBUMEN—
China, £2,000. Baxter, Hoare
U.S.A., £2,428. Litchfield & Saundy

ALUMINIUM SULPHATE—
France, 1,110 pkgs. Bailey
,, 100 McAndrews

ANTIMONY REGULUS—
Belgium, 8 t.
China, 60 Cookson
Germany, 1 H. Bath

ANTIPYRINE—*
£434.

ARGOLS—
Algeria, 806 pkgs.
France, 1,237
Italy, 165
Portugal, 463
Spain, 52

ARSENIC (METAL)—
Germany, 2,240 lb. Chance & Hunt

* Entered under the Safeguarding of Industries Act.

BARYTES—
Belgium, 130 bgs. Felton & Crepin
Germany, 88 cks. J. Bailey
,, 69 Burrell
,, 97 W. Harrison
,, 23 Dexters
,, 74
,, 91 Taylor & Cox
,, 100 bgs. Felton & Crepin
,, 350 L. Le Personne
,, 37 Beck & Pollitzer
,, 112 Pallister, Luck

BASIC SLAG—
Belgium, 15 t.

BONE BLACK—
Belgium, £147. O. Murray

BUTYRIC ACID—*
——— £169.

CALCIUM CARBIDE—
Austria, 30 t.
Jugo-Slavia, 305
S.C.S. State, 260 J. & R. Grant

CALCIUM GLYCEROPHOSPHATE*
——— £438.

CAMPHOR—
Japan, 25 cs. W. M. Smith

CARBON BISULPHIDE—
Germany, £204. J. Schnurmann

CARBON BLACK—
U.S.A., 14 cs. H. W. Peabody

CASEIN—
Argentine
Rep. £1,273.
,, £1,994. Duche
France, £170. G. T. Symons
,, £450. W. Bryan

CELLULOSE ACETATE—*
——— £843.

CHEMICALS (*otherwise undescribed*)
Denmark, £23. Anderson, Green
Germany, £41. W. J. Bush
,, £7. J. J. Griffin
,, 5 pkgs. Brit. Drug. Houses
,, £55. Cazaly, Mills
,, £35. Gerhard & Hey
,, £63. E. W. Taylor
,, £12. Petri
U.S.A., £47.
,, £273. Holt & Moseley

CHEMICALS (*otherwise undes.*)—*
——— £1,954.

COBALT CHLORIDE—
Canada, £190.

COUMARINE—*
——— £135.

CREAM OF TARTAR—
Holland, 10 pkgs.

DEXTRINE—
Germany, 20 t. H. Keller
Holland, 20 K. J. Kulder
,, 2 19 c.
,, 1 R. Windmuller
Poland, 25 P. Winn
U.S.A., 27

DIAMORPHINE HYDROCHLORIDE—*
——— £1,044.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Germany, £676.
,, 1 pkg.
,, £34. C. W. Hartrodt

DYESTUFFS (NATURAL)—
Annatto
Denmark, 10 pkgs.
,, 2 Anderson, Green
Cutch
Burmah, 10 t.
,, 200 pkgs. Leach
Indigo
Brit. India, 9 chsts. Parsons & Keith
Sandalwood
Brit. India, £1,002.

FERTILISERS (*otherwise undes.*)
Argentine
Rep., 25 t.

FERTILISERS (*otherwise undes.*)
Brit. India, 19 t. Wills
Germany, 300 Hollingshurst
Holland, 5 Burton, Smart & Orford
,, 200 Hollingshurst
Irish F. State, 17 ,,
,, 22
Norway, 20 ,,

GELATINE—
Belgium, £495. Duche
France, £246. G. T. Symons
Germany, £82. W. A. J. Tilleray
,, £57. Crowe
,, £113. C. Zimmermann
Switzerl'd, £300. Europ. & Gen Exp.
U.S.A., £10. Gordon McDonald

GLUE—
Belgium, £452.
,, £583. P. Ingenlath
,, £23. O. Murray
France, £489. A. J. Malicet
,, £798. G. T. Symons
,, £154.
Germany, £210. H. Smart
Holland, £101. P. Ingenlath

GLYCERINE—
Holland, £153.

GUANO—
France, 39 t. C. Page
Norway, 105 Hollingshurst

GYPSUM—
France, 1,050 t. Assoc. Portland Cement

HEXAMINE—*
——— £377.

HYDROGEN PEROXIDE—
U.S.A., 2 t. 8 c. Allen & Hanburys

ISINGLASS—
Brit. India, 15 cs.
France, 3
Japan, 25 bls. W. M. Smith
Straits, 11 cs.
U.S.A., 7

ISOPROPYL ALCOHOL—*
——— £123.

KIESELGUHR—
Algeria, 5 t. Clyde
,, 45 G. H. Stephenson
,, 24 W. Hamsher
France, 24 12 c. C. S. Lovell

LITHIUM CARBONATE—*
——— £376.

LITHOPONE—
Germany, 200 cks.
Holland, 205 F. T. H. Nye

MAGNESITE—
Holland, £35.

MAGNESITE (CALCINED)—
Holland, £159.
,, £60. Cazaly, Mills

MINERAL COLOURS (*otherwise undescribed*)—
Austria, 2 cks. Pinchin, Johnson
Czecho-Slovakia, 4 E. W. Taylor
Spain, 19 brls. Taylor & Cox
,, 10 cks. Lavington
,, 23 brls. E. Dechaine
,, 17 S. Branwell
,, 32 Brit. Anti-fouling Col & Paint

MONTAN WAX—
Germany, 80 bgs. E. Friedlander
,, 100 Holroyds Oil & Cer.
,, 44 L. Weller

MORPHINE HYDROCHLORIDE*
——— £821.

NOVOCAINE—*
——— £229.

OCHRE—
France, 107 cks. L. Le Personne
,, 24 brls. J. Spurling

OXALIC ACID—*
——— £528.

OZOKERITE
Austria, 164 bgs. T. H. Mins
,, 65 Holroyds Oil & Cer.

PARAFFIN WAX—
Burmah, 50 t.
,, 25 Asiatic Petr.
Poland, 250
U.S.A., 81 19 c. F. Chiesman
,, 140
,, 45 1 H. Hill
,, 60 Anglo-Amer. Oil

PITCH (*otherwise undescribed*)—
U.S.A., 25 brls.

PLUMBAGO—
France, 48 bgs. G. T. Symons
,, 1 ck. Mory
,, 235 bgs. G. Blackwell
Germany, 239 J. G. Hems
,, 147 Hall & Hall
U.S.A., 69 cs.
,, 2 brls.

POTASSIUM BROMIDE—*
——— £330.

POTASSIUM CHLORATE—
France, 200 pkgs. E. J. Brash
Germany, 10 Johnson

POTASSIUM PRUSSIATE—
Denmark, 28 pkgs.

PRUSSIAN BLUE—
France, 10 cks. H. H. Poole
Germany, 15 Stancourt & Muir

ROSIN—
France, 50 cks.
,, 50 Rosin & Turps Imp.
,, 6 Jensen & Nicholson
Portugal, 112 Langley, Smith
,, 72 brls. Rosin & Turp. Imp.
U.S.A., 150 ,,
,, 50 cks. ,,
,, 150 brls. Bigland & Jeffries
,, 150
,, 500 Fox, Stockell
,, 500 Lowden, Connell
,, 500 Langley Smith

SALT—
Germany, 35 t.

SALTPETRE
France, £220. B. & F. Metal & Chem.
Germany, £4,096. Stott & Hotopf
,, £160. Burton Baker
,, £2,374. Nobel Indus.

SHELLAC—
Brit. India, 7 t. 7 c. Litchfield & Saundy

SIZE—
France, £20. G. T. Symons

SOAP—
Australia, £40.
Austria, £243. Moss
Roughton
Belgium, £25. J. Bailey
Denmark, £96.
,, £29. Beck & Pollitzer
France, £300. E. A. Kimpton
,, £95. G. T. Symons
,, £23. Nunzi
Germany, £39.
,, £70. T. Meadows
Italy, £25.
U.S.A., £67. H. C. Hackney
,, £62. H. W. Peabody
,, £1,660. Knight & Morris
,, £51. H. A. Lane
,, £412. Gerhard & Hey

SODA CRYSTALS—
Belgium, 10 t. P. Winn

SODIUM BICHROMATE—
U.S.A., 10 t. W. J. Crook
,, 11 4 c.
,, 10 J. W. and T. A. Smith

SODIUM HYDROSULPHITE—*
——— £804.

SODIUM PEROXIDE—*
——— £159.

STEARINE—
Argentine
Rep. 57 cks.
,, 150 trcs. Armour
Germany, 14 bgs.

TALLOW—
Argentine
Rep. 50 t. Co-op. W'sale
Belgium, 12 brls. A. C. E. Garnham
N.S.W., 101 t. 5 c.
,, 11 J. W. Cook
N.Z., 133 3
,, 12 6 Thornett & Fehr
,, 13 cks. Weber, 37 t. 13 c. Smith & Hoare

TANNING MATERIALS—
Myrabolans
France, 500 pkgs.
Sumac
Switzerland, 5 pkgs.
Valonia
France, 1 c.
Unspecified
Natal, 50 t. Boutcher, Mortimore
U.S.A., 26 pkgs.

TAR (*otherwise undescribed*)—
Finland, 50 brls.
Latvia, 40

TARTARIC ACID—
Holland, 140 pkgs. J. Knill
,, 4

TURPENTINE—
Germany, 1 brl. Langley Smith
Russia, 60 White Sea & Baltic
Sweden, 8 cks. A. A. Brett
U.S.A., 250 brls. Goodlake, Mutter

ULTRAMARINE—
Holland, 8 cks. Henderson Craig
,, 2 O. Murray

WAX (*otherwise undescribed*)—
Austria, £95. O. Harris

WHITE LEAD—
Belgium, 52 cks. G. Farmiloe
Holland, 20 drms. Chance & Hunt

ZINC OXIDE—
Belgium, 10 brls. M. Ashby
,, 20 cks. ,,
Germany, 138 G. Elliott
Holland, 20 F. T. H. Nye

MANCHESTER.

Week ending November 17.

ACETIC ACID—
Rotterdam, 42 cks., 32 brls.

BARIUM CARBONATE—
Hamburg, 50 bgs.

BARYTES—
Bremen, 530 bgs., 169 cks.

BONE BLACK—
New York, 52 brls.

CALCIUM CARBIDE—
Gothenburg, 1,740 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 21 brls.

CREAM OF TARTAR—
Hamburg, 60 cks.

DEXTRINE—
Baltimore, 462 bgs.; Bremen, 9 cks.; Hamburg, 600 bgs.; Norfolk, 6,140 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 6 pkgs.
Indigo
Rotterdam, 7 brls.
Unspecified
Amsterdam, 5 cks.; Antwerp, 6,027 cks.; Hamburg, 54 cks.; Rotterdam, 3 brls.; Rouen, 2 cks.

* Entered under the Safeguarding of Industries Act.

FORMIC ACID—
Hamburg, 48 crbys.

GELATINE—
Rouen, 60 bgs.

GLUE—
Antwerp, 60 bls.

GLYCERINE—
Rotterdam, 3 drms.

LITHOPONE—
Bremen, 40 cks.
Rotterdam, 230 cks.

MAGNESITE—
Amsterdam, 200 bgs.
Hamburg, 205
Rotterdam, 286

MAGNESIUM CHLORIDE—
Hamburg, 116 cks., 231 drms.

MAGNESIUM SULPHATE—
Hamburg, 250 bgs.
Rotterdam, 706 bgs.

MINERAL COLOURS (*otherwise undescribed*)—
Amsterdam, 20 cks., 20 brls.
Hamburg, 13 cks.

NICKEL FORMATE—
New York, 2 brls.

OCHRE—
Rouen, 20 cks.

OXALIC ACID—
Hamburg, 12 brls.

PARAFFIN WAX—
Baltimore, 340 brls.

POTASSIUM CHLORATE—
Hamburg, 100 cks.

POTASSIUM PERMANGANATE—
Hamburg, 200 drms.

POTASSIUM PRUSSIATE—
Hamburg, 14 drms.
Rotterdam, 9 cks.

RED LEAD—
Amsterdam, 4 cks.
Rotterdam, 8 cks.

SALT—
New York, 1 cs.

SALTPETRE—
Hamburg, 21 bgs.

SOAP—
Bremen, 7 cs.

SODIUM ACETATE—
Rouen, 59 cks., 300 bgs.

SODIUM BICHROMATE—
Baltimore, 31 cks.

SODIUM PHOSPHATE—
Bremen, 19 cks.

STEARINE—
Antwerp, 167 bgs.
Rotterdam, 13 bgs.

TALLOW—
Fredriksstad, 540 brls.

TANNING MATERIALS—
Unspecified
New York, 4 brls.

TARTARIC ACID—
Amsterdam, 42 cks., 30 kgs.

ZINC OXIDE—
New York, 250 brls.

NEWCASTLE-ON-TYNE

Week ending November 17.

ANTIMONY—
Rotterdam, 2 bgs.

BARYTES—
Antwerp, 300 bgs.

CALCIUM CARBIDE—
Christiania, 660 drms.
Rotterdam, 180 drms.

GLUE—
Antwerp, 30 bls.

IRON OXIDE—
Valencia, 39 brls.

LEAD ASHES—
Antwerp, 459 bgs.
Rotterdam, 21 cks.

LITHOPONE—
Rotterdam, 20 cks.

MAGNESITE—
Rotterdam, 50 bgs.

RED LEAD—
West Italian Pts., 35 cks.

SALTPETRE—
Antwerp, 50 bgs.

SODIUM NITRATE—
Christiania, 183 bts.

SUPERPHOSPHATE—
Antwerp, 290 t.

TAR (*otherwise undescribed*)—
Archangel, 1,494 brls.

ZINC OXIDE—
Antwerp, 8 brls.

N. & S. SHIELDS.

Week ending November 17.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending November 17.

AMMONIUM SULPHATE—
Alicante, 252 t.

CAUSTIC SODA—
Barbados, 14 drms.

CHEMICALS (*otherwise undescribed*)
Auckland, 300 pkgs.; Barbados, 81 pkgs.; Bilbao, 3 pkgs.; Bombay, 21 pkgs.; Delagoa Bay, 1,762 pkgs.; Demerara, 61 pkgs.; Calcutta, 50 pkgs.; Gothenburg, 5 pkgs.; Colombo, 20 pkgs.; Hong Kong, 225 pkgs.; Dunedin, 50 pkgs.; Kobe, 203 pkgs.; Lyttleton, 60 pkgs.; Madras, 18 pkgs.; Montreal, 280 pkgs.; Pasages, 100 pkgs.; Pt. Louis, 20 pkgs.; Pt. Natal, 336 pkgs.; Pt. Sudan, 10 pkgs.; Singapore, 2 pkgs.; Tarragona, 480 bgs.; Trinidad, 111 pkgs.; Yokohama, 204 pks.

CHLOROFORM—
Auckland, £59.

COAL TAR PRODUCTS—
Pitch
Colombo, 14 t. 13 c.
Tar
Aden, 2 t.; Bombay, 1 c. 2 qrs.; Calcutta, 9 c.; Calicut, 4 t.; Cochin, 8 t.; Dar-es-Salaam, 9 c.; Hong Kong, 15 c.; Karachi, 34 t. 15 c.; Mombasa, 2 t. 7 c.; Pt. Natal, 4 c.
Unspecified
Belawan, 4 t.; Demerara, 1 t. 12 c.; Grenada, 14 c.; Pt. Louis (Mauritius), 13 t.; Sable D'Lonne, 419 t.; Trinidad, 2 t. 4 c.

DISINFECTANTS (*otherwise undes.*)
Delagoa Bay, 9 t. 9 c.
Pt. Natal, 6 t. 9 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Madras, £696.

FERTILISER (DRIED BLOOD)—
Colombo, 20 t.

GLUE—
Pt. Natal, 3 t.

PARAFFIN WAX—
Antofagasta, 50 t.; Arica, 75 t.; Bombay, 8 t.; Hong Kong, 70 t. 10 c.

PITCH (*otherwise undescribed*)—
Calcutta, 29 t. 15 c.

POTASSIUM BICHROMATE—
Callao, 2 t. 10 c.; Madras, 5 t.; Tientsin, 1 t. 10 c.

SHEEP DIP—
Auckland, 18 c..

SOAP—
Bombay, 1 t.; Calcutta, 2 c.; Colombo, 10 c.; Pt. Natal, 1 t. 2 c.

SODIUM BICHROMATE—
Barcelona, 4 t. 19 c.; Bombay, 5 t. 7 c.; Tientsin, 1 t. 10 c.

TALLOW—
Colombo, 1 t. 17 c.

TURPENTINE—
Kilindini, 1 t. 8 c.
Mombasa, 10 c.
Pt. Sudan, 25 galls.

GRANGEMOUTH.

Week ending November 17.

CHEMICALS (*otherwise undescribed*)
Antwerp, 13 cks.
Rouen, 71 cks.

COAL TAR PRODUCTS—
Creosote
Christiania, 10 brls.

IODINE—
Dunkirk, 3 cks.

PARAFFIN WAX—
Dunkirk, 16 bgs.
Rouen, 80 bgs.

HULL.

Week ending November 13.

BLEACHING POWDER—
Amsterdam, 40 drms.

CARBON BLACK—
Bergen, 2 cs.

CAUSTIC SODA—
Hango, 30 drms.
Pt. Said, 3 cs.

CELLULOSE ACETATE—
Genoa, 20 brls.

CHEMICALS (*otherwise undescribed*)
Antwerp, 50 drms.; Copenhagen, 2 cs., 2 cks.; Gothenburg, 4 cs., 35 cks., 18 pkgs., 9 drms.; Helsingfors, 200 bgs.; Halmstad, 2 pkgs.; Havre, 4 drms.; Malmo, 500 bgs., 75 drms.; Montreal, 95 cks., 15 brls., 75 bgs.; Rotterdam, 4 cs., 2 cks., 3 bgs.

COAL TAR PRODUCTS—
Benzol
Rotterdam, 88 drms.
Creosote
Boston, 15 drms.
Naphthalene
Rotterdam, 620 bgs.
Pitch
Baltimore, 27 brls.
Dunkirk, 161 t.

COAL TAR PRODUCTS—
Tar
Bergen, 22 drms.; Copenhagen, 13 drms.; Rotterdam, 3 drms.
Unspecified
Rouen, 346 drms.

DISINFECTANTS (*otherwise undes.*)
Bombay, 1,026 drms.
Karachi, 800 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Stavanger, 5 kgs.

FERRO MANGANESE—
Hango, 64 cks.
Helsingfors, 8 t.

GLUE—
Copenhagen, 20 bgs.; Helsingfors, 40 bgs.; Rotterdam, 10 bgs.

LEAD COMPOUNDS (*otherwise undescribed*)—
Havre, 1 ck.

SALT—
Copenhagen, 21 cs.

SHEEP DIP—
Montreal, 10 brls.

SIZE (ROSIN)—
Amsterdam, 10 brls.

SOAP—
Amsterdam, 506 cs.; Bombay, 6 brls.; Copenhagen, 9 cks.; Gothenburg, 2 cs.; Rotterdam, 1 ck., 2 cs.

SULPHUR—
Montreal, 40 bgs.

TALLOW—
Rotterdam, 1 ck.

TANNING MATERIALS—
Unspecified
Libau, 27 brls.

TURPENTINE—
Gothenburg, 5 cks.

LEITH.

Week ending November 17.

AMMONIUM SULPHATE—
Alexandria, 7,250 bgs.

COAL TAR PRODUCTS—
Tar
Larnaca, 3 brls.

ROSIN OIL—
Amsterdam, 13 brls.

SODIUM BICHROMATE—
Aarhus, 3 cks.

LIVERPOOL.

Week ending November 15.

ALUM—
Riga, 3 t. 10 c., £72.

ALUMINIUM SULPHATE—
Calcutta, 45 t., £388.
Melbourne, 2 t., £14.

ALUMINOFERRIC—
Calcutta, 4 t. 15 c., £35.

AMMONIUM CARBONATE—
Ancona, 1 t., £24.; Bombay, 1 t., £38.; Batavia, 1 t. 17 c., £60.; Calcutta, 2 t., £67.; Christiania, 1 t., £30.; Durban, 8 c., £14.; Genoa, 1 t. 4 c., £32.; Hong Kong, 1 t. 15 c., £50.; Hamburg, 4 t. 19 c., £116.; Kobe, 10 t., £240.; Leghorn, 1 t. 19 c., £50.; Marseilles, 3 t. 5 c., £92.; Messina, 10 c., £13.; Nantes, 10 c., £15.; New York, 5 t., £136.; Palermo, 16 c., £20.; Pernambuco, 1 t., £43.; Sydney, 3 t., £106.; Sourabaya, 12 c. 2 qrs., £20.

AMMONIUM CHLORIDE—
Adelaide, 5 c., £13.; Alexandria, 6 t. 18 c., £272.; Bombay, 5 t., £203.; Bourgas, 1 t., £41.; Calcutta, 7 t., £284.; Constantinople, 5 t. 18 c., £245.; Genoa, 5 t. 19 c., £201.; Gothenburg, 6 t. 1 c., £202.; Halifax, N.S., 1 t., £30.; Kobe, 69 t. 17 c., £2,053.; New York, 5 t., £188.; Piracus, 16 c., £28.; Philadelphia, 14 t. 18 c., £560.; Perth, 1 t. 2 c., £35.; Rosario, 1 t. 19 c., £89.; Salonika, 1 t. 15 c., £72.; Smyrna, 1 t., £41.; Valparaiso, 2 t. 18 c., £116.; Varna, 1 t., £42.

AMMONIUM SULPHATE—
Demerara, 606 t. 18 c., £8,918.; Hong Kong, 130 t., £2,190.; Las Palmas, 150 t., £2,127.; Lisbon, 29 t. 16 c., £425.; Messina, 39 t. 16 c., £558.; Rauritius, 50 t., £787.; Teneriffe, 10 t., £140.

ANTIFOULING PAINT—
Hamburg, 8 c. 2 qrs., £40.
Havana, 5 c., £22.
Kobe, 5 t. 10 c., £505.
Sydney, 16 c., £72.

ARSENIOUS ACID—
Melbourne, 2 t., £164.

BLEACHING POWDER—
Algoa Bay, 2 t., £23.; Arica, 3 t. 2 c., £40.; Bombay, 27 t. 10 c., £330.; Baltimore, 2 t. 13 c., £71.; Calcutta, 30 t., £295.; Copenhagen, 2 t. 2 c., £19.; Callao, 2 t. 10 c., £30.; Durban, 2 t. 10 c., £30.; Fremantle, 1 t., £14.; Iquique, 1 t. 2 c., £14.; Montreal, 10 t. 2 c., £91.; New York, 10 t. 14 c., £260.; Norfolk, Va., 10 t. 14 c., £254.; Piracus, 2 t. 16 c., £38.; Sydney, 3 t. 1 c., £38.; Vancouver, 2 t. 4 c., £28.

BOILER COMPOSITION—
Bombay, 12 c., £23.

BORAX—
Durban, 2 c., £5. ; Penang, 5 c., £6. ; Sierra Leone, 3 qrs., £1. 15s. ; Valencia, 1 t. 19 c., £55.

BORIC ACID—
Auckland, 2 c. 1 qr., £10. ; Karachi, 2 qrs., £2. 10s. ; Pt. Harcourt, 3 c., £3. 15s.

CALCIUM CARBIDE—
Calabar, 10 c., £10.
Pt. Harcourt, 1 t., £20.

CALCIUM CHLORIDE—
Auckland, 6 t., £39. ; Adelaide, 5 t. 1 c., £29. ; Bombay, 25 t., £119. ; Durban, 2 t. 12 c., £15. ; Fremantle, 5 t. 3 c., £30. ; Montreal, 10 t. 16 c., £55. ; Melbourne, 15 t. 6 c., £92. ; San Francisco, 20 t. 2 c., £122.

CHEMICALS (*otherwise undescribed*)
Auckland, 11 c., £19. ; Bari, 5 t. 4 c., £140. ; Dunedin, 1 t. 2 c., £30. ; Montreal, 20 t. 4 c., £431. ; Melbourne, 2 t. 13 c., £544. ; Rosario, 1 t. 4 c., £40. ; Sydney, 1 t. 1 c., £27.

CHLORINE—
Durban, 1 t. 5 c., £37.

CHROMIUM ACETATE—
Vera Cruz, 8 c., £26.

CITRIC ACID—
Barcelona, 1 t. 19 c., £297.
New York, 5 c., £42.

COAL TAR PRODUCTS—
Carbolic Acid
Antwerp, 6 c., £38. ; Bombay, 5 c., £56. ; Calcutta, 2 c. 2 qrs., £85. ; Genoa, 1 t. 19 c., £257. ; Hamburg, 10 t. 8 c., £1,325. ; Lyttleton, 2 c., £16. ; Montreal, 1 t. 5 c., £153. ; Switzerland, 1 t. 2 c., £180. ; Wellington, 2 c., £17.
Creosote
Hamburg, 4 t. 14 c., £112. ; Lagos, 10 c., £14. ; Melbourne, 8 c., £17. ; New York, 20 t. 19 c., £1,070.
Dinitrochlorbenzol
Dalny, 10 t. 2 c., £890.
Hamburg, 20 t., £1,568.
Orthocresol
Bordeaux, 1 t., £158.
Tar
Accra, 1 t. 11 c., £19. ; Conakry, 1 t. 5 c., £16. ; Durban, 2 t. 1 c., £20.
Unspecified
Rotterdam, 3 t. 14 c., £796.

COBALT LINOLEATE—
Genoa, 1 t. 12 c., £234.

COBALT OXIDE—
Bombay, 2 c., £82.

COPPER ACETATE—
Rio de Janeiro, 5 c., £24.

COPPER SULPHATE—
Alexnadria, 2 t., £49. ; Durban, 5 c., £7. ; Fremantle, 5 t., £135. ; Kilindini, 2 t., £240. ; Sapele, 5 c., £11. ; Sydney, 10 t., £265.

CREAM OF TARTAR—
Adelaide, 2 t., £170. ; Albany, 10 c., £49. ; Bluff, 1 t., £93. ; Dunedin, 2 t., £204. ; Fremantle, 1 t. 10 c., £129. ; Hawkes Bay, 1 t., £93. ; Melbourne, 2 t., £176. ; Wellington, 10 c., £40.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 1 t. 19 c., £85. ; Barranquilla, 14 c., £31. ; Delagoa Bay, 7 c., £10. ; Dunedin, 4 t. 11 c., £230. ; Halmstead, 4 c., £24. Lagos, 6 c., £25. ; Lyttleton, 2 t. 5 c., £30. ; Montreal, 9 t. 5 c., £382. ; New York, 59 t., £2,285. ; Pto. Colombia, 6 c., £17. ; Rosario, 14 t. 13 c., £741. ; Rangoon, 2 t. 10 c., £76. ; Varna, 12 c., £30. ; Wellington, 6 t. 15 c., £421. ; Warri, 15 c., £58.

DYESTUFFS (ARTIFICIAL)—
Indigo
Shanghai, 67 t. 9 c., £9,404.
Unspecified
Bombay, 10 c., £76.
Boston, 1 t., £187.
Dunedin, 1 c., £95.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Genoa, 1 t. 17 c., £184. ; Lisbon, 9 c., £67. ; Montreal, 2 t. 3 c., £871. ; Melbourne, 5 c. 2 qrs., £191. ; Oporto, 2 c. 3 qrs., £72. ; Shanghai, 2 t. 17 c., £582. ; Sydney, 14 c., £232. ; St. John's, 10 c., £73. ; Wellington, 15 c. 2 qrs., £134.

DYESTUFFS (NATURAL)—
Orchil
New York, 7 t., £413.

ESSENTIAL OILS (SYNTHETIC)—
Sydney, 11 c., £783.
Wellington, 11 c., £193.

FERTILISERS (*otherwise undes.*)
Guernsey, 9 t., £115. ; Norfolk, Va., 49 t. 8 c., £296. ; Stockholm, 1 t., £13.

FORMALDEHYDE—
Rouen, 5 t., £317.

GLYCERINE—
Aalborg, 1 t. 19 c., £133. ; Antwerp, 1 t., £80. ; Amsterdam, 2 t. 17 c., £211. ; Bolivia, 11 c., £50. ; Bangkok, 6 c., £27. ; Cape Town, 58 t. 10 c., £3,016. ; Copenhagen, 1 t. 18 c., £132. ; Durban, 2 c., £25. ; Cheribon, 10 c., £42. ; Delagoa Bay, 120 t., £10,200. ; Gothenburg, 19 c., £75. ; Havana, 4 t. 18 c., £411. ; Odense, 1 t., £68. ; Pto. Barrios, 2 c., £17. ; Rotterdam, 19 c., £71. Shanghai, 10 t. 17 c., £815. ; Stockholm, 1 t. 9 c., £100. ; Wellington, 9 t. 19 c., £872.

HYDROCHLORIC ACID—
Demerara, 1 t., £22.

HYDROFLUORIC ACID—
Bahia, 3 c., £18.

MAGNESIA (CALCINED)—
Pto. Barrios, 2 c. 3 qrs., £27.

MAGNESIUM CARBONATE—
Bombay, 1 t., £38. ; Boston, 26 t., £825. ; Cape Town, 2 t., £66. ; Melbourne, 2 t., £80. ; Sydney, 1 t., £45. ; Santos, 2 c., £25.

MAGNESIUM (POWDER)—
Rosario, 5 t. 5 c., £156.

MAGNESIUM SULPHATE—
Burutu, 4 c. 1 qr., £8. ; Cape Town, 1 t. 18 c., £18. 10s. ; Conakry, 2 c., £2. 15s. ; Demerara, 1 t., £7. ; Karachi, 2 t. 6 c., £69.

PHOSPHORUS—
Riga, 5 c., £55.

PITCH (*otherwise undescribed*)—
Bombay, 19 c. 2 qrs., £11. ; Baltimore, 21 t. 15 c., £240. ; New York, 12 t. 10 c., £176.

PLATING SALTS (*otherwise undes.*)
Shanghai, 1 c. 1 qr., £15.

POTASSIUM BICHROMATE—
Auckland, 10 c., £27. ; Alexandria, 7 t. 2 c., £344. ; Alexandretta, 1 t., £48. ; Bordeaux, 18 c., £44. ; Constantinople, 8 c. 2 qrs., £20.

POTASSIUM CYANIDE—
Rosario, 2 c., £13.

POTASSIUM IODIDE—
Demerara, 1 c., £87. ; Duala, 37 lb., £40. ; Pt. Harcourt, 186 lb., £199.

POTASSIUM PERMANGANATE—
Brisbane, 3 qrs., £11.

POTASSIUM PRUSSIATE—
Kobe, 10 t. 15 c., £1,110.

SALAMMONIAC—
Barcelona, 3 t. 5 c., £60.

SHEEP DIP—
Auckland, 3 c., £44. ; Algoa Bay, 7 t. 6 c., £482. ; Bluff, 14 c., £112. ; Buenos Aires, 14 t. 18 c., £546. ; Blenheim, 3 c. 2 qrs., £44. ; Beira, 11 c., £41. ; Cartagena, Col., 1 t. 5 c., £130. ; Dunedin, 5 c., £66. ; East London, 13 t. 6 c., £695. ; Gisborne, 3 c. 2 qrs., £11. ; Lyttleton, 5 t. 7 c., £419. ; Nelson, 2 c., £22. ; Napier, 7 t. 8 c., £557. ; Oamaru, 9 t. 18 c., £758. ; Rio de Janeiro, 1 t. 1 c., £60. ; Timaru, 8 t. 13 c., £667. ; Wellington, 18 t., £1,323. ; Wanganui, 2 t., £116.

SULPHUR (FLOWERS)—
Guernsey, 5 t., £52.

SULPHURIC ACID—
Antofagasta, 16 t. 17 c., £188.

SUPERPHOSPHATE—
Demerara, 5 t. 17 c., £25.

TANNING MATERIALS—
Unspecified
Auckland, 1 t. 2 c., £14. ; Christiania, 31 t. 4 c., £149. ; Dunedin, 2 t. 4 c., £36. ; Montreal, 52 t. 12 c., £858. ; Melbourne, 9 c., £11. ; Skien, 5 t. 10 c., £75. ; Sydney, 2 t. 1 c., £21.

TAR (STOCKHOLM)—
Jaragua, 18 c., £18.

TARTARIC ACID—
Durban, 4 c., £29. ; Melbourne, 4 t. 10 c., £546. ; Sydney, 5 t., £630.

TIN CHLORIDE—
Demerara, 19 c., £105.

TIN CRYSTALS—
Antwerp, 3 c., £23.

TIN OXIDE—
Montreal, 1 t., £230.

TRICHLORETHYLENE—
Buenos Ayres, 2 t. 10 c., £115.

VANADIUM OXIDE—
Dunkirk, 1 t. 5 c., £1,068.

VANILLIN—
Havre, 4 c., £342.

WOOD PRESERVATIVE—
Auckland, 4 t. 5 c., £129. ; Batavia, 12 c., £19. ; Singapore, 2 t. 10 c., £64.

ZINC AMMONIUM CHLORIDE—
Boston, 4 t. 14 c., £80.

ZINC CHLORIDE—
Calcutta, 13 t. 6 c., £334.
Madras, 9 c., £12.

ZINC OXIDE—
Havre, 40 t., £1,960.
Melbourne, 1 t., £40.

Week ending November 16.

BASIC SLAG—
Fremantle, 200 t.

CALCIUM CHLORATE—
Melbourne, 37 pkgs.

CAUSTIC SODA—
Adelaide, 10 drms. ; Alexandria, 251 drms. ; Alexandretta, 32 drms. ; Algoa Bay, 206 drms. ; Amsterdam, 51 drms. ; Antonina, 100 pkgs. ; Auckland, 136 drms. ; Bahia, 260 drms. ; Bari, 185 drms. ; Barranquilla, 65 drms. ; Bombay, 25 drms. ; Cartagena (Col.), 30 drms. ; Bourgas, 80 drms. ; Brisbane, 65 pkgs. ; Buenos Ayres, 67 drms. ; Cape Town, 81 drms. ; Ceara, 95 drms. ; Christiania, 40 drms. ; Cochin, 100 drms. ; Colombo, 67 drms. ; Delagoa Bay, 3 drms. ; Dunedin, 50 drms. ; Durban, 10 drms. ; East London, 210 drms. ; Hamburg, 485 drms. ; Fremantle, 40 drms. ; Genoa, 119 drms. ; Guayaquil, 10 drms. ; Hong Kong, 84 drms. ; Hankow, 155 drms. ; Jaffa, 51 drms. ; Lagos, 12 drms. ; Las Palmas, 11 drms. ; Maceio, 52 drms. ; Madras, 100 drms. ; Malta, 4 cs. ; Mazatlan, 75 drms. ; Melbourne, 160 pkgs. ; Montreal, 350 drms. ; Natal (Brazil), 60 drms. ; New York, 100 drms. ; Penang, 30 drms. ; Pernambuco, 124 drms. ; Piraeus, 9 drms. ; Pisco, 9 drms. ; Pt. Said, 60 drms., 25 cs. ; Pto. Cabello, 25 drms. ; Pt. Elizabeth, 69 cs. ; Progresso, 80 drms. ; Quebec, 200 drms. ; Rangoon, 69 drms. ; Reval, 829 drms. ; Riga, 1 drm. ; Rio de Janeiro, 695 drms. ; Rotterdam, 105 drms. ; Samarang, 30 drms. ; Santos, 175 drms. ; Sekondi, 100 drms. ; Shanghai, 609 drms. ; Sibolga, 5 drms. ; Sierra Leone, 6 cs. ; Stockholm, 53 drms. ; Sydney, 17 drms. ; Talcahuano, 60 cs. ; Tripoli (Syria), 10 drms. ; Valparaiso, 300 drms. ; Vera Cruz, 87 drms. ; Wellington, 9 drms. ; Zanzibar, 73 drms.

FERRO MANGANESE—
Antwerp, 114 t.
Baltimore, 972
Copenhagen, 1
Hamburg, 200
Lyttleton, 5
Montreal, 85
New Orleans, 97
Phildaelphia, 571

FERRO VANADIUM—
Rouen, 10 drms.
Trieste, 10 c.

GLUE, SIZE, AND GELATINE—
Bombay, 2 cks. ; Boston, 240 bgs. ; Delagoa Bay, 8 pkgs. ; Demerara, 8 pkgs. ; Havana, 40 pkgs. ; Montreal, 42 pkgs. ; Newcastle, 114 pkgs. ; New York, 270 bgs. ; Pt. Elizabeth, 10 cks. ; Quebec, 29 cks. ; Rangoon, 22 bgs. ; Rio de Janeiro, 5 cks. ; Rotterdam, 40 tins. ; Shanghai, 20 bgs. ; Valparaiso, 5 cs. ; Vera Cruz, 10 pkgs.

MANGANESE ORE—
Santander, 1 t.

PARAFFIN WAX—
Maceio, 32 bgs.

SALT—
Accra, 9 t. ; Antwerp, 265 t. ; Auckland, 71 t. ; Baltimore, 20 t. ; Barbados, 65 t. ; Bonny, 20 t. ; Burutu, 39 t. ; Calcutta, 2,974 t. ; Calabar, 97 t. ; Copenhagen, 7 t. ; Cotonou, 17 t. ; Conakry, 10 t. ; Demerara, 9 t. ; Dunedin, 19 t. ; Duala, 9 t. ; Durban, 25 t. ; Grand Lahou, 8 t. ; Guernsey, 5 t. ; Iddo, 555 t. ; Lagos, 354 t. ; Opobo, 13 t. ; New York, 175 t. ; Norrkoping, 150 t. ; Opobo, 40 t. ; Quebec, 100 t. ; Rio de Janeiro, 18 t. ; Saltpond, 11 t. ; Sierra Leone, 30 t. ; Sourabaya, 2 t. ; Stockholm, 400 t. ; Wellington, 434 t. ; Winnebah, 7 t.

SOAP—
Accra, 1,009 pkgs. ; Alexandria, 1,239 pkgs. ; Amboina, 100 bxs. ; Antwerp, 10 pkgs. ; Auckland, 107 pkgs. ; Bandjermassin, 90 cs. ; Bangkok, 881 pkgs. ; Barbadoes, 398 pkgs. ; Barcelona, 2 drms. ; Batavia, 140 cs. ; Bathurst, 172 cs. ; Beira, 178 pkgs. ; Belawan, 3 drms. ; Belize, 1,479 pkgs. ; Benghazi, 13 bxs. ; Bombay, 1,797 pkgs. ; Black River, 16 pkgs. ; Bourgas, 35 pkgs. ; Buenos Ayres, 1,430 cs. ; Burutu, 51 bxs. ; Calcutta, 638 pkgs. ; Cape Palmas, 20 pkgs. ; Casablanca, 5 pkgs. ; Ceuta, 128 pkgs. ; Colombo, 1,258 pkgs. ; Constantinople, 60 pkgs. ; Copenhagen, 250 pkgs. ; Curacao, 100 pkgs. ; Dunedin, 28 pkgs. ; Durban, 316 pkgs. ; Egwanga, 100 pkgs. ; Funchal, 6 bxs. ; Genoa, 2 pkgs. ; Grand Bassam, 30 pkgs. ; Grenada, 18 pkgs. ; Hong Kong, 145 pkgs. ; Iddo, 126 bxs. ; Jesselton, 10 pkgs. ; Kingston, Ja., 116 pkgs. ; Kobe, 100 pkgs. ; Koko, 20 pkgs. ; Kuala Lumpur, 10 pkgs. ; Lagos, 1,412 pkgs. ; Larache, 125 pkgs. ; Las Palmas, 655 pkgs. ; Livingston, 50 pkgs. ; Lyttleton, 8 pkgs. ; Maceio, 20 bxs. ; Madras, 53 cs. ; Malta, 15 pkgs. ; Menado, 50 cs. ; Monrovia, 77 bxs. ; Onitsha, 51 pkgs. ; Opobo, 14 cs. ; Palembang, 70 cs. ; Penang, 44 bxs. ; Pt. Gentil, 1 cs. ; Pt. Gore, 5 bxs. ; Pt. Harcourt, 631 cs. ; Pt. Said, 414 pkgs. ; Rangoon, 1,427 pkgs. ; Rio de Janeiro, 3 cs. ; Rotterdam, 420 cs. ; Rouen, 5 bxs. ; Saltpond, 1 pkg. ; Samarang, 250 pkgs. ; Santa Cruz (Brazil), 5 pkgs. ; St. John's, N.F., 458 pkgs. ; San Juan del Sur, 50 pkgs. ; St. Kitts, 75 pkgs. ; St. Lucia, 55 pkgs. ; St. Vincent, 62 pkgs. ; Sekondi, 3 bxs. ; Shanghai, 1,068 pkgs. ; Sierra Leone, 4 cs. ; Singapore, 2,099 pkgs. ; Sydney, 4 cs. ; Sourabaya, 891 pkgs. ; Tangier, 31 bxs. ; Teneriffe, 211 pkgs. ; Tjilatjap, 80 cs. ; Trinidad, 1,102 pkgs. ; Valparaiso, 30 drms. ; Wellington, 5 brls.

SODA ASH—
Ahrs, 200 pkgs. ; Antwerp, 5,000 pkgs. ; Brisbane, 30 pkgs. ; Calcutta, 4,646 bgs. ; Christiania, 250 pkgs. ; Christchurch, 80 pkgs. ; Cochin, 1,000 bgs. ; Copenhagen, 2,200 pkgs. ; Copenhagen, 300 pkgs. ; Dalny, 5,264 pkgs. ; Hamburg, 1,975 pkgs. ; Helsingborg, 500 pkgs. ; Hong Kong, 1,568 pkgs. ; Helsingfors, 100 pkgs. ; Kalmar, 100 pkgs. ; Karachi, 100 pkgs. ; Kobe, 9,196 pkgs. ; Malmo, 100 bgs. ; Maranham, 5 brls. ; Melbourne, 20 cks., 1,074 bgs. ; Moji, 4,869 bgs. ; Monte Video, 200 cks. ; Montreal, 500 bgs. ; Norrkoping, 50 bgs. ; Pelotas, 100 pkgs. ; Penang, 10 pkgs. ; Piraeus, 100 pkgs. ; Rangoon, 800 pkgs. ; Reval, 500 bgs. ; Riga, 150 pkgs. ; Rio de Janeiro, 147 bgs. ; Rotterdam, 6,010 pkgs. ; Shanghai, 2,408 pkgs. ; Stockholm, 800 bgs. ; Sydney, 2,627 pkgs. ; Vera Cruz, 4,800 pkgs. ; Zanzibar, 20 bgs.

SODA CRYSTALS—
Gibraltar, 20 pkgs. ; Patras, 10 pkgs. ; Rosario, 100 pkgs. ; Zanzibar, 10 brls.

SODIUM BICARBONATE—
Alexandria, 30 brls. ; Alexandretta, 48 bgs. ; Algoa Bay, 40 pkgs. ; Auckland, 320 pkgs. ; Barbados, 20 brls. ; Bari, 40 kgs. ; Bombay, 140 pkgs. ; Bourgas, 40 kgs. ; Brisbane, 58 pkgs. ; Dalny, 224 cs. ; Delagoa Bay, 50 pkgs. ; Demerara, 10 pkgs. ; Dunedin, 20 pkgs. ; East London, 20 pkgs. ; Gdnoa, 118 pkgs. ; Gibraltar, 10 pkgs. ; Kobe, 5,385 pkgs. ; Leghorn, 135 pkgs. ; Lyttleton, 20 pkgs. ; Melbourne, 337 pkgs., 20 kgs. ; Monte Video, 10 kgs. ; Penang, 10 pkgs. ; Pt. Alegre, 20 pkgs. ; Pt. Sudan, 30 pkgs. ; Reval, 600 pkgs. ; Salonika, 40 drms. ; Sandakan, 12 kgs. ; Smyrna, 40 kgs. ; Stockholm, 25 bgs. ; Sydney, 326 pkgs. ; Tampico, 300 kgs. ; Teneriffe, 10 kgs. ; Venice, 50 kgs. ; Wellington, 140 pkgs.

SODIUM BISULPHITE—
Penang, 25 drms.
Pt. Swettenham, 25 drms.

SODIUM CARBONATE—
Bombay, 10 cs.

SODIUM CYANIDE—
Sydney, 37 drms.

SODIUM HYDROSULPHITE—
Durban, 5 kgs.
Leghorn, 4 kgs.

SODIUM HYPOSULPHITE—
Sourabaya, 5 kgs.

SODIUM SILICATE—
Alexandria, 480 bgs. ; Algoa Bay, 3 pkgs. ; Barranquilla, 30 cks. ; Buenos Ayres, 843 cks. ; Cartagena, Col., 60 cks. ; Hankow, 78 pkgs. ; Hong Kong, 25 pkgs. ; Kobe, 143 pkgs. ; Marseilles, 3 pkgs. ; Melbourne, 7 cks. ; Newcastle, 5 pkgs. ; Pernambuco, 102 bgs. ; Rangoon, 15 pkgs. ; Rio de Janeiro, 16 pkgs. ; Rouen, 20 cks. ; Sourabaya, 18 pkgs. ; Sydney, 3 cks. Zanzibar, 11 drms.

SODIUM SULPHIDE—
Alexandria, 4 drms. ; Dunedin, 12 pkgs. ; Genoa, 21 pkgs. ; Gothenburg, 28 pkgs. ; Santos, 103 drms. ; Pasages, 12 drms. ; Piraeus, 21 drms. ; Sekondi, 83 drms.

TALLOW—
Danzig, 37 brls.

WAX (VEGETABLE)—
Maceio, 5 cs.

ZINC ASHES—
Antwerp, 5 t.

LONDON.

OFFICIAL AMENDMENTS.

From return for week ending September 5, 1923, deduct—

CHEMICALS (*otherwise undescribed*)
Durban, 2 pkgs. (pt.), £5.

Week ending November 14.

ACETANILID—
Brisbane, 3 cs. (pt.), £12.

ACETIC ACID—
Alexandria, 2 cs., £6. ; Auckland, 34 cs., £112. ; Bombay, 4 cs., £12. ; Launceston, 2 cs., £7. ; Lyttleton, 6 cs., £21. ; Perth, 2 cs., £5.

ACETONE—
Antwerp, 34 drms., £1,260.
Melbourne (F.), 2 drms., £15.

ACETYL SALICYLIC ACID—
Brisbane, 2 cs. (pt.), £53. ; Calcutta, 2 cs. (pt.) £13. ; Melbourne, 2 cs., £39. ; Montreal, 7 cs. (pt.), £87. ; Shanghai, 4 cs. (pt.), £19. ; Sydney, 1 cs. (pt.), £5. ; Wellington, 1 cs. (pt.), £11.

ALKALINE TARTRATE—
Santander, 1 t. 13 c., £125.

ALUM—
Alexandria, 3 brls., £5.
Bombay, 40 kgs., £45.

ALUMINIUM HYDRATE—
Barcelona, 2 cks., £19.

AMMONIA—
Bombay, 8 drms., £86. ; Calcutta, 15 cs., £27. ; Cape Town, 24 cs., £40. ; Colombo, 6 cs., £11. ; Karachi, 5 cs., £9. ; Nice, 1 cs., £10. ; Shanghai, 10 cs., £17.

AMMONIA (ANHYDROUS)—
Irish Free State, 4 cylds., £46. ; Kilindini, 4 cylds., £16. ; New York (F.), 2 cylds., £15. ; Rotterdam, 56 cylds., £370.

AMMONIUM CARBONATE—
Antwerp, 1 t., £33. ; Bangkok, 1 t. 10 c., £89. ; Calcutta, 14 c., £57. ; Copenhagen, 10 c., £14. ; Coquimbo, 18 c., £50. ; Genoa, 1 t. 2 c., £32. ; Hamburg, 1 t. 10 c., £41. ; Hong Kong, 18 c., £50. ; Madras, 2 c., £7. ; Melbourne, 1 c., £6. ; Paris, 2 t. 10 c., £64. ; Penang, 1 t. 2 c., £55. ; Pt. Elizabeth, 4 c., £8. ; Singapore 10 c., £28.

AMMONIUM CHLORIDE—
Zanzibar, 1 ck., £8.

AMMONIUM IODIDE—
Melbourne, 1 cs. (pt.), £7.

AMMONIUM SULPHATE—
Auckland, 25 t., £398. ; Dunkirk, 25 t., £337. ; Jamaica, 100 t., £1,450.

ANTIMONY SULPHIDE
Antwerp, 2 cks., £11. ; Montreal, 34 cks., £265. ; New York, 44 cks., £505. ; Stockholm, 6 cks., £30. ; Toronto, 38 cks., £323.

ARSENIC—
Santos, 60 drms., £192.
Valencia, (F.), 5 cks., £58.

ARSENIC SULPHIDE—
New York, 10 kgs., £31.

BISMUTH CARBONATE—
Brisbane, 1 cs. (pt.), £21.
Melbourne, 2 cs., £143.

BISMUTH CITRATE—
Melbourne, 1 cs. (pt.), £16.

BISMUTH SALTS (*otherwise undes.*)
Calcutta, 3 pkgs., £162.
Rangoon, 1 cs. (pt.), £6.

BITUMEN—
Colombo, 35 brls., £145.
Singapore, 4 brls., £10.

BLEACHING POWDER—
Irish Free State, 2 c., £19.

BORAX—
Bombay, 3 c., £14.
Rotterdam, 8 t. (F.), £190.

BORIC ACID—
Bombay, 5 c., £13. ; Calcutta, 15 c., £42. ; Dar-es-Salaam, 2 c., £6. ; Hong Kong, 6 c., £18. ; Toronto, 2 c., £6.

BROMIDES (*otherwise undescribed*)
Sydney, 4 cs., £100.

CALCIUM CARBIDE—
Channel Islands (F.), 2 t. 5 c., £32. ; Kilindini, 1 c., £6. ; Pt. Sudan (F.), 1 t. 1 c., £21.

CALCIUM GLYCEROPHOSPHATE
Montreal, 5 cs., £140.

CARBON BISULPHIDE—
Mombasa, 10 cs., £17.

CARBON DIOXIDE—
Calcutta, 1 cs., £6.

CARBON TETRACHLORIDE—
Madras, 14 cs., £44.

CAUSTIC POTASH—
Karachi, 2 cs. (pt.), £7.
Lyttleton (F.), 5 cs., £15.

CAUSTIC SODA—
Kilindini, 9 c., £15.
Shanghai, 7 c., £29.

CHEMICALS (*otherwise undescribed*)
Adelaide, 10 cs. (pt.), £165. ; Alexandria, 35 pkgs., £143. ; Amoy, 5 pqgs. (pt.), £10. ; Auckland, 8 cs., £40. ; Bangkok, 13 pkgs. (pt.), £23. ; Barcelona, 6 cks., £36. ; Bombay, 1 pkg. (F.), £15. ; Bombay, 13 cs. (pt.), £30. ; Brisbane, 5 cs. (pt.), £13. ; Calcutta, 20 cs. (pt.), £51. ; Cape Town, 25 pkgs., £88. ; Christchurch, 2 cs. (pt.), £7. ; Colombo, 16 pkgs. (pt.), £25. ; Danzig, 150 pkgs., £368. ; Durban, 1 cs. (pt.), £6. ; East London, 7 pkgs., (pt.) £29. ; Fremantle, 44 pkgs., £151. ; Hamburg, 150 pkgs., £375. ; Jamaica, 5 pkgs., £6. ; Karachi, 2 cs. (pt.), (F.), £11. ; Karachi, 11 cs. (pt.), £53. ; Kilindini, 1 cs., £41. ; Launceston, 13 pkgs., £16. ; Lyttleton, 3 cs., £10. ; Madras, 78 pkgs. (pt.), £247. ; Melbourne, 78 pkgs. (pt.), £738. ; Mombasa, 7 pkgs., £6. ; Montreal, 10 cs. (pt.), £97. ; Nairobi, 4 cs., £15. ; New York, 50 cs., £45. ; Otago, 5 cs., £63. ; Perth, 4 pkgs. (pt.), £6. ; Petrograd, 50 pkgs., £125. ; Petrograd, 425 pkgs. (F.), £500. ; Pt. Elizabeth, 2 cs. (pt.), £10. ; Pt. Sudan, 4 cs., £9. ; Pt. Swettenham, 3 pkgs., £11. ; Rangoon, 8 pkgs. (pt.), £15. ; Rotterdam, 40 pkgs. (F.), £346. ; Rotterdam, 235 pkgs., £950. ; Sekondi, 4 pkgs., £15. ; Shanghai, 13 cs. (pt.), £26. ; Stockholm, 60 pkgs. (F.), £300. ; Stockholm, 10 pkgs., £25. ; Sydney, 24 pkgs. (pt.), £371. ; Toronto, 1 cs., £12. ; Wellington, 2 cs. (pt.), £6. ; Zanzibar, 5 pkgs., £6.

CITRIC ACID—
Amsterdam, 10 c., £73. ; Auckland, 5 c., £37. ; Bangkok, 1 c., £6. ; Bluff, 10 c., £12. ; Bombay, 1 c., £10. ; Brisbane, 2 c., £14. ; Colombo, 1 c., £6. ; Hong Kong, 5 c., £46. ; Irish Free State, 5 c., £39. ; Montreal, 8 c., £73. ; Napier, 1 c., £8. ; Rangoon, 2 c., £20. ; Rotterdam, 1 t., £158. ; Sydney, 17 t., £1,559. ; Tientsin, 4 c., £39.

COAL TAR PRODUCTS—
Anthracene Oil
Boston, 48 drms., £163.
Benzol
Irish Free State (F.), 50 brls., £176. ; Rotterdam (bulk), 68,168 galls., £4,841. ; Rouen (bulk), 164,760 galls., £11,714.
Carbolic Acid
Channel Islands, 8 drms., £34. ; Hamburg, 25 drms., £238. ; Singapore, 2 drms., £18.
Creosote
Durban, 11 drms., £37. ; Kilindini, 10 drms., £14. ; Malta, 2 brls., £15. ; Vancouver, 14 drms., £182.
Naphthalene
Madras, 6 cs., £9.
Pt. Sudan, 4 kgs., £8.
Pitch
Antwerp (bulk), 540 t., £3,780. ; Dunkirk (bulk), 447 t., £2,888. ; Rouen (bulk), 588 t., £4,245. ; Valparaiso (F.), 20 brls., £38. ; Valparaiso, 2 cks., £10.
Pyridine
Corinto, 10 drms., £113.
Tar
Alexandria, 139 pkgs., £320. ; Chinde, 100 drms., £81. ; Hobart (F.), 12 drms., £6. ; Montreal, 1 cs., £6. ; Mozambique, 50 brls., £128.

COBALT OXIDE—
France, 1 cs., £113.

COLOURS (*otherwise undescribed*)—
Bangkok, 3 cs. (pt.), £11. ; Bombay, 4 cs. (pt.), £8. ; Hong Kong, 2 cs., £8. ; Madras, 2 cs., £5.

COPPER SULPHATE—
Delagoa Bay, 5 c., £8.
Valparaiso, 3 c., £6.

CREAM OF TARTAR—
Auckland, 3 t., £254. ; Bluff, 10 c., £42. ; Brisbane, 5 t. 3 c., £435. ; Dunedin, 1 t., £85. ; Geraldton, 5 c., £22. ; Hong Kong, 5 c. (F.), £35. ; Melbourne, 14 t. 10 c., £1,226. ; Sydney, 19 t., £1,679.

CRESYL PHOSPHATE—
Bombay, 2 cs., £54.

DISINFECTANTS (*otherwise undes.*)
Aden, 4 c., £9. ; Auckland, 5 c., £93. ; Barranquilla, 3 c., £18. ; Cape, 1 t. 16 c., £45. ; Christiania, 2 c., £6. ; Colombo, 7 c., £15. ; Curacao, 1 c., £8. ; Demerara, 3 c., £16. ; Hong Kong, 2 t. 2 c., £146. ; Lagos, 15 c., £60. ; Limon, 1 c., £9. ; Malta, 9 c., £15. ; Melbourne, 3 c., £39. ; Penang, 2 t. 1 c., £69. ; Pt. Sudan, 9 c., £23. ; Pt. Swettenham, 19 c., £22. ; Samarang, 18 c., £18. ; Singapore, 1 t. 14 c., £76. ; Sydney, 1 t. 4 c., £153. ; Tanga, 9 c., £15. ; Trinidad, 7 t. 18 c., £248. ; Valparaiso, 3 c., £8. ; Wellington, 1 c., £8.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 20 kgs., £179.
Unspecified
Adelaide, 6 kgs., £103. ; Boulogne 10 kgs., £61. ; Helsingborg, 1 kg., £14. ; Lyttleton, 1 cs., £13. ; Madras, 2 kgs., £494. ; Melbourne, 1 cs., £18. ; New York, 2 cs., £19. ; Perth, 1 cs., £21. ; Singapore, 1 cs., £43. ; Sydney, 1 cs., £11.

ETHER—
Kilindini, 2 cs. (pt.), £7.
Melbourne, 1 cs., £10.

FERTILISERS (*otherwise undes.*)—
Auckland, 1 cs. (pt.), £5. ; Channel Islands, 22 t. 18 c., £172. ; Melbourne, 16 c., £36. ; Savannah, 300 t., £1,620. ; Wellington, 1 c., £7.

FORMALDEHYDE—
Alexandria (F.), 5 cs., £10. ; Bombay (F.), 8 cs., £25. ; Wellington, 7 cs., £26.

GALLIC ACID—
Sydney, 1 cs., £37.

GLYCERINE—
Alexandria, 1 t., £80. ; Jamaica, 1 c., £14. ; Pt. Said, 4 c., £16. ; Wormerveer, 5 t. 14 c., £293. ; Yokohama, 9 t. 14 c., £750.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
Bombay, 1 cs. (pt.) £10. ; Brisbane 1 cs., £6. ; Montreal, 2 cs. (pt.), £8.

GUANO—
Barbados, 6 t., £50.

HYDROFLUORIC ACID—
Bangkok, 1 cs., £6.
Durban, 1 cs., £7.

HYDROGEN PEROXIDE—
Calcutta, 3 cs., £14. ; Irish Free State, 3 cs., £38. ; Nice, 2 cs. (pt.), £6. ; Rangoon, 9 cs., £23. ; Sydney, 5 cks., £30.

IODIDES (*otherwise undescribed*)—
Calcutta, 2 cs. (pt.), £37.
Rangoon, 1 cs. (pt.), £27.

IODINE—
Adelaide, 1 cs. (pt.), £53. ; Bilbao, 10 cs., £1,033. ; Brussels, 2 cs., £310. ; Calcutta, 1 cs., 1 ck., £152. ; Rangoon, 1 cs. (pt.), £13. ; Sydney, 1 cs. (pt.), £13.

IODINE (RESUBLIMED)—
Rangoon, 1 cs., £55.

IRON AMMONIUM CITRATE—
Bombay, 1 cs. (pt.), £7.
Sydney, 1 cs. (pt.), £6.

LEAD ACETATE—
Madras, 5 kgs., £12.

LEAD PEROXIDE—
Antwerp, 183 bgs., £315.

MAGNESIA—
Auckland, 15 cs., £36. ; Brisbane, 3 cs., £7. ; Christchurch, 10 cs., £24. ; Gisborne, 5 cs., £12. ; Guayaquil, 4 cs., £29. ; Napier, 10 cs., £24. ; Singapore, 4 cs., £8. ; Sydney, 12 cs., £29.

MAGNESIUM CARBONATE—
Adelaide, 2 cs., £7. ; Alexandria, 4 cs., £7. ; Bombay, 4 cs., £7. ; Calcutta, 2 cs., £9. ; Dunedin, 4 cs., £14. ; East London, 6 pkgs., £18. ; Melbourne, 1 ck., £18. ; Sydney, 5 cs., £11.

MAGNESIUM CITRATE—
Barcelona, 40 cs., £600.
Rangoon, 2 cs., £14.

MAGNESIUM SULPHATE—
Auckland, 2 t. 10 c., £55. ; Bombay, 6 c., £7. ; Brisbane, 1 t. 2 c., £24. ; Calcutta, 6 c., £14. ; Melbourne, 2 t. 19 c., £65. ; Mombasa, 5 c., £6. ; Montreal, 3 t. 90 c., £51. ; Napier, 5 c., £6. ; Sydney, 1 t., £22.

MANGANESE HYPOPHOSPHITE
Montreal, 1 cs., £18.

MERCURIALS (*otherwise undes.*)—
Calcutta, 5 cs. (pt.), £59.

MERCURY AMMONIUM CHLORIDE—
Adelaide, 1 cs. (pt.), £6. ; Melbourne, 1 cs. (pt.), 1 cs., £19. ; Montreal, 2 cs., £50.

MERCURY BICHLORIDE—
Melbourne, 1 cs., £10.
Montreal, 10 cs., £205.

MERCURY IODIDE—
Melbourne, 1 cs. (pt.), £9.

MERCURY OXIDE—
Montreal, 1 cs., £25.

MOLYBDIC ACID—
Pt. Elizabeth, 1 cs. (pt.), £5.
Sydney, 1 cs., £9.

NICKEL OXIDE—
Brussels, 1 cs., £7.

NICKEL SALTS (*otherwise undes.*)—
Durban, 5 cs., £23.
Melbourne, 7 cs., £16.

NITRIC ACID—
Alexandria, 4 c., £22.
Bangkok, 1 c., £7.

PARAFORMALDEHYDE—
Lyttleton, 1 cs., £19.

PETROLEUM ETHER—
Alexandria, 8 cs., £17.

PHOSPHATES (*otherwise undes.*)—
Pt. Elizabeth, 5 kgs., £18.

PHOSPHORIC ACID—
Adelaide, 3 cs., £12.
Melbourne, 7 cs., £28.

PHOSPHORUS—
Havana, 130 cs., £574. ; Melbourne, 1 cs., £9. ; Puerto Colombia, 24 cs., £115.

POTASSIUM ACETATE—
Alexandria, 1 cs., £6.

POTASSIUM BROMIDE—
Auckland (F.), 1 cs., £6. ; Rangoon (F.), 2 cs., £5. ; Sydney, 3 cs., £13.

POTASSIUM CARBONATE—
Adelaide, 2 kgs., £5.
Melbourne, 1 cs., £6.

POTASSIUM CHLORIDE—
Melbourne, 5 pkgs. (pt.), £9.

POTASSIUM CITRATE—
Bombay, 1 cs., £14. ; Brisbane, 1 cs. (pt.), £8. ; Calcutta, 1 cs., £12. ; Colombo, 1 cs. (pt.), £5. ; Melbourne, 5 cs., £50. ; Montreal, 20 cs., £93. ; Otago, 1 cs., £7. ; Sydney, 5 cs., £57.

POTASSIUM CYANIDE—
Adelaide, 1 cs., £6.
Melbourne, 4 cs., £26.

POTASSIUM IODIDE—
Bombay, 1 cs., £88. ; Brisbane, 1 cs. (pt.), £28. ; Brussels, 3 cs., £259. ; Christchurch, 1 cs., £22. ; Colombo, 1 cs. (pt.), £22. ; Half Assine, 1 cs., £19. ; Hong Kong, 1 cs., £88. ; Melbourne, 1 cs. (pt.), 5 pkgs. (pt.), 1 cs., £368. ; Rangoon, 2 cs. (pt.), £110. ; Sydney, 1 cs. (pt.), 1 cs., £100. ; Wellington, 1 cs. (pt.), £22.

POTASSIUM PERMANGANATE—
Adelaide, 2 kgs., £9. ; Brisbane (F.), 1 kg., £11. ; Colombo, 1 cs., £6. ; Hong Kong, 1 drm., £5.

POTASSIUM PRUSSIATE—
Hamburg, 17 cks., £345.

POTASSIUM SULPHOGUAIACOLATE—
New York (F.), 4 cs., £126.

PRUSSIAN BLUE—
Paris, 4 cks., £79.
Vera Cruz., 2 cks., £89.

PYROGALLIC ACID—
Abo, 1 bx., £12.

SALAMMONIAC—
Adelaide, 5 kgs., £16. ; Callao, 20 cs. (pt.), £5. ; Colombo, 1 cs. (pt.), £20. ; Talcahuano, 2 cks., £14. ; Valparaiso, 5 cks., £46.

SALICYLATES (*otherwise undes.*)
Montreal, 1 cs., 3 cs. (pt.), £36.

SALICYLIC ACID—
Bombay, 2 cs. (pt.), £7. ; Hong Kong, 1 cs., £11. ; Jamaica, 1 cs., £14. ; Melbourne, 1 ck., 1 cs., £25.

SALTPETRE—
Auckland, 1 t., £35. ; Dunedin, 2 t., £77. ; Melbourne, 2 c., £6. ; Pernambuco, 2 t. 19 c., £117. ; Teneriffe, 2 t. (F.), £57.

SHEEP DIP—
Christchurch, 19 t. 6 c., £1,200. ; Nelson, 6 t. 5 c., £390. ; Timaru, 12 t. 8 c., £748.

SILVER NITRATE—
Fremantle, 1 cs., £29.

SODA CRYSTALS—
Mombasa, 10 c., £11. ; Nassau, 5 c., £6. ; Penang, 15 c., £6.

SODIUM ACID PYROPHOSPHATE
Fremantle, 1 t., £78.

SODIUM BENZOATE—
Adelaide (F.), 1 c., £11.
Paris, 16 c., £210.

SODIUM BICARBONATE—
Calcutta, 19 c., £56. ; Fremantle, 1 t. 2 c., £25. ; Geraldton, 5 c., £6. ; Havana, 12 c., £12. ; Melbourne, 10 c., £20. ; Toronto, 2 t. 12 c., £123.

SODIUM BISULPHITE—
Belawan, 2 t. 10 c., £48. ; Colombo, 2 t., £38. ; Penang, 1 t. 5 c., £25.

SODIUM BROMIDE—
Melbourne, 2 c., £7.
Sydney, 2 c., £9.

SODIUM CITRATE—
Montreal, 4 t. 13 c., £911.

SODIUM HYDROSULPHITE—
Calcutta, 10 c., £79.

SODIUM HYPOPHOSPHITE—
Montreal, 1 c., £18.

SODIUM IODIDE—
Melbourne, 1 cs. (pt.), £13.
Sydney, 1 cs., £26.

SODIUM PERBORATE—
Gothenburg, 1 t., £91.

SODIUM PRUSSIATE—
Rio de Janeiro, 1 t., £78.

SODIUM SALICYLATE—
Christchurch, 2 c., £28. ; Durban, 1 cs., £7. ; East London, 2 c., £28. ; Melbourne, 1 c., £15. ; Wellington, 2 c., £29.

SODIUM SULPHATE—
Calcutta, 1 c., £6.
Jamaica, 11 cks., £7.

SODIUM SULPHITE—
Cape Town, 1 t., £17. ; Calcutta, 1 c., £6. ; Penang, 1 t. 5 c., £32.

SODIUM TARTRATE—
Adelaide, 10 c., £35. ; Calcutta, 3 c., £15. ; Melbourne, 7 c., £32. ; Sydney, 6 c., £21.

SULPHUR—
East London, 1 c., £5.

SULPHURIC ACID—
Bangkok, 1 c., £7. ; Channel Islands, 15 c., £20. ; Kilindini, 12 c., £13. ; Rio de Janeiro, 1 t., £20. ; Santos, 1 t. 7 c., £74.

SUPERPHOSPHATE—
Channel Islands, 110 t., £275.

TARTARIC ACID—
Cape Town, 1 c., £8. ; Durban, 6 c., £38. ; Jamaica, 4 c., £32. ; Melbourne, 6 t. 10 c., £831. ; Paris, 2 t., £240. ; Pt. Sudan, 1 c., £6. ; Rangoon, 2 c., £26. ; Sydney, 10 c., £60.

ZINC OXIDE—
Adelaide, 2 cs., £13. ; Calcutta, 1 cs., £9. ; East London, 1 ck., £5. ; Riga, 40 cks., £76. ; Toronto, 1 ck., £7.

ZINC SULPHIDE—
New York, 2 cks., £102.

Week ending November 17.

ANTIMONY REGULUS—
Calcutta, 10 c.

BEESWAX—
Durban, 10 c.

CERESINE WAX—
Durban, 5 c.

FULLER'S EARTH—
Montreal, 60 t.
New York, 25 t.

GLUE, SIZE, AND GELATINE—
Antwerp, 1 t. 10 c. ; Bangkok, 5 t. 12 c. ; Calcutta, 3 t. ; Colombo 8 c. ; Durban, 19 c. ; Dunkirk, 2 t. ; East London, 5 c. ; Helsingfors, 9 c. ; Jamaica, 1 c. ; Jesselton, 3 c. ; Kobe, 30 t. ; La Guayra, 6 c. ; Limon, 1 c. ; Los Angeles, 3 t. ; Madras, 4 c. ; Melbourne, 1 c. ; Montreal, 1 c. ; New York, 22 t. ; Riga, 3 t. 2 c. ; Perth, 6 c. ; Rangoon, 1 t. 1 c. ; Sydney, 1 t. 11 c. ; Toronto, 1 t. ; Wellington, 3 c.

ISINGLASS—
Antwerp, 3 c.

MINERAL WAX—
Melbourne, 15 t.

PLUMBAGO—
Amsterdam, 1 c. ; Copenhagen, 4 c. ; East London, 7 c. ; Gothenburg, 10 c. ; Stockholm, 2 c. ; Tampico, 1 t. ; Valparaiso, 6 c.

QUININE—
Bombay, 2,340 oz. ; Calcutta, 10,780 oz. ; Colombo, 178 oz. ; East London, 228 oz. ; Ghent, 10 oz. ; Karachi, 137 oz. ; Madras, 200 oz. ; Pt. Swettenham, 1,760 oz. ; Riga, 1,212 oz. ; Rio de Janeiro, 20 oz. ; Sydney, 1,274 oz. ; Zanzibar, 400 oz.

ROSIN—
Hong Kong, 4 t.
Melbourne, 1 t. 13 c.

SALT—
Kilindini, 3 c. ; Kobe, 6 c. ; Madras, 14 c. ; Pt. Said, 4 c. ; Pt. Sudan, 14 c. ; Shanghai, 2 c.

SHELLAC—
Ghent, 2 c.
Italy, 1 t. 4 c.

SOAP—
Accra, 19 t. 16 c. ; Alexandria, 2 c. ; Amsterdam, 8 t. 11 c. ; Antwerp, 1 t. 6 c. ; Auckland, 2 t. 10 c. ; Bermuda, 2 c. ; Bombay, 1 t. ; Calcutta, 1 t. 18 c. ; Cologne, 3 c. ; Copenhagen, 3 c. ; Dar-es-Salaam, 1 c. ; Durban, 2 c. ; Fremantle, 1 c. ; Gibraltar, 10 c. ; Half Assinie, 6 t. 6 c. ; Hamburg, 2 c. ; Havre, 1 c. ; Helsingfors, 2 c. ; Hong Kong, 5 c. ; Iddo, 5 c. ; Italy, 1 c. ; Jamaica, 6 t. 3 c. ; Karachi, 3 c. ; Kilindini, 11 c. ; Kobe, 2 c. ; Limon, 1 c. ; Madras, 1 c. ; Malta, 3 c. ; Melbourne, 1 c. ; Mombasa, 7 c. ; Monrovia, 1 t. 3 c. ; Pt. Swettenham, 1 c. ; Perth, 1 c. ; Montreal, 2 c. ; New York, qty. ; Ouideo, 1 t. 5 c. ; Ostend, 3 c. ; Pt. Sudan, 1 c. ; Rangoon, 1 c. ; Reval, 3 t. 1 c. ; Saltpond, 13 t. 13 c. ; Sapele, 2 c. ; Sekondi, 16 t. 1 c. ; Singapore, 4 c. ; Tientsin, 4 c. ; Vancouver, 1 t. 4 c. ; Warri, 4 c. ; Winnebah, 12 t. 14 c.

TALLOW—
Danzig, 10 t. 3 c. ; Hamburg, 15 t. ; Jamaica, 4 c. ; Pasages, 74 t. 15 c. ; Rotterdam, 21 t.

TAR (STOCKHOLM)—
Jamaica, 2 c.

WHITE LEAD—
Adelaide, £144. ; Auckland, £2,420. ; Bombay, £105. ; Brisbane, £118. ; Calcutta, £33. ; Dunedin, £434. ; Fremantle, £162. ; Jamaica, £14. ; Limon, £40. ; Lyttleton, £771. ; Malta, £63. ; Melbourne, £200. ; Panama, £28. ; Pt. Elizabeth, £14. ; Shanghai, £131. ; Singapore, £31. ; Sydney, £615. ; Wellington, £317.

ZINC ASHES—
Antwerp, 5 t.

MANCHESTER.

Week ending November 17.

ALBUMEN—
New York, 16 cks.

CHEMICALS (*otherwise undescribed*)
Belgium, 5 cks.
France, 13 drms.

COAL TAR PRODUCTS—
Aniline Oil
Basle, 12 drms.
Naphthalene
New York, 499 bgs.
Naphthol
Holland, 2 kgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 500 kgs., 135 cks.
Copenhagen, 1 kg.
Unspecified
Bombay, 10 kgs., 17 cks., 4 drms. ; France, 1 ck. ; Lyons, 1 kg. ; Rouen, 3 kgs.

LEAD NITRATE—
France, 10 cks.

MAGNESIUM CARBONATE—
France, 198 bgs.

SOAP—
Basrah, 76 cs. ; Holland, 26 cs. ; Pto. Barrios, 7 cs.

TALLOW—
Bombay, 47 brls.

NEWCASTLE-ON-TYNE

Week ending November 17.

AMMONIA—
Alicante, 1,541 bgs. ; Bergen, 30 kgs. ; Valparaiso, 66 bgs.

ANTIMONY—
Christiania, 1 ck. ; Montreal, 307 cks. ; Valparaiso, 8 cks.

CAUSTIC SODA—
Christiania, 119 drms.
Gothenburg, 68 drms.

COAL TAR PRODUCTS—
Pitch
Bergen, 1,688 bgs.
Gothenburg, 1 tin.

CUPROUS OXIDE—
Bergen, 10 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bergen, 1 cs.

LITHARGE—
Christiania, 26 cks.
Gothenburg, 21 cks.

MAGNESIA—
Montreal, 80 cs.

RED LEAD—
Christiania, 28 cks. ; Copenhagen, 5 cks. ; Gothenburg, 26 cks. ; Valparaiso, 20 kgs.

SODIUM HYPOSULPHITE—
Batavia, 20 kgs.

SODIUM SALTS (*otherwise undes.*)
Copenhagen, 90 drms.

SODIUM SULPHATE—
Bergen, 30 bgs.

SUPERPHOSPHATE OF LIME—
Pernau, 2,075 bgs.

WHITE LEAD—
Copenhagen, 9 cks.

N. & S. SHIELDS.

Week ending November 17.

NIL.

PRICES CURRENT.

WEDNESDAY, NOV. 21, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. *at makers' works, but it must be understood that the prices in different localities may vary*

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23- / &	46/-	
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	90	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	5
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	1½
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	3
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	6	17	6
Pyridin	gallon	1	3	0
Tar, crude	ton	4	10	0
Tar, refined	barrel	2	4	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	10	10	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	70	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	10	0
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	81	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	0	0
Formaldehyde, 40%	ton	64	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	2	6
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	44	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	47	0	0
Lead Nitrate	ton	44	0	0
Lime Acetate (brown)	*ton	14	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	5	0
Litharge (British)	ton	45	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	2	0	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	3	1
Naphtha (Wood), Solvent	*gallon	0	6	0
Naphtha (Wood), Miscible, 60° p.	gallon	0	6	0
Potassium Bichromate	lb.	0	0	5½
Potassium Carbonate, 90%	ton	23	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	31	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	27	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	16	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8½
Potassium Prussiate (yellow)	lb.	0	0	10½
Potassium Prussiate (red)	lb.	0	2	6
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	55/- &	52/-	
Sodium Acetate	ton	24	0	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	2¾
Sodium Cyanide (100% basis) for export	†lb.	8d. to 8½d		
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	14	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	26	10	0
Sodium Perborate	lb.	0	0	14½
Sodium Phosphate	ton	14	10	0
Sodium Prussiate	lb.	0	0	5¾
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	10	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	0	0
Sulphur (Roll Brimstone)	ton	8	0	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	3½
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	42	0	0
Copper	ton	61	0	0
Lead (Chemical Sheet), delivered	cwt.	1	17	6
Lead (Foreign Pig)	ton	30	5	0
Nickel	ton	130	0	0
Silver	oz.	0	2	9½
Tin, English Ingots	ton	2[illegible]3	0	0
Zinc (Spelter)	ton	32	5	0
Zinc Dust, 90/92%	ton	50	0	0
OILS.				
Cottonseed	*ton	44	0	0
Linseed, Raw	*ton	46	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	39	0	0
Turpentine	cwt	3	13	3

* *Packages extra or returnable*; otherwise prices usually include packages.

† Makers' prices for home consumption only

THE

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AND

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CONTENTS.

	PAGE
Current Topics:—	
High Pressures in Sulphuric-acid Manufacture	637
Dyestuffs Corporation Finance	638
Protection by Patents	638
The Linseed Oil Industry	639
Prussian Blue from Coal Gas	642
Sewage Works Problems	643
Fifty Years of British Ammonia Soda	644
The Chemical Industry Club	644
Society of Chemical Industry	645
Legal Intelligence	646
The Sea Transport of Corrosive Acids	646
Correspondence	647
The Spanish Trade in Red Iron Oxide	647
Items of Interest	648
Coming Events	649
Reports of Companies	650
Our Bookshelf	650
Fertiliser News	651
South Wales Notes	651
Exports of Chemical and Allied Products in October	653
Cumberland Coking and By-product Industries	653
New Companies	653
Gazette News	654
The Patent List:—	
Applications for British Letters Patent	654
Complete Specifications Accepted	654
Complete Specifications Open to Public Inspection before Acceptance	654
Abstracts of Latest Complete Specifications	655
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	655
Thirty-five Years Ago	656
Publications Received	656
Market Reports:	
London "Open Market" Report	656
London Metal Market	658
Manchester Chemical Market	658
Swansea Market Report	658
Liverpool Chemical Market	659
West of Scotland Chemicals	659
Imports of Chemical Products	660
Exports of Chemical Products	664
Prices Current	666

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CURRENT TOPICS.

HIGH PRESSURES IN SULPHURIC-ACID MANUFACTURE.

THE mechanism of the formation of sulphuric acid by the chamber process has been the subject of numerous researches from the time of Clément and Désormes, who in 1806 discovered the intermediate formation of nitrososulphuric acid, and propounded the first theory of the effect of the nitrous gases, up to the present day. If we leave the purely theoretical considerations on one side, however, and confine ourselves to those investigations which have had for their immediate object the elucidation of the mechanism of acid formation with regard to the concentration, composition, and temperature of the reacting gases, and the design of the leaden chambers, we find that the classical investigations of Lunge and Naef, carried out at the Uetiken Alkali Works, near Zurich, in 1883-1884, still represent the most reliable data at our disposal. These experiments were particularly useful, because they were actually carried out on the plant, but this advantage itself introduced limitations, inasmuch as the conditions under which the reaction was studied could not be modified from the normal to any marked extent. The work of Lunge and Naef demonstrated clearly that the conversion of sulphur dioxide into sulphuric acid takes place very quickly so far as the middle of the first chamber, then slackens considerably, but is suddenly accelerated again when the gases pass into the second chamber. Under normal conditions of working, it was shown, over 70 per cent. of the sulphurous acid is oxidised before the middle of the first chamber is reached. The influence of temperature and defective mixing of the gases was also studied, and, as a direct result of these investigations, many marked improvements were introduced into the design of chamber plants. A good deal of work on the subject has, of course, been carried out since 1884, but this has been mainly desultory, and Lunge and Naef's results retain their original authority. Within the last year or two, however, the problem has been attacked anew, and this time the work has been carried out on the laboratory scale, under conditions which could be varied as often and as widely as wished. These investigations have been conducted under the direction of the late Professor Ph. A. Guye, in the laboratories of the University of Geneva, where special methods of gas manipulation technique and special apparatus have been devised. The earlier work was confined to the initial stages of sulphuric-acid formation, but the latest work

(*Helvetica Chim. Acta*, June, 1923) deals with the reaction in its entirety. The apparatus used is too complicated to describe here in detail, but it may be briefly mentioned that it consisted essentially of seven glass tubes, connected in series. The products formed in each tube could be isolated and examined separately, and the results could be interpreted either as applicable to a seven-chamber system, or to a one-chamber system. Generally speaking, the conclusions of Lunge and Naef have been confirmed, but many new data have been established, and the foundations for a complete theoretical understanding of the mechanism of the reaction have been well laid. The effect of gaseous concentration and pressure have been closely studied, and it has been found that the proportion of sulphuric acid formed is almost quadrupled when the pressure of the gas admitted to the chambers is doubled. The possibilities of working under pressures above atmospheric are thus opened up, and the suggestion of replacing lead by materials such as iron-silicon alloys is made. The possibility is certainly worthy of detailed examination, but a great deal more investigation and experience will be necessary before it can be stated that the disadvantages of so radical an alteration of chamber-construction methods do not outweigh the advantages accruing from increased production. Experience in modern intensive systems of sulphuric-acid production by chamber or tower processes has proved the general correctness of the views once expressed by the late Mr. George E. Davis: "If you go on in the old way, working with 25 cubic feet of space per pound of sulphur per 24 hours, the process goes on absolutely by itself. Decrease your chamber space to 15 cubic feet, and you want a chemist and a clever foreman; while with 8 cubic feet, neither foreman nor chemist know what peace is either by night or day." We are not implying that many of the modern systems in which chamber capacity has been reduced, by providing for more effective mixing of the reacting gases, control of the temperature, or the use of higher concentrations of nitrous gas together with efficient recovery methods, have not been successful, but rather that each decrease in chamber capacity per unit of sulphur burned has brought with it difficulties of supervision and depreciation which may, if the process of intensification be carried far enough, be sufficiently great to more than counterbalance the concomitant advantages.

DYESTUFFS CORPORATION FINANCE.

Up to the time of writing, the directors of the British Dyestuffs Corporation have added nothing to their preliminary announcement that a scheme of capital reconstruction is under the consideration of the board. There is little room for doubt, however, that the direction of reconstruction will be a more or less drastic writing down of capital, and the only questions awaiting elucidation are the exact amount of reduction, and how the sacrifice is to be shared by the various classes of security holders. The announcement, whilst causing considerable interest and comment, has occasioned no surprise, for the imminence of some scheme of reconstruction was foreshadowed definitely by Sir William Alexander in his address to the shareholders, in Manchester, this June. It may be recalled that the Corporation's paid-up capital consists of £4,117,117. of 7 per cent. non-cumulative £1. preference shares, £4,085,794. of 8 per cent. non-cumulative £1. preferred ordinary shares, and £994,190. of deferred ordinary shares, also of £1. par value. The Government hold 850,000 of the preferred ordinary shares and 850,001 of the preference shares. The amount of capital to be sacrificed by the general body of shareholders will probably depend largely upon the attitude of the Government and how far it is prepared to go in the matter of its own holdings. The belief is prevalent that no claim will be made on the holders of preference shares, who have preferential rights as to capital, and who have received no dividend for the past three years. The general view of the market is that the holders of the preferred and deferred ordinary shares will bear the whole of the reduction, and one forecast, which may or may not be inspired, fixes the reduction at 25 per cent. in the former case and 75 per cent. in the latter. This would mean a total capital reduction of nearly £2,000,000., a figure which should meet those items in the last balance-sheet which seem to require total extinction if the Corporation is to be placed on a sound capital basis. The items to which we are referring are: Preliminary expenses, £251,000.; balance of loss, £700,000.; and "goodwill, patents, and other rights," £1,020,000., although in the last-mentioned case drastic writing-down, and not complete cancellation, will be the probable course. From the standpoints of range, quantity and quality of output, the Corporation has now reached a very satisfactory position, and there is every reason for hoping that when its capitalisation has been reduced to more practical dimensions, the undertaking will enter upon a period of comparative prosperity.

PROTECTION BY PATENTS.

An American lawsuit concerning the alleged infringement of patent rights, which will probably be heard in the near future, promises to be something of a novelty in patent litigation. A firm of dyestuffs manufacturers who acquired certain of the German chemical patents seized by the Alien Property Custodian during the war, are now seeking to prohibit the importation from Germany of those products covered by the patents, on the grounds that such importations constitute a definite infringement of their (the American manufacturers') rights, and that the importing firm should have obtained a licence from the American patent holders. Certainly, had the patents in question been assigned by the German owners under normal circumstances, an action such as the American owners are now bringing would appear to have a fair chance of ending successfully, but as both the legality and the equity of the original patent seizure by the Alien Property Custodian are still matters of dispute, no definite opinion on the ultimate outcome of the new lawsuit can profitably be expressed.

THE LINSEED OIL INDUSTRY.

By "Omega."

LINSEED OIL is the oil contained in the seed of the flax plant, *Linum usitatissimum* (Linn). The plant is of Asiatic origin and thrives to the best advantage in a moist climate where there is an abundant rainfall. The soil most favourable to its growth is a deep, moist, fertile and well-drained loam, covering a heavy sub-soil. Calcareous soils tend to retard the growth of the plant (*B. of Agriculture Leaflet*, No. 278). Linseed is now being cultivated extensively in North and South America, India, Russia, and Morocco, and to a limited extent in the British Isles. There are two varieties of the seed, the white and the red, the oil produced from the white linseed being considered generally to be of superior quality. The British Flax Growers' Association (*J.S.C.I.*, 1919, p. 65R), state that for the production of linseed in England, the River Plate seed is the most suitable from all points of view. Similar results were also obtained from experiments conducted by the Board of Agriculture at Wye during 1919.

Market Prices of Linseed Products.

The following table shows the fluctuation in market prices of linseed, linseed oil, and linseed cake during recent years:

Year.	Seed. Per Ton.	Oil. Per Ton.	Cake. Per Ton.
1914	£12	£25	£7
1920	£36	£70	£22
1921	£16	£29	£11
1922	£21	£39	£13
1923	£21	£42	£11

The market price of linseed oil has fluctuated considerably during the current year, the price per ton in January, 1923, being £28., in May £44., and in November, £42.

Extent of the Linseed Oil Industry.

The acreage under flax cultivation in Russia has naturally varied widely during the last few years, and no figures are available for the present year. The flax seed acreage of the U.S.A. for 1923 is 2,285,000 acres, of Canada 563,400 acres (*U.S.A. Agric. Returns*, 1923), and of India 3,532,000 acres (*Indian Government Returns*, 1923). The following figures show the progress in the production of linseed, the figures being those of the acreage of land under linseed cultivation in the principal producing countries:

	Argentine.	India.	U.S.A.	Canada.	Russia.
1904	740,000	571,832	585,013	13,388	471,836
1908	1,048,852	163,200	645,125	79,133	500,339
1912	1,130,000	641,200	701,825	528,505	650,000

Principal Directions of Trade.

The total imports of linseed into England during some recent years are as follows (*Board of Trade figures*):

	1913.	1919.	1920.
Tons	654,812	552,912	389,367
£	7,195,399	20,662,835	15,688,378

The quantity of seed exported was (*Board of Trade Returns*):

	1913.	1919.	1920.
Tons	5,781	3,486	1,370
£	69,695	278,918	55,629

The seed retained and pressed in England being:

	1913.	1919.	1920.
Tons	649,031	549,426	387,997
£	7,125,704	20,383,917	15,632,749

The principal sources of the seed imported into England were as follows (*Board of Trade Returns*):

	1913.	1919.	1920.
CANADA:			
Tons	255,535	5,585	2,424
£	2,792,955	540,383	223,690
ARGENTINE:			
Tons	225,373	216,205	216,625
£	2,398,635	7,744,217	8,207,810
BRITISH INDIA:			
Tons	136,589	318,953	143,161
£	1,564,428	11,737,891	5,776,933
RUSSIA:			
Tons	19,849	280	1,763
£	228,167	12,700	118,367
U.S.A.:			
Tons	8,587	413	314
£	98,366	42,473	14,600

The total quantity of foreign linseed oil itself imported into England was as follows:

	1913.	1919.	1920.
Tons	11,888	976	1,595
£	310,670	105,156	166,107

The English pressed oil exported was as follows:

	1913.	1919.	1920.
Tons	29,911	75,002	48,421
£	880,833	6,952,027	4,959,404

Production of the Oil from the Linseed.

The flax seed is a small brown pod about ¼in. long and 6 milligrammes in weight. The average percentage composition of the seeds (*Thorpe's Dict.*) is: Water, 9.0; protein, 22.8; and fat, 44.4; nitrogen-free substances, 22.8; fibre, 6.8; and ash, 4.2.

The oil-seed trade recognises several qualities of linseed, and these are usually designated by the name of the country or district where the seed has been grown. The Baltic seed is generally considered of first-class quality, and gives the best drying linseed oil. Baltic seed is now marketed and sold on a basis of 95 per cent. purity and some varieties as high as 97 per cent. Some of the lower-quality seeds have been found to contain hemp, rape, and mustard seeds, due to contamination during cultivation or harvesting. The proportion of oil contained in flax seeds cultivated in different countries varies between 30 and 40 per cent. The following are average figures and are quoted from Leather (*Memoirs of Dept. of Agric. of India*, Vol. I., No. 2, p. 38):

	Per Cent.
Russian Linseed	32/38
Indian Linseed	37/43
River Plate Linseed	35/36
N. American Linseed	36/38
Levant Linseed	37/42
Hungarian Linseed	36/38
Morocco Linseed	36/40
Sicilian Linseed	41/42
Chinese Linseed	31/38

The linseed oil to be used for edible purposes and by artists is made by pressing the seed in the cold, a light yellow-coloured product with a pleasant odour and taste being obtained. The commercial oil is obtained by hot expression of the seed at high hydraulic pressures, after a preliminary maceration and heating at about 70° C. The high-quality seeds are crushed direct, but the poorer qualities are first screened to remove any foreign matter. The residual matter after expression of the oil is used as a cattle food. In Germany some attempts have been made to extract the oil by means of volatile solvents, but little success has been met with, except in the cases of low grade or contaminated seed. Solvent-extracted linseed oil has been found to be of a very dark colour, unsuitable for high-quality paints and the cake is of little value as a cattle food. In the United States some linseed oil is obtained by extraction methods, using naphtha as the solvent medium. Mastbaum (*Zeit. angew. Chem.*, 1896, Vol. 9, p. 719), has shown that the oil obtained by pressing the seed has superior drying qualities to that obtained by solvent extraction, this being due to the former containing a higher percentage of low-melting glycerides of the unsaturated fatty acids.

Linseed Cake.

The percentage composition of the linseed cake obtained by the two processes of expression and solvent extraction are given as follows by Kellner:

	Water.	Protein.	Fat.	N. Free Extract.	Fibre.	Ash.
Pressed	11.0	33.5	8.6	31.7	8.7	6.5
Solvent extracted ..	10.2	37.4	3.8	32.7	9.1	6.8

In the treatment of linseed, enzyme action plays an important part. Such action on the cyanogenetic glucoside contained in the seed is liable to become active when the seed is crushed and moistened (Jorrissen, *Bull. Acad. Roy. Belg.*, 1883, Vol. 3, p. 750). Heating the seed before cold pressing destroys all enzymes. The bacterial and enzymatic decomposition of linseed has been studied very extensively by Collins and Blair (*Analyst*, 1914, Vol. 39, p. 70, and *Chem. News*, 1915, p. 19), these authors stating that linseed cultivated in tropical countries contain a more active type of hydrolysing enzyme than the linseed grown in sub-tropical and temperate countries. Collins (*Proc. Durham. Phil. Soc.*, 1914, Vol. 4, p. 99/108), concludes that any fermentation that would take place in linseed under optimum conditions is relative to: (1) extent of the enzyme and cyanogenetic glucoside present; (2) temperature; (3) acidity. The acidity

of the animal stomach being about N/20, linseed cannot under normal conditions ferment when fed to carnivorous or herbivorous animals. Extensive researches are now being conducted in the U.S.A. as to the conditions under which any fermentation products are formed and liberated from linseed or linseed cake.

Owing to its high protein and fat value linseed cake has found extended application as a cattle feeding stuff. The following table quoted from Henrys "*Feed and Feeding*" gives typical percentage analyses of the more common feeding cakes.

	Protein.	Fat.	Extract.	Fibre.	Ash.	Water.
Soya	42.7	6.0	28.1	6.0	5.9	11.3
Cottonseed	33.9	7.8	35.7	7.3	5.5	9.8
Linseed	45.3	10.2	24.0	6.3	6.6	7.0

From a digestible nutrient standpoint, the value of linseed meal is as follows (*Ministry of Agriculture Journal*, August, 1923, p. 461):

Proteid	30.8
Soluble carbohydrates	27.2
Nutritive Ratio	1 : 1
Maize meal equivalent per 100lb. maize	74

Taking the price of linseed cake as £10. 10s. per ton:

The manurial value per ton is	£1 19 0
Cost of food value per ton is	£8 11 0
Starch equivalent per 100lb.	75
Price per unit starch equivalent	£0 2 4
Price per lb. starch equivalent	1.25d.

The British Linseed Cake Trade.

The production of linseed oil cake in Great Britain alone during the last three years has exceeded 1,000,000 tons per year. This was supplemented by the importation of 300,000 tons. The total linseed cake exported last year (1922) was 42,000 tons. The extent of the British trade in linseed cake, is shown in the following tables (*Board of Trade figures*):

	1913.		1919.		1920.	
	Tons.	£	Tons.	£	Tons.	£
Imported into England	83,679	626,118	71,252	1,639,245	44,290	954,013
Exported from England	7,435	57,687	1,965	45,820	4,199	99,111
Principal sources of Imports—						
U.S.A.	24,837	185,253	43,112	1,006,566	22,313	483,692
Russia	18,747	146,592	—	—	—	—
British India	17,606	129,707	14,310	288,594	10,413	21,849
Canada	15,233	112,899	10,165	257,220	1,423	33,382
Argentine	2,318	16,306	488	11,749	2,098	44,594
Spain	2,187	15,506	400	10,000	680	13,694
Germany	1,788	12,788	—	—	—	—

The Properties of Linseed Oil.

Linseed oil is a light-brown liquid, with a characteristic odour and taste and very pronounced drying properties. Its physical constants are tabulated below:

Specific gravity at 15.5/15.5° C.	0.9340
Melting point	−16° to −20° C.
Solidifying point	−25°
Saponification value	190 to 195mgms. KOH
Iodine value	170 to 200
Reichert—Meissel value	Nil.
Maumené test	104 to 120° C.
Heat of bromination	30° to 31° C.
Refractive Index at 15° C.	1.4835
,, ,, at 20° C.	1.4807
Oleo-Refractometer at 22° C.	+50°
Butyro-Refractometer at 20° C.	84 to 90°
Viscosity at 20° C.	212 seconds
Coefficient of expansion	0.00075
Distillation number	16.3
Flash point	240° C.
Acetyl value	4.0
Ozone number	33.5
Oxygen number	18.0
Acid value	0.8 to 8.5
Unsaponifiable matter	0.5 to 1.0
Valenta value (alcohol reagent)	57 to 74° C.
(acetic ,,)	5.9
Drying test	18 to 84 hours
Hehner value	95
Hexabromide value	43.0

Linseed Oil Fatty Acids.

Specific gravity at 15.5/15.5° C.	0.9233
Melting point	24° C.
Solidifying point	16° C.
Titre point	19 to 19.4° C.
Neutralisation value	198mgms. KOH
Mean molecular weight	283
Iodine value	195
,, of liquid fatty acids	209
Refractive index at 60° C.	1.4546
Ether-insoluble bromides	35 per cent.
Heat of bromination	21° C.

U.S. Government Specifications for Crude and Boiled Oils.

The U.S.A. Government enforce rigidly the following specification for the supplies of linseed oil:

	Maximum.	Minimum.
Specific gravity at 15° C.	0.936	0.932
,, 25° C.	0.931	0.927
Iodine value (Hanus)	190	178
Saponification value	192	189
Acid value	3.0	Nil
Ref. index at 25° C.	1.4805	1.4790
Unsaponifiable matter	1.5 per cent.	Nil.

The following specifications for boiled linseed oil issued by the U.S. Navy Department, November 20, 1911, are the ones now ruling.

1. The oil must be absolutely pure boiled oil of the best quality, made wholly by heating pure linseed oil to over 350° F., with oxides of lead and manganese for a sufficient length of time to secure a proper combination of the constituents and be properly clarified by settling or other suitable treatment.

2. Evidence of the presence of any matter not resulting solely from the combination of the linseed oil with the oxides of lead and manganese shall be considered grounds for rejection.

3. To be acceptable the oil must show on examination:—Unsaponifiable matter—Not more than 1.5 per cent. Lead oxide (PbO)—Not less than 0.20 per cent. Manganese oxide —Not less than 0.04 per cent. Iodine No. (Hanus)—Not less than 170. Specific gravity at 60° F.—Not less than 0.938.

4. The oil shall give no appreciable loss at 212° F., in a current of hydrogen, and the oil flowed over glass and allowed to drain in a vertical position must dry free from tackiness in 12 hours at 70° F.

5. To be purchased by the commercial gallon; to be inspected by weight, and the number of gallons to be determined at the rate of 7½lb. of oil to the gallon.

6. Before acceptance the oil will be inspected. Samples of each lot will be taken at random, the samples well mixed together in a clean vessel, and the sample for test taken from this mixture. Should the mixture be found to contain any impurities or adulterations the whole delivery of oil it represents will be rejected.

7. To be delivered in shipping cans and cases which shall conform to the latest specifications for the same issued by the Navy Department, or, if specifically stated in the contract, in strong, tight, well-made white oak casks, hooped with eight iron hoops; the chime hoops to be about 1¾ inches wide; the bilge hoops to be about 1½ inches wide; each cask to have a capacity of about 50 gallons.

8. Barrels to be marked with gross and net weight, and their weights will be verified by the inspecting Officers as may be deemed necessary.

9. The quantity of oil delivered in 5-gallon shipping cans will be determined by taking the gross weight of 10 per cent. of the total number of cans, selected at random, from which the average gross weight of the delivery will be determined. A sufficient number of these cans will be emptied to determine the average tare, and the net weight of the oil will be taken from the figures thus obtained.

10. Each delivery will be considered a lot by itself, and each lot will be inspected and accepted or rejected as it passes or fails to pass the test required. No second test of any lot rejected will be permitted.

Chemical Composition of Linseed Oil.

Linseed oil is composed of a complex mixture of triglycerides. Being a natural product, it is liable to vary in composition, with the type of soil and seed, climatic conditions, period of harvesting and state of maturity at time of expression. The identities of all the acids contained in linseed oil have not yet been definitely established, and the proportion in which the various acids exist as determined by various authorities, vary widely. It is generally accepted that linseed oil contains the following saturated organic acids: stearic, palmitic, arachidic, myristic and the following unsaturated organic acids, oleic, linolic and linolenic. Hazura (*J.S.C.I.*, 1896, p. 77), considers that the drying oils as a class consist mainly of mixtures of oleic, linolic, linolenic, and iso-linolenic, all of which are liquid. The composition of linseed oil according to Hazura and Mulden is as follows:

	Hazura and Grüssner (*Monatsh*, 1876, Vol. 8 p. 260).		Mulder (*Die chemie der austrocknenden Oele*. Berlin, 1867, p. 40–49).
Oleic	5	....	10
Linolic	15		
Linolenic	15		80
Isolinolenic	65		
Myristic	—	....	5
Palmitic	—	....	5

A more detailed account of the composition of linseed oil is given in the following table, No. 1 Fahrion (*Zeit. angew. Chem.*, 1903, Vol. 16, p. 1,193); No. 2 (*Zeit. angew. Chem.*, 1910, Vol. 23, p. 1,106). Nos. 3 and 4 are those calculated by Newton Friend ("*Composition of Linseed Oil*") from the figures in Hazura and Grüssner given in the last table:

	No. 1.	No. 2.	No. 3.	No. 4.
Oleic	17.5	17.5	4.3	9.5
Linolic	26.0	30.0	12.9	—
Linolenic	10.0	38.0	68.9	75.8
Isolinolenic	35.5			
Unsap. matter	0.8	0.6	1.0	1.0
Saturated organic acids (palmitic, myristic, and arachidic)	8.0	9.3	8.6	9.4
Glyceryl radicle	4.2	4.6	4.3	4.3

Mitchell considers linseed oil to consist of 10 to 15 per cent. of the glycerides of solid fatty acids (principally palmitin), and 85 to 90 per cent. of the glycerides of liquid fatty acids, the latter consisting of 5 per cent. oleic, 15 per cent. linolic, 15 per cent. linolenic, and 65 iso-linolenic. Newton Friend (*loc. cit.*), suggests that for linseed oil to give an iodine value lying between 170 and 180, the percentage composition would be as follows:

Constituents.		Iodine Value.		Iodine Value.
Unsap matter	10	0	10	0
Saturated organic acids				
Oleic acid	5	4.5	5	4.5
Linolic acid	59.1	107.2	48.3	87.9
Linolenic acid	21.3	58.3	32.1	87.6
Glyceryl radicle	4.6	0	4.6	0

Schicht (*Seif.*, 1914, Vol. 34, 6. 673), has identified in linseed oil the presence of linolo-palmitostearin, dioleostearin and linolodistearin. Orloff (*Jour. Russ. Phys. Chem. Soc.*, 1911, Vol. 43, p. 1508/1525), gives the results of his classic researches into the composition of and distribution of oxygen in the dried layers of linseed oil. Orloff found that with an oil layer 100 square centimetres in area, oxygen was absorbed to the extent of 12 per cent. at a stage when setting takes place, and then oxidation proceeded further reaching a maximum at 16 per cent. A solid phase is formed at 12 per cent. A physical process also takes place, oxygen penetrating or diffusing into the oil.

The Refining of Linseed Oil.

The refining of linseed oil is to eliminate impurities and foreign matter such as water, mucilage, and odouriferous and colouring matters. Edible linseed oil is deodourised and decolourised by treating with charcoal or fuller's earth under vacuum and filtering and then tanking or allowing to stand for some time so that any colloidal matter may subside. Artists' linseed oil is prepared by bleaching the cold-expressed oil by exposure in thin layers to sunlight or to the action of ultra-violet light. Hot-expressed linseed oil is refined by first allowing the crude oil to settle out, at a temperature of about 70° C., drawing away the impurities, adding a small quantity of sulphuric acid, well stirring the whole and allowing to stand for a few days when the carbonaceous impurities settle out and leave a clear and pale oil. Various oxidising agents such as potassium permanganate, potassium bichromate and hydrogen peroxide have been proposed as refining agents and have found some application In any refining process, the preliminary settling appears to be an important and efficient means of obtaining a good-quality product.

Common Adulterants and Their Detection.

Continental linseed oils have been found occasionally to be adulterated by the addition of cheap fish oils, rosin, mineral oils, cottonseed or other semi-drying oils. The refractive index, iodine value and flash-point are in general indicative of any adulteration. The refractive index is depressed by animal and fish oils, and raised by polymerised linseed or mineral oils. Sjollema (*Zeit. Unters. Nahr. Genussm.*, 1903, Vol. 6, p. 631), states that genuine linseed oil remains clear at −14° C., any adulteration being detected by turbidity at low temperatures. Rosin and mineral oil adulteration may generally be detected by the flash-point, and the Liebermann-Storch reaction; cottonseed oil adulteration by Halphen's reaction; fish oils by the darkening of the insoluble bromides when heated and also by the cholesteryl acetate reaction. Linseed oil of density below 0.930 is to be regarded with suspicion. The iodine value should not be below 175.

An outstanding characteristic of genuine linseed oil is the insoluble bromide test and the heat evolved on treatment with sulphuric acid. The following list shows the heat value for various oils: linseed 104° C., hemp seed 98° C., whale oil 91° C., poppy seed 74° C., arachis 67° C., rape 57° C., castor 47° C., olive 42° C. Lewkowitsch (*Analyst*, 1904, Vol. 29, p. 334), states that the insoluble bromide value of the glycerides is an important figure in differentiating various types of treated linseed oils. The following table gives typical values:

Oil.	Specific Gravity.	Iodine Value.	Insoluble Bromide. Per Cent.
1. Linseed oil	0.9308	186.4	24.17
2. Pale boiled oil	0.9429	171.0	20.97
3. Double boiled oil	0.9449	169.96	13.03
4. Linseed oil heated to 600° F.	0.9354	176.3	8.44
5. Linseed oil blown at 120° C. for 10 hours	0.9460	166.6	23.16
6. Ozonised oil (Baltic oil)	0.9310	180.1	36.26—36.34
7. "Thin" lithographic varnish	0.9691	125.3	2.00
8. "Medium" „	0.9693	121.9	0.95

Applications and Uses of Linseed Oil.

The principal applications of linseed oil are in the manufacture of varnish, paint, linoleum, oilcloth, and soft soap. Linseed oil gives a quick lathering soap of characteristic odour and colour. It is used in the manufacture of transparent soap and in pharmacy in making green "sapo verdigris." The majority of its uses are based on linseed oil possessing the best drying qualities of all oils. Polymerised linseed oil is used in the printing trade, in the manufacture of inks, for lithographic work and in the preparation of plastic masses. Polymerised linseed oil is also a valuable carrying agency for pigments in paints and varnishes and in the preparing of putty. A rubber substitute, produced by the interaction of sulphur and linseed oil at elevated temperatures, has recently been marketed.

The type of linseed oil used, either raw or treated, varies with the particular industry. In the paint and varnish industries the Baltic oil is considered the best obtainable from a drying standpoint. Recent investigations, however, have shown that the River Plate seed gives an oil equal in quality to the Baltic oil when cultivated under supervision and harvested under modern methods.

The hardening of linseed oil is now being conducted on an extensive scale. The stearine produced is of a good grade and commands a high market price. Woodmansey (*J.S.C.I.*, 1919, p. 104T) has shown that for permanency, a polymerised linseed oil is superior to an oxidised oil as a paint vehicle, and that the oxidised oil after drying may be decomposed by lengthy exposure, with the formation of liquid acid compounds, which in the case of a paint containing white lead may be neutralised to form a brittle coating, but if the paint contains an inert base—*e.g.*, barytes or iron oxide, the paint becomes tacky and is easily removed by soap. This has been borne out by the experience of painters and lineleum printers, who used raw oil and a dryer instead of boiled oil, and found the paint to weather badly.

The Drying of Linseed Oil.

The drying of linseed oil with the production of linoxyn, is generally considered a process of oxidation and not a simple evaporation as the name would imply, the coagulation of the oxidised glycerides being an important factor. In the production of blown or oxidised oils for paint and linoleum manufacture, the oil is either sprayed at about 100° C., or air is blown through the hot oil. It has been shown that very little if any polymerisation takes place during oxidation. Various catalysts or driers are used to accelerate the oxidation of linseed oil, the better known of these being litharge, red lead, and the acetates, resinates, and oleates of lead and manganese. An excellent drier is prepared by heating together rosin and ammonium metavanadate. Vanadium driers act more readily and give better drying oils and films than cobalt, lead or manganese in spite of somewhat darkening the oil. Gentle (*Zeit. angew. Chem.*, 1906, Vol. 19, p. 2087), states that a resin is obtained from an eastern tree, *Rhus vernicifera*, which is an extremely active accelerator for the drying of linseed oil Fokin (*Jour. Phys. Chem. Russia*, 1907, Vol. 39, p. 617), and Lipport (*Zeit. angew. Chem.*, 1905, Vol. 18, p. 94), have studied the oxidation of linseed oil and give the following conclusions:—(1)

the rate of oxidation is doubled for every 10° C. rise in temperature; (2) the oxygen absorption at 100° C., is 27 per cent.; (3) pressure has a marked influence on the rate of oxidation. Fokin claims that this is directly proportional to the pressure: (4) the density of the oil is increased; (5) Ostwalds formula for auto-catalysis is applicable. (6) The oxidation of linseed oil is a two-stage process, the first consisting of the oxidation of the glycerides, the second in the coagulation of the oxidised glycerides from the sol to the gel form (*Zeit. angew. Chem.*, 1921, Vol. 34, p 86). The extent of the saturated glycerides present in linseed oil have also an important bearing on the rate of the drying of the oil.

Oxidation and Polymerisation of the Oil.

The oxidised linseed oil is made on a commercial scale by an initial heating of the linseed oil so as to eliminate any moisture, 0.5 per cent. of accelerator added, the oil thoroughly agitated by means of an air current, allowed to settle and the clear oil decanted. The oxidised linseed oil dries very much more rapidly than the raw product. During oxidation the iodine value of the oil is reduced with a corresponding increase in density. Proctor (*J.S.C.I.*, 1905, Vol. 24, p. 1,287), conducted a number of experiments, heating the oil and oxidising at 100° C., the change in constants being as follows:

Hours Treated.	Specific Gravity.	Iodine Value.
0	0.930	165
8	0.933	158
16	0.940	145
24	0.943	140

Heating linseed oil brings about a marked change in its physical and chemical properties. Heating up to about 250° C., effectually coagulates the mucilage, and polymerises the oil, commencing with the linolenic glycerides. Coffey (*J.S.C.I.*, 1921, p. 19T), has made a comprehensive study of the polymerisation of linseed oil with the following results:

Hours of Heating.	Sp. Gr. 20° C.	Viscosity 20° C.	Acid Value.	Sap. Value.	Iodine Value.	Hexa Bromide Value.
0	0.9310	1.00	6.4	189	189	43
7	0.9480	2.26	10.4	188	177	Nil
21	0.9714	4.00	12.6	188	142	,,
35	0.9810	34.40	15.0	188	116	,,
42	0.9875	50.00	15.0	188	107	,,

The extent of polymerisation at higher temperatures is shown in the following table, Friend (*J.C.S.*, 1917, Vol. II, p. 162):

Time of Heating (hours)	Temp.	Molecular Weight
0 ..	15°C ..	740
30 ..	200 ..	760
36 ..	300 ..	1,000

Future Prospects of the Linseed Industry.

The importance of the linseed industry to Great Britain was brought into marked prominence during the war. The British Flax Growers' Association has expressed the opinion that Great Britain is capable of growing all the linseed necessary for home consumption and hence may become independent of foreign supplies of seed or oil. From an economic standpoint the present value of a linseed crop is £27. per acre, the cost of production being £9. per acre. The quantities of oil obtained from the pressing of the linseed imported into England for the last three years have been as follows:—1920, 125,000 tons; 1921, 155,000; and 1922, 117,450. The tariff laws of the various countries have a marked effect on the price and production of linseed and its allied products. One instance is of the Fordney tariff by which an import duty of £17. per ton was placed on all linseed oil imported into the United States, with the result that the linseed oil trade between Great Britain and North America has been absolutely destroyed (*Economist*, February 17, 1923, p. 355).

The growing of linseed for fibre and oil purposes is important from a national standpoint in making the country self-supporting and also in the fostering of trade, the soil and climate of England being quite suitable for cultivation purposes. The growing demand for pure linseed oil for industrial purposes within recent years should assist the industry and allow it to compete successfully with other treated oils which are less suitable, particularly in the paint and linoleum industries.

PRUSSIAN BLUE FROM COAL GAS.*

NEW PROCESS FOR ITS DIRECT PREPARATION.

By A. Delcleve.†

BOTH coal gas and coke-oven gas contain cyanogen compounds, according to the work of M. Lewis, only in the form of free cyanogen and hydrocyanic acid. Thiocyanic acid, if formed, would be decomposed immediately in the presence of hydrogen, according to the following equation:

$$CNSH + H_2 = CNH + H_2S.$$

Again, ammonium cyanide cannot be present in the gases for this compound decomposes at temperatures above 266° C., and the presence of ammonium thiocyanate has not been detected by any experimental method. The cyanogen compounds met with in the gas liquors result from secondary reactions. Thus ammonium ferrocyanide is formed by the action of free hydrocyanic acid in the presence of ammonia, on the sulphide of iron, which itself results from the action of the hydrogen sulphide on the iron pipes and scrubbers.

$$6HCN + 6NH_3 + FeS = Fe(CN)_6(NH_4)_4 + (NH_4)_2S.$$

The thiocyanate is formed by the interaction of carbon bisulphide and the ammonium sulphide dissolved in the liquors:

$$(NH_4)_2S + CS_2 = NH_4CNS + 2H_2S.$$

Drawbacks to the Bueb Recovery Method.

The industrial importance of the cyanogen compounds need not be emphasised here, but it may be mentioned that the world's consumption of the alkaline cyanides alone reaches almost 20,000 tons per annum. The ferrocyanides have numerous uses in dyeing, organic chemistry and metallurgy. Prussian blue itself finds important outlets in the leather industry, and for colouring paper and plastic materials. There is little doubt that were the price of Prussian blue not so high, its uses could be increased several fold.

All the processes for the direct extraction of hydrocyanic acid from coal gas that have been proposed hitherto have been displaced by the Bueb process. In this process a pasty mixture consisting of a complex of iron, cyanogen compounds, and ammonia in ammoniacal liquor is obtained. After the free ammonia has been eliminated and the material filtered and dried, the resultant product is of very low value, and consists, in the author's opinion, of a mixture of Prussian blue 30 per cent., ammonium ferrocyanide 44 per cent., and ammonium sulphate 4 per cent. The abandonment of the direct extraction processes is due largely to the two facts—firstly, that transport and concentration costs for ammoniacal liquor are unduly high; and secondly, that the products obtained are not very valuable. In France, even the Bueb process is but rarely worked as the cost of purifying the Prussian blue-ammonium thiocyanate mixture is prohibitive.

Outlines of the Recovery Process.

The process to be described below has for its object the direct production from the gas itself of Prussian blue in commercially saleable form. It is based upon experimental work in which the effect of passing the cyanogen-containing gas through aqueous solutions of ferrous salts and suitable alkaline salts, was closely studied.

When an alkaline solution is added to the solution of a ferrous salt, a precipitate of ferrous hydroxide is formed.

$$2M^1OH + FeSO_4 = M^1_2SO_4 + Fe(OH)_2.$$

If the gas resulting from the distillation of coal is bubbled through an alkaline solution containing ferrous hydroxide in suspension, iron sulphide is formed:

$$Fe(OH)_2 + H_2S = FeS + 2H_2O.$$

This iron sulphide suspended in the alkaline solution, gives the alkali ferrocyanide in the presence of the hydrocyanic acid of the coal gas:

$$FeS + 6HCN + 4M^1OH = M^1_4Fe(CN)_6 + H_2S + 4H_2O.$$

The Harmful Secondary Reactions.

At the same time however, the following secondary

* *Chimie et Industrie*, October, 1923.
† Chemical Engineer to the Société des Houilleries de St. Etienne.

reactions, which are by no means negligible, occur:

$$2M^{I}OH + H_2S = M^{I}_2S + 2H_2O.$$

$$M^{I}OH + HCN + H_2S = M^{I}CNS + H_2O + H_2.$$

Part of the hydrocyanic acid, therefore passes into the state of sulphocyanide, whilst the liquor becomes charged with sulphur compounds which upon oxidation may give rise to polysulphides, thiosulphates and similar compounds. Again, since the coal gas can never be without traces of free oxygen, deposits of free sulphur may also be formed:

$$2H_2S + O_2 = 2H_2O + S_2.$$

$$H_2S + 2Fe(OH)_2 + O_2 = 2Fe(OH)_3 + S.$$

The free sulphur formed combines in the presence of moisture with the iron monosulphide to form various polysulphides which can react with the hydrocyanic acid to form thiocyanic acid:

$$2FeS + S = Fe_2S_3.$$

$$Fe_2S_3 + HCN = HCNS + 2FeS.$$

$$Fe_2S_3 + FeS = Fe_3S_4.$$

$$Fe_3S_4 + S_2 = 3FeS_2.$$

Measures to Avoid the Secondary Reactions.

In order to avoid as far as possible these undesirable secondary reactions, the following measures must be adopted: The use of caustic alkalies should be avoided and substituted by the salts of weak acids, so that the weak acid may be replaced by hydroferrocyanic acid formed in the liquor, and at the same time the hydrogen sulphide be prevented from reacting with the alkali. Sodium carbonate meets these conditions. The presence of air in the coal gas should be as far as possible avoided.

The means the writer has adopted for the prevention of the accumulation of free and combined sulphur and the formation of sulphocyanides are the following:

(1) Ferrous salts in solution when treated with a solution of alkaline carbonate give first a precipitate of ferrous carbonate which rapidly becomes converted into ferrous hydroxide. This hydroxide reacts with hydrogen sulphide to give iron sulphide which, as shown earlier, can react to give the alkaline ferrocyanide.

(2) The presence of caustic alkalies and the alkaline sulphides having been recognised as harmful, it has been considered advisable to work with gas freed from its ammonia.

(3) On raising the temperature of the alkaline ferrocyanide mixture the following reaction, which does not take place at all at ordinary temperatures, occurs:

$$Na_4Fe(CN)_6 + 3S_2 = 4NaCNS + Fe(CNS)_2.$$

(4) To avoid the adverse effects of oxygen, the ferrous salts employed should be as free from ferric salts as possible.

If the above four conditions are realised, by bubbling the coal gas through the absorption medium to saturation point, there will be obtained a mud consisting of a solution of alkaline carbonate, alkaline ferrocyanide, alkaline sulphate, and a little sulphocyanide, which is formed in spite of all the precautions taken, and containing in suspension iron sulphides rich in sulphur proceeding from the action of the oxygen in the gas.

Separation of the Insoluble Iron Compounds.

The direct separation of the iron sulphides from the solution containing the ferrocyanide is inadvisable. The process recommended by the author is to bubble air vigorously through the suspension. By this means the iron sulphides are decomposed into ferric oxide and sulphur, whilst the hydrogen sulphide which entered into the solution during the treatment with the coal gas is oxidised to sulphuric acid, and is finally converted to alkaline sulphate.

$$2FeS + 3O + 3H_2O = 2Fe(OH)_3 + 2S.$$

$$Fe_2S_3 + 3O + 3H_2O = 2Fe(OH)_3 + 3S.$$

$$H_2S + 2O_2 + Na_2CO_3 = Na_2SO_4 + H_2O + CO_2.$$

$$Na_2S + 2O_2 + Na_2CO_3 = Na_2SO_4 + Na_2CO_3.$$

This oxidation completed, it is easy to separate the precipitate of ferric oxide and sulphur from the solution. The soluble ferrocyanide can then be precipitated as ferric ferrocyanide (Prussian blue) by the usual processes. The precipitate of ferric oxide and sulphur is treated with dilute sulphuric acid. The free sulphur is separated, and the filtrate, which is a solution of ferric sulphate, is utilised for oxidising the ferrous ferrocyanide to Prussian blue.

Advantages of the New Process.

Utilising simple methods the present process permits of:

(1) Recovering the whole of the hydrocyanic-acid contained of coal gas.

(2) Avoiding the formation in the iron oxide purification mass of compounds inert to hydrogen sulphide.

(3) Obtaining Prussian blue directly saleable, a small quantity of solid free sulphur, and sufficient ferric sulphate to provide the oxidising agent for completing the manufacture of the blue.

(4) Avoiding the formation of valueless sulphocyanides.

Of all processes for the manufacture of Prussian blue, the present process appears to be the cheapest. The plant required is relatively modest. A rotary washer of the standard three-compartment type for washing the gas, several bubbling vats, one, or preferably two, Zenith filters for filtration and drying, will be all that is necessary.

With regard to the necessity for working with ammonia-free gas, it is important to note that in the processes for the manufacture of ammonium sulphate by the semi-direct method, the passage of the gas through a solution of sulphuric acid containing 12-15 grammes per litre of free acid, is in no way deleterious to the hydrocyanic-acid content of the gas.

SEWAGE WORKS PROBLEMS.

STANDARD ANALYTICAL METHODS AND SLUDGE DISPOSAL.

SEWAGE works chemists and managers are troubled not a little just now in regard to several important matters—namely, the methods of testing the purity of effluents in order to avoid pollution of rivers, and also the formulation of some means for standardising the various tests adopted by sewage works managers and chemists all over the country. The Association of Sewage Works Managers has been holding a conference in London in connection with the Public Works, Roads and Transport Exhibition and the above matters were discussed. The Association which has been working very closely with the Ministry of Health has now formed a sub-committee to collect and collate information with regard to the methods of testing adopted in various parts of the country. Many of these, apparently, differ from the method suggested by the Royal Commission on sewage disposal, and as showing the need for standardisation it may be pointed out that even adopting the Royal Commission test it has been found that results differing by 50 per cent. have been obtained as between the use of distilled water and ordinary tap water for the purpose. In these circumstances the sub-committee is drafting definite proposals which will subsequently be placed before the Ministry of Health in the hope that the Ministry will then call a conference of sewage authorities, rivers boards, county councils, the Institute of Chemistry, the Society of Public Analysts, and any other interested parties.

The Sludge Digestion Process and Fertiliser Values.

Another matter which continues to cause sewage works managers and chemists trouble is the treatment of their sewage sludge without creating a nuisance. It is admitted that generally speaking the sludge question so far as its treatment is concerned, stands where it did when the Royal Commission of Sewage Disposal issued its fifth report in 1908. The most recent experiments on the problem have been carried out by Mr. J. D. Watson, engineer to the Birmingham, Tame, and Rea District Drainage Board, and aim at the treatment of the sludge by what is termed the digestion process. Disposal by digestion, it is claimed, has the merit that after the sludge is removed from the drying areas it is absolutely devoid of odour. Moreover, the method obviates waste of nitrogen and so enables the sludge to be used profitably as a fertiliser. The process is based on the Imhoff tank, and the dry sludge matter contains 2.71 per cent. of nitrogen. In the case of the Birmingham sludge, it is sold to contractors with a water content of about 25 per cent. and the contractors fortify it after further reducing the water content, with sulphate of ammonia, bone phosphates, and sulphate of potash. Whilst in some cases the contractors say that sewage sludge is not a profitable proposition from their point of view, on the other hand we hear that at Worcester as much as £2 per ton is being obtained for it, whilst in other parts a figure of £1 per ton is mentioned.

On the problem of the cost of transport, the Ministry of Health is doing all it can to secure a reduction in the rate,

FIFTY YEARS OF BRITISH AMMONIA SODA.

THE JUBILEE OF BRUNNER, MOND AND CO.

IN October of the year 1873 John Tomlinson Brunner and Ludwig Mond, after many months of anxiety and trouble, had the satisfaction of seeing building operations commence on the estate they had acquired at Winnington. In the spring of the following year the first works in Great Britain for manufacturing soda ash by the Solvay ammonia-soda process were put into operation, and the two young partners had the further satisfaction of being in a position to demonstrate practically that, under capable management, the process was a commercial success.

The First Plant at Winnington.

The first works, which were very modest, and built almost entirely to Solvay's plans, consisted of what at that time Solvay termed "one element," that is five small (4ft. 4in. diam.) Solvay towers, four stills, one lime kiln, one blowing engine, one driving engine, five filters, four furnaces, a mill and a water pump. Barns and other buildings existing on the estate were utilised for cooperage, joiner's shop, and smithy; the time office, stores, and laboratory were housed in another building after some extension, while the partners themselves, with their office staff, took possession of the harness room in the stable yard. From these modest beginnings, and in the short space of fifty years, the firm of Brunner, Mond and Co. has grown until there is no corner of the earth which its fame and the fame of its products have not reached. The ramifications and world-wide interests of the firm at the present day are too well known to our readers to necessitate detailed reference here, and some account of the early vicissitudes of the undertaking were given in our columns in February of this year, when the centenary of the British alkali industry was being celebrated by the United Alkali Company.

A Jubilee Commemorative Volume.

To commemorate their fifty years of progress, the firm of Brunner, Mond and Co. have just published an excellently produced and illustrated volume which, although written primarily to interest the past and present staff of the undertaking, yet contains much material of undoubted value not only to that portion of the public interested directly in the chemical industry, but also to the general public. The history of Brunner, Mond and Co. is essentially the history of the lives of the three great men whose courage, far-sightedness, and labours made it possible for such a gigantic organisation to be built up, and consequently the first chapter of the work deals with the lives of John T. Brunner, Ludwig Mond, and Ernest Solvay. In the words of Mr. John I. Watts, the editor of the volume, "at present their deaths are of too recent date for the world to realise what great men they were, and what it owes to their strenuous lives. The statement that they provided mankind with cheap soda, and thereby contributed in no small degree to the welfare of the human race, is of little significance until it is realised that this has meant lowering the cost of soap, glass, paper, woollens, textiles, and numbers of other necessaries that make up the cost of living. Each of them, too, started life with very little money; and each, when he became rich, devoted enormous sums to promoting the enlightenment and comfort of his fellow-men."

The second chapter deals briefly but explicitly with the rise of the alkali-chemical industry from the discovery of the Leblanc process to the year 1873, and the following chapter gives a fascinating account of the Brunner and Mond partnership. The "Progress of Fifty Years" is then dealt with in a comprehensive chapter. In looking back and comparing the works of 1881 with those of to-day, one is struck by the completeness of the change in the plant employed, and is led to marvel that the ammonia-soda process became a commercial success with the apparatus employed in the early days. That it did so certainly shows what an essentially sound process it is, and that the margin for profit between cost and selling price was ample in those first years. When it is realised that the whole of the plant has been remodelled, enlarged, or altered, not once, but many times, and that every part had to be specially designed, some idea can be obtained of the ceaseless activity that has been required to bring the process to its present state of its near approach to perfection.

War-time Services and Welfare Work.

The great services rendered by the company to the country during the war will be still fresh in the memory of most of our readers, but the facts and figures given in the Jubilee Volume on the production of calcium nitrate, ammonium nitrate, T.N.T., and synthetic phenol are presented in an exceedingly illuminating form. A powerful factor contributing to the success of Brunner, Mond and Co. has been the great and personal interest evinced from the outset by the leaders of the undertaking in the welfare, both material and intellectual, of the large number of workpeople employed. This phase of the company's activities is revealed very clearly in the book under consideration. A full list of the employees of the firm who laid down their lives during the war, both on active service with the forces and in the great T.N.T. explosion at Silvertown in 1917 are given, together with splendid photographs of the various memorials that the firm have erected. The numerous measures adopted by the firm to enhance the welfare of their employees are recounted in detail, and the list of Mond pensioners leaves the definite impression that very few other large industrial undertakings, either in this country or abroad, can produce an equal number of long-service employees.

Commercial Developments.

The final chapter of the volume deals with the commercial development of the firm. The policy of only one grade of product—the best—has been pursued unremittingly, with the result that the growth of the business has become so rapid that it has been necessary to establish separate sales companies in China, Japan, and India. Brunner, Mond and Co. are to be congratulated on publishing a commemorative volume which, for the intrinsic value of its contents no less than for the beautiful manner it is produced and illustrated, will ensure its becoming a valued possession to many.

THE CHEMICAL INDUSTRY CLUB.

FIFTH ANNUAL DINNER.

ON Monday, November 26, at the Connaught Rooms, Great Queen Street, London, the Chemical Industry Club held its fifth annual dinner. Mr. H. Edwin Coley (Chairman of the Executive Committee of the Club) presided. Among those present were Lord Exmouth, Sir Lionel Phillips, Sir Arthur Duckham, Mr. A. G. Craig, Professor Hodgkinson, Professor J. W. Hinchley, Sir William Pope, and Mr. J. A. Reavell.

Sir Lionel Phillips and Tariff Reform.

Sir Lionel Phillips proposed "The Profession and Industry of Chemistry," and emphasised the marvellous advance which had taken place in chemical and physical science. Chemistry was playing so important a part in our lives that it should be included and supported in the social system, as its great brother science, medicine, had been. Discussing tariff reform and free trade, Sir Lionel said that, whilst it might have been a very good thing in days gone by to go in for that glorious thing that we hold up to-day as a shibboleth—namely, free trade, the conditions of the world had changed enormously; theoretical economics no longer applied. We must view the position as it exists; it was no good our putting our heads in the sand and saying that we were the only people who knew how to manage our affairs; the rest of the world knew something as well, and the rest of the world, on the whole, appeared to have been doing pretty well by its action with regard to tariffs.

Mr. F. W. Harbord, C.B.E., F.I.C., responding, said there was no profession which was brought into more intimate relation with all the industries of the country than the chemical industry.

Sir Arthur Duckham said he was very glad to have been asked to attend the dinner, because he was very interested in the chemical industry, and was instrumental, more or less, in forming the new Institution of Chemical Engineers, of which he is the first president. The reason he had taken a part in the formation of the Institution was that he had hoped it would be the last straw, in the way of institutions and societies, which would break the camel's back, and would "bust the lot." He was certain all present would agree that there were too many societies and institutions, and

the time had arrived when there should be some merging of their activities. Many works in this country were inefficient, and the message he had to convey to his hearers was that he would rather see efficient combination and good production than protection.

The Objects of the Club.

Sir William Pope (President of the Club) proposed the toast of "The Chemical Industry Club." The Club, he said, was looked upon as providing a social link between all the great interests of chemistry. The membership of the Club included a variety of different types of people—the chemical manufacturer, the business man, and the down-trodden professorial class, which he had the honour more intimately to represent. The Club had been going on for roughly five years, and had become very important; he believed that it was going to become a sort of "key" club to the whole of the chemical fraternity. But the members of the Club ought to conserve very carefully a recollection of the men who founded it, in face of a good deal of opposition, and should be everlastingly grateful to those men. One of the founders was Mr. Coley (the Chairman), whom he (Sir William Pope) hoped to see in the Chair for a long time to come. He paid a tribute to Mr. Coley, and coupled his name with the toast.

The Chairman, in response, said that a great deal of work had been done on behalf of the Club by others as well as himself. Referring to the Executive Committee, Mr. Coley said he had never served on committees which had been so harmonious, pleasant, and unanimous in their efforts as the committees which had served the Club during the past seven years. It was the endeavour to make a Club in which every member was equal; they had appealed to nobody for support financially, and had never endeavoured to push any particular person forward because he had been an officer of the Club; that seemed to him to be one of the greatest successes achieved. There had also been democratic control, and he hoped sincerely that that democratic control would be continued in the future, so that it could never be said that the Club had been run for any particular person's advantage. The Club was the one concern connected with the industry and profession which was unbiassed and uninfluenced by any particular person or persons connected with the trade, and it was on that, he believed, that the future Club would be built.

Mr. W. Cullen then proposed "The Guests." Professor J. W. Hinchley, replying, said that the Institute of Chemical Engineers looked upon the Club as one which it was the bounden duty of everyone connected with the industry to support.

Presentation to the Chairman.

Mr. A. G. Craig proposed the final toast, of "The Chairman." On behalf of the members of the Club, he presented to Mr. Coley a gold half-hunter watch, as a mark of appreciation for his untiring work as the Club's first Hon. Secretary.

The Chairman, expressing his appreciation, said he accepted the gift with the greatest possible delight, because his resignation from the secretaryship was a step he little desired to take. The Club had been part of his life for seven years, and he had given up the work because he had felt that he could not carry it on as it should be carried on. His seven years of service were the most pleasant he had ever experienced.

SOCIETY OF CHEMICAL INDUSTRY.

PAPERS BEFORE NOTTINGHAM SECTION.

AT a meeting of the Nottingham Section of the Society of Chemical Industry held on November 21, Dr. H. S. Holden and Mr. J. E. T. Gilbert read a paper on "Observations on Some Micro-Organisms Growing in Glycerol."

Micro-Organisms Growing in Glycerol.

Glycerol, they stated, was generally considered to have a distinct lethal action on bacteria as seen in the preservation of calf lymph in a sterile condition by addition of an equal volume of 50 per cent. glycerol. This concentration of glycerol was largely used in bacteriological laboratories as a temporary mounting medium, and one such stock solution was found to contain a white flocculent deposit which consisted of one dominant mould (*Penicillium* type) and several kinds of yeast.

Of the latter two were isolated, one a white variety which formed smooth white colonies on agar, and the other a pink which showed similar, but larger colony characteristics. The first variety grows well on beerwort agar, and slowly fermented maltose and saccharose, but not on lactose. Glucose was fermented rapidly with the formation of acid and gas, while glycerol was fermented with the production of traces of alcohol and formic acid. The most remarkable character of this yeast, however, was its tolerance of high concentrations of glycerol even up to 75 per cent. solutions. The growth in solutions of lower concentration (5-20 per cent.) was increased considerably by supplying nitrogen either in the form of ammonium sulphate or peptone solutions. Growth in glycerol solutions caused change of form and also definite reduction in size.

The pink yeast resembled the white one in its tolerance of glycerol of high concentration, but of the carbohydrates mentioned glucose alone was fermented. The effect of the yeasts is the production of a general cloudiness in the glycerol, while the flocculent precipitate is a result of infection by moulds. This fungus and the pink yeast are probably the result of contamination from the air, and the production of the white yeast is possibly derived from the glycerol. Two drops of chloroform water (B.P.) to 10 c.c. of the culure solution inhibits the growth of both of the yeasts and the mould. The white yeast has not yet been identified with any known species.

Mr. Richmond mentioned that Savage had discovered certain yeasts which exhibited similar tolerance of condensed milk, and were also capable of fermenting sugar.

New Organic Compounds of Tin.

Mr. H. Lambourne then read a paper entitled "Organic Compounds of Tin," in which he described the so-called methyl-stannonic acid $CH_3.SnO.OH$, and some new acyl derivatives which seemed to show that they did not correspond to the simple type as represented by $CH_3.SnO.OR$. A condensed form of three molecules of the ortho type $CH_3.Sn(OH)_3$, would give a cyclic compound $(CH_3SnOOH)_3$, and some of the new derivatives he had prepared corresponded to such polymerised structure in which the tin and oxygen atoms were alternately combined. Other compounds appeared to be of open chain structure still containing the tin and oxygen atoms in alternate combination, while just recently he had obtained derivatives of even more complex constitution, possibly of the type $(CH_3SnOOR)_6$.

Hydrogen-ion Concentration—Its Value in Analysis.

Dr. Prideaux then gave a demonstration of a universal regulator of acidity, with some suggested uses in analysis, and showed the advantages of using the symbol PH in quantitative and graphical treatment of acidity and alkalinity. The lecturer showed how rapid changes of PH with added alkali corresponded to good titrations, while buffer mixtures produced gradual changes which corresponded to good hydrion regulations. He showed how the "B.D.H." universal buffer mixture together with their universal indicator improved the reguiation by the introduction of acids of intermediate dissociation constants, and indicated how the PH values of milk and other fluids could be tested.

It could be shown that the PH of beer lies between 3.9 and 4.7 by adding pure litmus to one sample which should give a red colour, and to another sample bromphenol blue which should give violet. The exact PH of beer could then be determined by using the universal buffer with methyl red. The use of the "B.D.H." comparator case was demonstrated as improving the accuracy of the determination. In hopped worts, prevention of the growth of disease was obtained if the PH was below 5.4, and this value could be as low as 4.3 without inhibition of yeast growth. The PH of vinegar is given by different authorities as 2.36 to 3.21 and 2.67 to 2.84 respectively, and it should not be below the lowest of these values. Buffer solution and Tropaolin OO showed a sample of vinegar after five-fold dilution to have a PH of 2.8.

Mr. Burford asked as to what was the advantage in taking the PH of ordinary drinking water. Mr. Calam inquired as to the sensibility of the palate towards liquors of low acidity, and mentioned the very different taste of beer and vinegar although of similar PH values.

In reply, Dr. Prideaux stated that the PH determination was useful in conjunction with other chemical properties of water. As yet no sensitiveness of the palate to PH had been found, but probably 0.001 N was about the limit, but considerable variation occurred according to whether the PH was produced by a strong acid in low concentration, or a weak acid in higher concentration.

LEGAL INTELLIGENCE.

MANUFACTURE OF "MILTON" IN AMERICA.

Milton Manufacturing Co., Ltd., *v.* W. D. Forbes.

In the King's Bench Division, on November 21, the Lord Chief Justice and a special jury heard an action by the Milton Manufacturing Co., Ltd., of Bunhill Row, London, E.C., against Mr. Wm. Dick Forbes, of Pinners Hall, London, E.C. Plaintiffs, who are the manufacturers of a disinfectant called "Milton," sued the defendant for £6,800., which represented the balance of the price of 12,500 £1 preference shares in the company, with interest. Mr. Forbes counter-claimed for a recession of the agreement to purchase the shares, alleging that he purchased them because of misrepresentations made by Mr. D. M. Rogers, the managing director of plaintiff company.

Mr. Forbes, in his evidence, stated that Mr. Rogers described the American market of Milton as wonderful, and said he had a site upon which a factory out there was to be built so that the 25 per cent. importation duty might be saved. It was upon the representation that £100,000 was to be spent in advertising in England and building an American factory that he bought the shares. In cross-examination Mr. Forbes agreed that the directors of the company took up 27,000 shares out of the 100,000, and the people who underwrote most of the 73,000 had paid up. Milton might have been a successful commodity in England, and there was every reason for believing that it would be successful in America. He also agreed that it was necessary that the company should have money with which to advertise and push their goods in America, and that the company had a smart agent in America. It was a fact that delay had occurred through the difficulty of getting the American authorities to accept labels on the bottles, while the agents there owed the company a huge sum on contracts.

At this stage the defendant submitted to judgment on the claim and counter-claim, his counsel observing that after hearing the defendants' admission in cross-examination he could not advise him that it would be wise to proceed.

CHEMICAL MANUFACTURER'S BANKRUPTCY.

Bertram Levin.

Bertram Levin, chemical manufacturer, carrying on business at Deansgate, Manchester, who was stated to have had large interests in several chemical companies, including the Comet, the Semolina, and Victors, Ltd., appeared for further examination at Manchester Bankruptcy Court on Friday of last week.

Debtor, it was stated by the Official Receiver, did not admit insolvency. He stated that apart from contingent creditors his assets exceeded his liabilities, and as touching contingent claims it was difficult to estimate his liability. His difficulties really arose out of his connection wth Victors, Ltd. The accounting statement supplied by debtor opened with a surplus of £36,405. on July 31, 1921, since which date he had earned an income of £2,000. To account for this sum of £38,405., he estimated that he had £11,437. bad debts, his household expenses were £2,000. and he had lost on shares held in Victors, Ltd., £14,280., whilst his liabilities *re* Victors, Ltd., was £4,928. His surplus, according to this statement, was £912.

Debtor stated, in the course of further examination, that he had not been asked to prepare a trading account.

An application was made on behalf of the petitioning creditor for an order to compel debtor to prepare a trading account. It was impossible to see debtor's position from the accounts he had provided.

The Registrar (Mr. Atkinson): The accounts are hopeless. For an educated business man I never saw a more clumsy statement. No business man, in fact, would dream of putting things in this way.

Debtor was ordered to file a proper cash account, and the examination was further adjourned until February 8 next.

SALE OF A FISH OIL PROCESS.

E. G. Oliver *v.* J. Wolstenholme.

In the King's Bench Division, on November 22, the Lord Chief Justice and a special jury heard an action by Mr. Edmund Gifford Oliver, of 59, Cadogan Square, W., against Mr. James Wolstenholme, of Great London Wall, E.C., in which the plaintiff claimed the return of £1,000. he had paid defendant in return for a one-third share of the price received for the sale of a process for the manufacture of edible fats from fish oils. Mr. Oliver's case was that Mr. Wolstenholme told him that he had an option of the purchase of valuable process from the Lewkowitsch Laboratories, and that he was putting up his own money to develop the matter in connection with the process he controlled that it might be sold at a good profit. It was ascertained a long time after plaintiff paid over his money that Mr. Wolstenholme had never controlled the process, and plaintiff charged him with misrepresentation and claimed his money back for want of consideration.

Mr. Wolstenholme, in his evidence, said he held an option on the process for some months, and showed it to Mr. Oliver. He negotiated with Spencer and Co., of Aberdeen; Lever Bros., and other big firms for the sale of the process without success.

The jury later stopped the case and returned a verdict for the defendant, for whom judgment was entered with costs.

POTASH FIRM'S LIQUIDATION.

Alsace Lorraine Development and Trading Company, Ltd.

A meeting of the creditors of the Alsace Lorraine Development and Trading Company, Ltd. (Societe Generale d'Alsace Lorraine), Pinners Hall, Old Broad Street, E.C., was held on November 23. The liquidator, Mr. A. H. Partridge, stated that the meeting was really a sequel to a conference of some of the larger creditors which was held on June 19 last, when the position of the company was explained. A statement of affairs showed liabilities of £12,743 6s., of which £9,642. 7s. 6d. was due to unsecured creditors. There was one partly secured creditor (the bank) for £4,056. 1s. 7d., who held security £2,355. 3s. 1d., leaving £1,700. 18s. 6d. to rank as unsecured. There was also a creditor for rent, £2,000., who held as security furniture valued at £600., leaving £1,400. to rank. The assets comprised £8,999. 2s. 3d., from which had to be deducted £30. for preferential claims, leaving net assets of £8,969. 2s. 3d. of a deficiency of £3,774. 3s. 9d. There were claims against the company for income tax, £1,360. 13s. 4d.; excess profits duty, £880.; and corporation profits tax, £1,720. 6s., which were at present under investigation. The company was incorporated on March 8, 1919, with a nominal capital of £50,000., made up of 40,000 shares of £1. each and 40,000 founders shares of 5s. each. After some discussion it was decided to confirm the voluntary liquidation of the company, with Mr. Partridge as liquidator, together with a committee of five of the principal creditors.

THE SEA TRANSPORT OF CORROSIVE ACIDS.

RESTRICTIVE POLICY OF BRITISH SHIPPING COMPANIES.

THE British heavy chemical industry, states a correspondent to the *Times Trade Supplement*, is now not altogether satisfied with the conditions on which consignments of corrosive acids are accepted by British shipping companies. These acids, by reason of their dangerous character, are shipped, as a rule, on deck, and it seems that the restrictions of the British companies are considerably more exacting than those of some Continental lines, and especially of German companies.

Sulphuric acid, for instance, is usually shipped in jars in wooden cases, in iron drums, or in carboys. Chemical firms report that frequently the shipping companies will not accept cases of a total weight of 3cwt., which means, allowing for tare, a net weight of the acid of 1½cwt., or even less. In some instances the total weight of the cases acceptable is understood to be limited to 1cwt. The number of cases which the companies will accept for one vessel is also restricted. Some of the Continental lines are not nearly so exacting in their requirements, with the result that foreign manufacturers are in a more advantageous position.

Limitations on Size of Drums.

Similarly, some shipping companies are understood to refuse to accept iron drums weighing more than about 3cwt. gross, while others limit the total weight to 1cwt., and it is common to restrict the number of drums for any one vessel to about 25. German companies, on the other hand, will accept drums of any weight, such as 11½cwt., which allows for 10cwt. of acid, and they impose no restrictions as to the numbers. They will accept, it is also understood, 500 drums for shipment in one vessel.

CORRESPONDENCE.

*** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE "SENSIBLE HEAT" COAL-CARBONISATION PATENTS.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—There have recently been quite a number of patents taken out for retorts in which the so-called "sensible heat" of gases is used for carbonisation of coal or other materials. I believe that the original idea was that of myself and the late Mr. John West (Patent No. 114,937). This patent was applied for on June 11, 1917, and the complete patent accepted April 25, 1918.

We did not use the words "sensible heat," but applied what is now called "sensible heat" to the ordinary Glover-West retorts with very useful results. We returned a portion of the stripped gas back through the incandescent coke, thereby partially cooling the coke and at the same time heating the gas, so that "sensible heat" helped in the carbonisation of the upper layers. In our case, we had external as well as internal heat. In several cases which have recently been noted in the Press, the "sensible heat" has been entirely used within the retort without external heating. The gas used for "sensible heating" is naturally an inert gas—that is to say, any gas which contains no oxygen, such as producer gas.

On August 28, 1917, in conjunction with Nitrogen Products and Carbide Company, I took out another patent (No. 128,660), in which acetylene was used as the inert gas. This was completed July 3, 1919. I have not found that anyone before these dates had suggested the use of the (sensible heat) inert gas for carbonisation, and it seems to me to make very little difference whether a combination of the "sensible heat" of inert gas is entirely used, or whether it is use in conjunction with external heat.—Yours, etc.,

F. Mollwo Perkin.

"Albion House," 59, New Oxford Street,
London, W.C. 1. Nov. 27, 1923.

TRADE MARKS IN THE IRISH FREE STATE.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We have received a number of inquiries with reference to the registration of trade marks in the Irish Free State. So far the Irish Parliament has not passed any measure requiring registration in that country, but it is expected that a Statute Law will in due course be introduced dealing with trade mark registration there. In the meantime the Ministry of Commerce and Industry have granted facilities by which trade-mark owners may enter their marks on the official records of the Ministry in Dublin, so as to constitute evidence of deposit, and of the date from which title by user is claimed. Such deposit will in fact be a preservation on public record of a firm's trade marks which is evidence of a claim to title, so that when legislation is introduced legalising their registration in the Irish Free State, such marks on the official list will have priority over those not on the official list.

It therefore, becomes a matter of first importance to consider the necessity of entering one's marks on the Irish records in Dublin, so as to set up a claim to title in priority to later applicants and if any of your readers will furnish us with specimens, in duplicate, of the trade marks used in connection with their business, together with the approximate date of first user, we shall be happy to undertake their deposit in the official lists above referred to. We shall be pleased to supply any further information desired.—Yours, etc.,

W. H. Beeston, Director,
Trade Mark Protection Society.

50, Lincoln's Inn Fields,
London, W.C. 2,
November 22, 1923.

CHEMICAL ENGINEERING AND HYDROCHLORIC-ACID TREATMENT.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—At the meeting of the Chemical Engineering Group, reported in your issue of November 23, Professor Hinchley made certain statements concerning chemical engineering and hydrochloric acid treatment. We have made a study of this problem for some years, and have in operation a number of plants dealing with difficult hydrochloric acid problems. In one works not very far from the Professor's lecture room we have been pumping *aqua regia* for some considerable time and while we cannot, for obvious reasons, give exact details of the process, we have documents in our possession from the firm, which is one of the best known in the country, stating how entirely satisfactory the results are.

In the Midlands we have had a series of vessels of some hundreds of gallons capacity working on hot hydrochloric acid for six years. We have not yet experienced deterioration. The Ceratherm Glandless Pump is already being applied for continuous use of hot hydrochloric acid in seven different countries, although it was only made available to the trade early this year. Finally we hardly think it possible that the conditions of use of hydrochloric acid which Professor Hinchley has experienced can be so very much more severe than those encountered in other works, and we cannot conceive them being as severe as some of the *aqua regia* and other processes for which we have to cater.—Yours, etc.,

Guthrie and Co.

Accrington, Lancashire,
November 26, 1923.

THE DISINFECTANT "IZAL."

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Referring to the letter of Messrs. Newton, Chambers and Co., Ltd., in your issue of November 23, *re* the statement in my recent article on "Disinfectants and Preservatives," concerning "Izal": in "Practical Sanitary Science," by R. Sommerville, 1906, the following paragraph occurs:—"Izal is a reddish-brown liquid, insoluble in water, and is derived from the oil produced during the carbonisation of coke in close ovens. It is a highly efficient disinfectant, and mixes with water in all proportions, forming a milky-white emulsion. For the disinfection of fluids, and fluids containing solids, a copious solution, at least 5 per cent. in strength, should be applied for half an hour."

When considering the efficiency of a disinfectant of a certain strength, it is necessary to bear in mind that it must come into contact with the germs to be destroyed without undergoing further dilution, and remain in contact with them for a considerable time, so that if the material to be disinfected is bulky, the strength of the disinfectant must be increased accordingly. However, it is well-known that the product "Izal," manufactured by Newton, Chambers and Co., Ltd., is highly efficient in such dilution as 1 in 600, which is the usual dilution employed for ordinary processes of disinfection. The statement quoted above by R. Somerville probably refers to extremely bulky solutions or fluids containing a high percentage of solids.—Yours, etc.,

Nov. 23, 1923. S. N. Brown.

THE SPANISH TRADE IN RED IRON OXIDE.

AMONG the more important products exported from Malaga is red oxide of iron. According to the U.S. Vice-Consul at Malaga it is mined, principally in the mountainous regions in the Province of Jaen. The crude ore is carried to Malaga, where it is levigated. Nearly all of the larger mining companies now possess overhead cables which connect the mines with the main railroad.

The ore milled in Malaga is reputed to be of very good quality, not equal in colour to the more expensive variety mined in the Persian Gulf region, but much higher in ferric-oxide content and therefore of more value as a preservative for iron and woodwork. Moreover, the Persian ore is only shipped in the crude form, there being no levigating nor grinding plants on the island of Ormuz nor in Persia.

The red-oxide industry has expanded considerably during the last 10 years, the greatest increase having occurred during the past three years. This is accounted for by the growing use of paints in construction work of all kinds. The cement and rubber trades also now consume large quantities, and a large amount is used in paper staining. Approximately 60 per cent. of the ore exported from Malaga is shipped to the United States, about 30 per cent. goes to the United Kingdom, and the remaining 10 per cent. is taken by various other countries. During the first six months of 1923 the total exports of levigated oxide from Malaga may be taken as 10,000 long tons.

ITEMS OF INTEREST.

Tariff Notes.—It is officially announced that the export duty on palm oil and gum copal from Sierra Leone has been abolished.

Unemployment Decreasing. — The number of persons on November 19 recorded in Great Britain was 1,234,700. This was 9,704 less than in the preceding week, and 251,178 less than the figure recorded on January 1, 1923.

Tin Prices Rising.—The price of tin has of late considerably advanced, and on Wednesday the price spurted further to £236. 17s. 6d. per ton for cash, and £237. 7s. 6d. for three months' delivery. It is necessary to go back to 1920 to find a quotation in excess of this figure, the highest level that year being £420. per ton for cash.

Industrial Cancer. — A coroner's jury in Bradford, on Wednesday, returned a verdict of accidental death at an inquest on William Henry Tate, chemical works' labourer, of 3, Providence Place, Cleckheaton, adding a rider in accordance with the medical evidence that the cancerous growths from which the man had suffered had arisen in the course of his employment as a tarworker.

Dangerous Drugs in Switzerland. — The Swiss Department of Public Economy has drafted a law relating to narcotic drugs with a view to controlling their sale, as well as the manufacture, import, and export of opium, cocaine, morphine, and heroin. When this law has been passed and put into force Switzerland will be in a position to ratify the Hague Opium Convention.

Petroleum Spirit Storage.—The Home Office has issued a new regulation to come into force on January 1, under the Locomotives on Highways Act, with regard to the storage of petroleum spirit. The new regulation provides, among other things, that the storehouse must be at least 20ft. from any other building or any highway or public footpath. Provision must be made by excavation or by retaining walls to prevent outflow of the spirit in the event of fire.

Sicilian Sumac Crop.—The present Sicilian sumac crop is estimated to be about 20,000 tons, but the quality is not as good as last year's, because of the unusually few rainy days during this season. Stocks of the previous crop are entirely exhausted, and, in consequence, prices are above normal. The superior grades of the new crop will undoubtedly command high prices, but just now prices do not reach high levels because of the small foreign demand.

State Reward for Mme. Curie. — A Bill has been laid before the Chamber by the Minister of Public Instruction for the purpose of conferring on Mme. Curie, Professor at the Faculty of Science, University of Paris, a pension of forty thousand francs. It is proposed that the pension shall be conferred on the twenty-fifth anniversary of the discovery of radium by Mme. Curie and her late husband, and as a mark of national recognition of her scientific work.

Litigation Over Carbonisation Patents.—On Dec. 12 next is due to be heard in the Comptroller-General's Court at the Patent Office, a case regarding patents for low-temperature carbonisation processes applied for respectively by Dr. S. R. Illingworth and Mr. John Roberts. On the eve of the date for sealing Mr. Roberts' patent an opposition was filed on behalf of Dr. Illingworth, in which it was alleged that Mr. Roberts' claims were covered by a prior grant of patent to Dr. Illingworth. A counter-action was commenced by Mr. Roberts applying to the Comptroller for the revocation of Dr. Illingworth's patent on several grounds. Both specifications refer to blending of inferior coals for carbonising.

U.S. National Exposition of Chemical Industries.—No exhibition will be held in 1924, but the tenth Chemical Industries Exposition will be held in the Grand Central Palace, New York, during the week, September 28 to October 5, 1925. From preliminary announcements we have received it appears that nearly all the floor space has already been booked by those exhibitors who have been present in previous years, and that additional floor space will be needed. The experiment of holding a course for students in the fundamentals of chemical engineering practice, which was a feature of the 1923 Exposition, proved such a success that it has been decided to increase this aspect of the Exposition's functions in 1925. The attendance of disinterested casual visitors is to be discouraged by greater strictness in the allocating of admission tickets.

British Coal Output.—The output of coal from the mines of Great Britain during the week ended the 17th inst. was 5,574,100 tons, against 5,571,900 tons in the preceding week and 5,376,000 tons for the corresponding period of last year.

Swiss Artificial Silk Industry.—According to the *Swiss Exporter*, the favourable marketing conditions for Swiss artificial silk are causing the Viscose S.A. of Emmebrücke (Lucerne) to contemplate the erection of a second factory. Moreover, a new undertaking for the manufacture of artificial silk is about to be established at Stockborn by the "Borvisk" Artificial Silk Works, Ltd., of Zürich.

Lancashire Dyers' Dispute Settled. — The dispute between Manchester merchants and the Piece Dyers' Association ended this week, the piece dyers having withdrawn the condition that all the dyeing in Great Britain shall be sent to their Federation, and consented to a reduction in prices of 7½ per cent., with a further rebate ranging from 1 to 5 per cent., based on the amount of work done.

British Empire Exhibition.—Included in the programme of conferences to be held during the course of the British Empire Exhibition at Wembley next year are: The Institute of Mining and Metallurgy, from June 3 to 6; the Textile Institute, June 10 to 12; the Society of Dyers and Colourists, June 11 and 12; and the Association of British Chemical Manufacturers on July 10.

Separation of Asphaltenes from Mineral Oils.—M. Jakes (*Chem. Zeit.*, 1923, 113/114, 757) recommends the use of purified cyclohexane instead of petroleum spirit (benzine) for the separation and estimation of asphaltenes in mineral oils. Comparative analyses with benzine and cyclohexane of a cylinder oil rich in asphaltenes showed that the former solvent gives a higher result (1.38 per cent.) than the latter (0.36 per cent.).

Coke Price Agreement.—It is reported that the price of blast-furnace coke, which has latterly been fixed on a month-to-month basis, has now been settled till the end of March, as a result of a conference between the collieries and the consumers. The existing price of 24s. per ton, at oven, will apply over the intervening period. The coke suppliers of Lancashire, Yorkshire, Derbyshire, Nottinghamshire, and Staffordshire are parties to this arrangement.

Explosion on British Steamer.—A fire followed by an explosion occurred on Friday of last week on board the British steamer Otterburn, belonging to the Guernsey Shipping Company, Limited, which was lying off Marseilles. The Otterburn has been grounded, and lies with her stern waterlogged. The casualties are not yet known, but the captain and five sailors are missing. It is believed that the accident was due to the explosion of some barrels of chlorate of potash.

Rating of Machinery.—The Minister of Health and the Secretary for Scotland have appointed a committee, with Mr. Edward Shortt as chairman, to inquire into the present law and practice regarding the rating of machinery and plant in England and Scotland respectively; to make recommendations as to alterations which are desirable and practicable, having regard to the considerations involved, with a view to removing inequalities, and if possible assimilating the law and practice of the two countries, and to make definite proposals thereon.

The Hamburg Wax Market. — According to a report of Consul General Oliver, dated November 20, the position of the market is unchanged, inland business is at a standstill, while sales abroad on a small scale were firm for the most part. Carnauba wax realised 89-90 shillings per cwt. fat grey, and 87-88 shillings per cwt. current grey. Japanese wax was quoted at 84-85 shillings per cwt. for the first three qualities. There is practically no demand for beeswax, prices remaining unchanged at 95-103 shillings per cwt. for West African, 98-106 shillings for East African, and for finer qualities up to 120 shillings; 40-45 dollars are asked for ozokerit-ceresin natural yellow 62—64° C., 48-50 dollars for ozokerit-ceresin prime white 62-64° C., 15 dollars for ceresin natural yellow 54-56° C., and 13.50 dollars for ceresin prime white 54-56° C. The increased demand for paraffin continued, chiefly from abroad, and could not be met. American prices were 9.25 to 9.50 dollars per 100kilogs., c.i.f. Hamburg. Sales took place at 9.50 to 10 dollars per 100kilog., according to quantity, for prime white American paraffin blocks, and at 8.50 to 9 dollars for white American paraffin shavings. All prices (except for wax and ceresin) were undutied, net cash.

Liquid Oxygen as an Explosive.—The results of an investigation at the U.S. Bureau of Mines experimental station at Pittsburgh indicate that liquid oxygen explosives may be used to advantage, especially in the lessening of blasting costs, in iron, salt, and other mineral mines and quarries. Among the advantages of liquid oxygen are the low cost per unit of material blasted and greater safety in use. Since liquid oxygen explosives are made at the place of consumption, the danger common in the transportation of other explosives is eliminated, and there is practically no likelihood of premature ignition.

Arsenic Ores in Turkey. — Arsenic is found in several places in the Province of Smyrna, and also at Zara, in the Province of Sivas, Turkey, states a U.S. Consular report. Prospects have been opened in other parts. The chief source at present is that of the Balia lead mines, the arsenic ore production of which has reached a maximum of 262 tons in a year. It is operated by the Société Anonyme de Balia Karaidin (French). The Balia Karaidin Mines have not, however, produced any arsenic since October, 1922. Their 1921-22 output of arsenic ore amounted to 200 tons, and was exported to Belgium. Transactions ordinarily are with Belgium and Germany.

The Colour of Dakin Solution.—Dakin solution is a buffered aqueous solution of sodium hypobromite, and is used as a bactericide. When prepared from chloride of lime and a mixture of carbonate and bicarbonate of sodium, Dakin solution frequently has a pink colour. J. Holden (*U.S. Naval Med. Bull.*, 1923, 19, 156-157) states that this pink colour is due to the presence of sodium permanganate; manganese may be present in the chloride of lime as calcium manganate, and is converted into sodium permanganate in the preparation of the Dakin solution. The presence of permanganate is believed to be desirable rather than objectionable.—*J. Fr. Inst.*

British Industries Fair.—The demand for exhibiting space at both the White City and Birmingham Sections of the next British Industries Fair, says the Board of Trade *Journal*, has shown a decided advance on that of the corresponding period in the organisation of the 1923 Fair. Since 1921, the scale of charges for stand erection has been reduced year by year. The comparison in the cost to the exhibitor of a stand in 1921 as against the prices ruling for the next Fair is shown in the following table:—

Sq. ft.	1921 £ s. d	1924 £ s. d.
100	13 6 8	8 18 11
200	26 13 4	13 13 0
500	66 0 0	17 18 11

The Future of the Imperial Institute.—In view of the changes in the constitution of the Imperial Institute which have been decided upon, Professor Wyndham R. Dunstan will, it is announced, resign the directorship of the Institute next month. Professor Wyndham, who became director in 1903, was connected with the Institute from the year 1896. It will be recalled that under the reorganisation scheme approved by the Imperial Economic Conference, the work of the Institute is to be curtailed appreciably. Investigations relative to new Empire raw materials are to be confined to analyses and preliminary examination only, and the Exhibition Galleries are to be discontinued. It has been agreed that for a period of five years the Imperial Government shall contribute £9,000. yearly to the Institute, the Colonies and Protectorates £8,000., and the Dominions and India £8,000. between them. This, with the endowment fund and other minor sources of income, will provide the reconstituted Institute with £40,000. per year.

Anise Oil Market at Hongkong.—Anise oil is exported from Hongkong to the value of approximately 150,000 dollars annually, principally to Great Britain, the United States, Japan, Germany, and France. Most of the exports consist of oil secured from the Provinces of Kwangsi and Kwangtung in South China, and the best quality is obtained from a district north of Woochow, in Kwangtung. The American Consul at Hongkong states that anise oil is being freely offered in that market at 90 Hongkong dollars per picul (1 picul = 133⅓lb.) at warehouse, including packing. Sales are usually contracted for on the basis of certificates issued by local analysts. Payments are made cash against documents on confirmed letter of credit. The oil is packed in cases of four lead containers of 16⅔lb. net each, the average can occupying three cubic feet. It is not expected that the market will improve until stocks at London and Hongkong are considerably reduced.

COMING EVENTS.

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, November 30,** at **7 p.m.,** at 36, George Street.

Society of Chemical Industry (Liverpool Section).—Meeting, **Friday, November 30,** at **6 p.m.,** in the Clubrooms of the Overseas League, 14, Elliott Street. Discussion: "The Society of Chemical Industry and What it Stands For," to be opened by Dr. E. F. Armstrong.

Society of Chemical Industry (London Section).—Meeting, **Monday, December 3,** at **8 p.m.,** at the Chemical Society, Burlington House, Piccadilly, W.

Institution of the Rubber Industry (London Section).—Meeting, **Monday, December 3,** at **8 p.m.,** at the Engineers' Club, Coventry Street, London, W. Paper: "Accelerators," by Major V. Lefebure.

Society of Public Analysts. — Meeting, **Wednesday, December 5,** at **8 p.m.,** at Burlington House, Piccadilly, W.

Society of Chemical Industry (Bristol Section).—Joint meeting with the Institute of Chemistry, **Thursday, December 6,** at **7.30 p.m.,** at the University, Woodland Road. Paper: "Some Reminiscences of an Alkali Inspector," by R. D. Littlefield.

Society of Dyers and Colourists (Bradford Junior Branch).—Meeting, **Thursday, December 6.** Paper: "Wool Dyeing in the Piece," by H. Mitchell.—**(Scottish Section):** Meeting, **Friday, December 7.** Paper: "Wetting Power and Its Application to Industry," by W. H. Nuttall.

Chemical Society. — Meeting, **Thursday, December 6,** at **8 p.m.,** at Burlington House, Piccadilly, W. 1.

Society of Chemical Industry (Manchester Section).—Joint meeting with the Institution of the Rubber Industry, **Friday, December 7,** at **7 p.m.,** at the Textile Institute, 16, St. Mary's Parsonage. Papers: "Methods to be Adopted in Comparing the Activity of Various Accelerators," by S. Martin; "The Analysis of Rubber Vulcanisation Accelerators," by Dr. T. Callan and N. Strafford.—**(South Wales Section):** Meeting, **Friday, December 7,** at **7.30 p.m.,** at the Technical College, Cathays Park, Cardiff. Paper: "Coke Ovens," by T. G. Watts, to be followed later by a visit to the Maritime Coke Works, Pontypridd.

Institute of Chemistry. — Annual dinner, **Monday, December 10,** at **7.30 p.m.,** at the Hotel Victoria, Northumberland Avenue.

Institute of Metals (Scottish Section).—Meeting, **Monday, December 10,** at **7.30 p.m.,** at 39, Elmbank Crescent, Glasgow. Paper: "Cold Working of Metals and Its Influence on the Properties and Uses," by A. T. Adam.—**(N.-E. Coast Section):** Meeting, **Tuesday, December 11,** at **7.30 p.m.,** at Armstrong College, Newcastle-on-Tyne. Paper: "Admiralty Gunmetal," by S. G. Homfray and F. Adam.—**(Birmingham Section):** Meeting, **Tuesday, December 11,** at **7 p.m.,** at the Chamber of Commerce, New Street. Paper: "Extrusion Problems," by Major R. M. Sheppard.—**(London Section):** Meeting, **Thursday, December 13,** at **8 p.m.,** at 85-88, The Minories, Tower Hill, E. 1. Paper: "Some Foundry Problems," by A. H. Mundey.—**(Sheffield Section):** Meeting, **Friday, December 14,** at **7.30 p.m.,** at the University, St. Georges' Square. Paper: "The Metallurgical Microscope," by J. H. G. Monypenny.—**(Swansea Section):** Meeting, **Friday, December 14,** at **7.15 p.m.,** at University College, Singleton Park. Paper: "The Brinell Hardness Test," by A. L. Norbury.

Hull Chemical and Engineering Society. — Meeting, **Tuesday, December 11,** at **7.45 p.m.,** at the Photographic Society, Grey Street. Paper: "Recent Advances in the Study of Corrosion," by Dr. J. Newton Friend.

Society of Chemical Industry (Edinburgh Section).—Meeting, **Tuesday, December 11,** with the Institute of Chemistry. Paper: "H.M. Factory, Gretna," by Allin Cottrell.—**(Newcastle Section):** Meeting, **Wednesday, December 12,** at **7.30 p.m.,** at Armstrong College, Newcastle-on-Tyne. Paper: "The Sterilisation of Preserved Foods," Miss C. M. Dugdale.

Institute of Chemistry (South Wales Section).—Visit on **Wednesday, December 12,** to the Chemical Department of University College, Swansea.—**(Leeds Section):** Meeting, **Thursday, December 13,** at **7 p.m.** Paper: "Practice Under Modern Patent Law," by Griffith Brewer.

REPORTS OF COMPANIES.

Langdale's Chemical Manure Company, Ltd.

The annual general meeting was held at Newcastle on Friday, November 16. Mr. E. L. Beckingham (chairman) presided, and, in moving the adoption of the report and balance-sheet, referred to the effects of foreign competition in the superphosphate trade. There had unfortunately been no relief during the year under review. The French and Belgian makers were favoured by lower wages, lower rates and general cost. Further, the abnormal rate of the exchanges gave them an additional advantage in selling on our market. He understood that labour in France was paid at the rate of 20 francs per day, which was equal to 30s. per week of 48 hours; in Belgium, he believed, it was less. As there was no unemployment in these countries, industry was spared the very heavy addition to rates and taxes to deal with it. The Fertiliser Manufacturers' Association had placed a recommendation before the Prime Minister asking for his assistance to prevent many of the manufacturers of superphosphate from closing down, but he was not sanguine that any help was to be expected from that quarter. What might occur if an import duty were put on French superphosphate was that the French Government might retaliate by discriminating against us with an export duty on North African phosphate rock. The phosphate rock supplied within the Empire, on account of their distant situation in the Pacific, were at prices beyond the means of chemical-manure manufacturers, faced with these selling prices that they were. Difficult as the foreign competition undoubtedly was to fight, the company had not lain down under it during the past year, and, with much contriving and effort, had sold more sulphuric acid and fertilisers from their works than last year. There was a growing belief and hope that the tide was on the turn, and improvement in trade generally in sight. In the trade there was a distinct stiffening of prices on the Continent during the last few weeks, which led to the hope that, if continued, the competition might relax, and they might be able to dissolve more of their own superphosphate.

The adoption of the report and accounts was agreed to.

Pan de Azucar Nitrate Company, Ltd.

The annual meeting was held in London on Tuesday, Lord Hunsdon (the chairman of the company) presiding.

The Chairman, in moving the adoption of the report and accounts, said:—With regard to the position of the nitrate industry generally, the outlook when we met last year was uncertain, but a marked improvement took place in the spring of 1923, when demand developed strongly in all consuming markets. Sales of nitrate in the current year are going on well, and in some quarters it appears to be expected that the total will reach 2,300,000 tons. This seems to me to be a rather high figure, but if it should be realised, and assuming that production in Chile is not materially increased, the world supply at June 30, 1924, may be reduced to about 1,000,000 tons. The average sale price so far secured for the current year is about 9s. 3¾d. per Spanish quintal, and as the price for further sales is fixed at the equivalent of about 9s. 8d. per Spanish quintal, these further sales will improve the average price. From the average price obtained we have to deduct 4d. per quintal compensation to the Pool, as was the case last year, but if the present rate of sales be maintained, this compensation should be completed by March 31, 1924. Altogether the situation is much healthier than it was twelve months ago.

Liverpool Nitrate Company, Ltd.

Presiding at the meeting of the Liverpool Nitrate Company, Ltd., in Liverpool, Sir Robert Harvey said his forecast of a year ago of a good result for this year had been justified, the gross profit having been £132,544., as against £6,096.; and the net profit £41,009., as against a loss of £79,549. Moreover, it was in August and September, 1922, that oficina San Lorenzo and Ramirez reopened, and oficina San Donato did not start until January last. Their compensation to the Nitrate Pool amounted to £20,587., an increase of nearly £10,000. The total amount of compensation which the Nitrate Association agreed should be paid to the Pool was £1,500,000. Up to date £996,000. had been collected, and probably by April next they would be entirely relieved of this levy.

London Nitrate Company, Ltd.

Report and accounts to June 30 show that profit on trading, after deducting depreciations, is £80,377., which is increased by transfer fees to £80,411., add amount brought forward £17,968., making £98,379. Deduct office expenses in Liverpool and directors' fees £3,261., income tax and corporation profits tax £13,991. Debenture interest £7,934., bank interest and discount £917., and one-fifth, being balance of expenses of debenture issue, £856., leaving £71,418. Directors have appropriated £30,000. to reserve for redemption of debenture stock, and interim dividend paid in June last absorbed £10,000., leaving £31,418., from which final dividend for year of 1s. 6d. per share free of tax will be paid on December 6 next amounting to £15,000., leaving £16,418. to be carried forward.

Malayan Tin Dredging, Ltd.

The report for the year ended June 30, 1923, states that the total quantity of tin ore produced was 1,167½ tons, which realised £128,646., or an average price of £110. 3s. 10d. per ton, as compared with £93. 5s. 6d. per ton for the previous year. The profit, after writing o depreciation, amounts to £36,467., making, with £60,005. brought forward, £96,472. Deducting dividend of 1s. per share paid May 15 last, £9,000.; amount written off plant and machinery, £25,396.; and transfer to reserve account, £20,000., leaves a balance (subject to corporation profits tax) of £42,076., out of which a further dividend of 1s. per share paid paid on August 21.

Castner Kellner Alkali Company, Ltd.

Report for the year ended September 30 states the net profit is £263,187., add amount brought forward £55,494., making £318,681.; deduct debenture interest £7,351., interim dividend paid on May 24, 1923, £80,000., leaving an available balance of £231,330.; £120,000. in payment of a final dividend of 12 per cent., making 20 per cent. for the year, payable on December 5, 1923; £75,000. to be carried to suspense account, £36,330. carried forward.

DIVIDENDS.

Zinc Corporation, Ltd.—The directors have declared a dividend of 2s. per share on the preference shares, being the last half of the fixed preferential dividend of 20 per cent. for the year 1913, also an interim participating dividend of 1s. per share on both the preference and ordinary shares, less tax.

Parke's Drug Stores, Ltd.—Interim dividend of 2½ per cent., less tax, on ordinary for half-year to August 31, payable November 30.

Anglo-Persian Oil Co., Ltd.—Dividend on ordinary shares of 10 per cent. less tax for year ended March 31, 1923, carrying forward £1,777,788.

OUR BOOKSHELF.

Clouds and Smokes. William E. Gibbs, D.Sc. London: J. and A. Churchill; 10s. 6d. net.

Commencing with a foreword by Sir Oliver Lodge, this book aims at a clear and comprehensive account of "aerosols" (matter in a highly disperse condition in a gas) and their practical and industrial applications. Part I. is devoted to the formation of aerosols, general properties, particle movement, and experimental determinations. Part II. concerns itself very suitably with the industrial treatment of fumes and dusty gases, gas washing, electrostatic precipitation, dust explosions, and various other practical considerations. The monograph ought to make a large number of friends in various directions.

Industrial Alcohol. John Geddes M'Intosh (2nd edn. rev. Stocks). London: Scott, Greenwood and Son; 12s. 6d.

A well-known work, which deals in a very practical manner with the production of alcohol from various forms of raw material, including beet, cane, grain, and molasses. Consideration of general principles which form good practice in fermentation is followed by good descriptive detail and illustrations of plant from a wide variety of sources. A chapter is devoted to alcohol by synthetic processes, all of which have a long way to go to compete with alcohol produced from cheap and more or less waste raw materials. "Statistics and Uses of Alcohol" is a section of interest, as is also "Alcohol for Power," etc

FERTILISER NEWS.

Nitrate of Soda.—Judging by the remarks let fall by certain speakers at recent nitrate company meetings, the self-imposed burden of the producers in respect of compensation for the famous "Pool" of a couple of years ago is becoming considerably lightened. It will be remembered that the huge stocks accumulated by the "Pool" on this side, and produced at high cost, were, by a sudden cessation of demand, left high and dry. How to dispose of these stocks on a falling market was a problem, and the members of the "Pool" were promised compensation to the extent of £1,500,000. to help them to meet their losses. This large sum was to be wiped off by levying a toll on every quintal sold and shipped, and, according to the most recent estimates, almost £1,000,000 has been raised in this way to meet the grant. Production is increasing month by month, and it is estimated that the levy, which now stands at 4d. per quintal, should be complete by the end of April next. In the last nitrate year some 46 per cent. of the total exported from Chile went to the United States and its possessions, the total amount reaching 979,000 tons. It is anticipated that the current fertiliser year will see an improvement on this, in consequence of the larger area under cotton. Demand at the present time, however, is reported to be far from brisk, and there is a general feeling that prices are too high. Many consumers are holding back their orders, under the impression that prices will eventually fall; but seeing that the quotation is regulated in the producing country, and most of the f.o.b. business is transacted by the Association at its fixed price, the only price-cutting that could take place is in the difference in the margin of profit which merchants allow themselves. So long as the American sulphate of ammonia market remains so strong, however, there is little hope of a reduction in quotations in the entire absence of any competitive conditions. On this side, the situation is very similar. The European demand is very quiet at the present time, and unsold stocks are being steadily, if slowly, accumulated in Continental ports. So far as the United Kingdom is concerned, consumers on the agricultural side are by no means anxious to place orders for nitrate at £13. 10s., when they have plentiful supplies of a relatively much cheaper nitrogenous fertiliser at hand.

Sulphate of Ammonia.—The new list of prices as circulated by the British Sulphate of Ammonia Federation comes as something in the nature of a surprise. Taking the neutral, 25¾% per cent., quality material, the quotation for December delivery is raised by 1s. per ton to £14. 16s. The advent of the new year, however, witnesses an increase of 6s. per ton on this figure, and the spring prices are given as £15. 2s. for January, £15. 3s. for February, and £15. 5s. per ton for March-May delivery. It is quite understood, of course, that these prices are for sulphate of ammonia destined for use in the United Kingdom only, and the export trade of the Federation is safeguarded by a clause in the contracts enforcing a penalty should any sulphate sold under the above price-list find its way abroad. Judging by the export prices now being realised, however, it is highly improbable that this rule will be infringed. The average price realised for exported material in September was, according to the Board of Trade returns, £15. 7s. per ton, f.o.b.; but in October, only £14. 17s. per ton f.o.b. was obtained. Speaking before the Director of Gas Administration on November 14 last, Mr. D. Milne Watson, Governor of the Gas Light and Coke Company, and Chairman of the Sulphate of Ammonia Federation, stated that the price of sulphate was on the downgrade, and expressed the opinion that it would touch £13. per ton before the end of December next. The latest circular of the Federation, referred to above, does not hold out any hope that home prices will be reduced, rather does it indicate the possibility of further increases without notice. The only alternative, therefore, is that Mr. Milne Watson was referring to the export prices—a supposition which is borne out by the evidence in the Trade Returns. Shortly, then, there will be the anomalous position of an industry endeavouring to foster the domestic demand by charging the home consumer higher prices than the foreign customer. Reports from the United States claim that sulphate is being imported, in spite of the tariff, but that producers are gradually reducing prices to meet this competition. Japan is said to be very anxious to buy in that market, but the export organisation is by no means in running order, so that British producers have no need to anticipate serious competition from America for some little time.

Czecho-Slovakia's Fertiliser Trade. — Czecho-slovakia imported 230,158 tons of fertilisers, valued at 188,997,800 crowns, during the calendar year 1922. Imports of Chilean nitrate amounted to 24,354 tons, valued at 74,094,800 crowns. Approximately 50 per cent. of this amount was shipped direct from Chile, 28 per cent. from Belgium, 16 per cent. from Germany, and 6 per cent. from other countries. Germany supplied practically the entire imports of potash salts, while Belgium, the Netherlands, and Sweden furnished practically all of the superphosphates. Natural phosphates, totalling 31,460 tons, were imported, 50 per cent. of which came from French Africa. Considerable shipments, however, were also received from the United States, Germany, and Tunis. During the first seven months of 1923 imports of fertilisers totalled 155,798 tons, valued at 96,957,800 crowns. The importation of all items of fertilisers remained practically normal, as compared with the last calendar year, with the exception of natural phosphates, which increased from 31,460 tons during 1922 to 59,792 tons during the first seven months of 1923. The imports of natural phosphates during the period were valued at 23,815,500 crowns. The difference in values, as compared with 1922, was caused by the appreciation of the Czecho-Slovak crown and its stabilisation during 1923. Of the natural-phosphate imports, 50 per cent. were purchased in Germany, while Tunis supplied 8,810 tons and Algiers 5,000 tons. The United States sold to Czecho-slovakia 6,682 tons during the first seven months of 1923, as compared with 7,275 tons during the calendar year 1922.

The production of superphosphates in the United States during the first half of 1923 amounted to 1,758,039 short tons, as compared with 1,198, 724 short tons in the first half of 1922, an increase of 46.5 per cent. The production during the second half of 1922 was 1,589,483 tons. Stocks on hand at June 30, 1923, amounted to 1,111,120 short tons, against 1,179,794 tons at the corresponding date of the previous year.

SOUTH WALES NOTES.

(Specially Contributed.)

In the tinplate trade conditions have improved during the week, and a large volume of business is being transacted. The Stabilisation Committee have advanced prices by 4½d. per box to £1. 3s. 6d. Exports are increasing, and the steel tinplate-bar makers have reduced the price of bars to £8. 18s. 9d., less a rebate of 7s. 6d. to the tinplate manufacturers. This enables sellers to accept business in forward lines, and it is confidently anticipated that before long most of the factories will have sufficient orders on hand to keep the mills going over the first half of next year. The galvanised-sheet trade, although orders are not numerous, is in a fairly active state; forward orders are being received in small quantities. The patent-fuel works are steadily employed, and the export business has rallied. The difficulties encountered in the use of American pitch have been partly overcome, and further large orders are to be placed for this material. Coke ovens are operating full time, in view of the good demand for coke, while the residuals, on the whole, are being well sought for. Sulphate of ammonia is dull, and buyers are standing off for a reduction in price.

Among the imports for the week were 800 tons iron pyrites from Pomaron to Swansea; five tons of salt from Hamburg, 15,500cwt. of petroleum pitch from Rotterdam, 175 tons calcium carbide from Sebonico, 106cwt. red arsenic from Antwerp, to Cardiff. The exports included 45 tons green copperas to St. John (N.B.) from Cardiff; and 94 tons painters' colours to Cape Town from Newport.

Estimation of Eugenol in Essential Oils.—A weighed quantity (2 to 3 drops) of clove oil, or other essential oil containing eugenol, is treated, in a method worked out by P. N. van Eck (*Pharm. Weekblad*, 1923, 60, 937), with 25 c.c. of 0.1 *N* silver-nitrate solution, to which sufficient ammonia has been added just to dissolve the precipitate first formed. The flask is then heated beneath a reflux condenser for a short time until a silver mirror is formed on the sides, after which the liquid is filtered, the filter and flask washed, the filtrate slightly acidified, with nitric acid, and the unreduced silver titrated with 0.1 *N* thiocyanate solution. Experiments with pure eugenol showed that the mgrms. of reduced silver divided by the mean factor 1.75 give the corresponding weight of eugenol.

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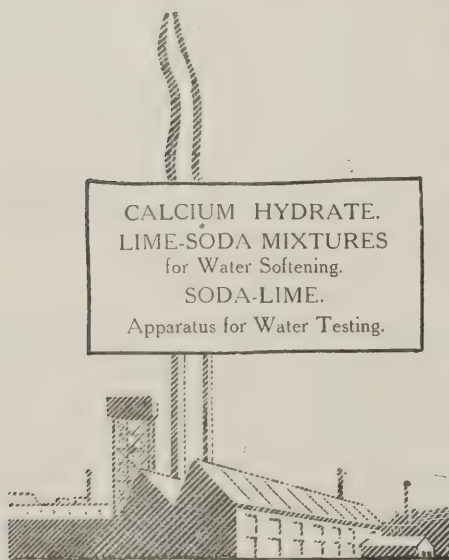

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EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN OCTOBER.

(Concluded from page 623.)

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during Oct., 1923, compared with 1921 and 1922. As from April 1, 1923, export trade of the Irish Free State is excluded from the Returns.

Articles.	Quantities. Month ended October 31.			Value. Month ended October 31.		
	1921.	1922.	1923.	1921.	1922.	1923.
Oils, Fats and Greases:				£	£	£
Animal (except Marine Animal), not refined .... tons	2,217	1,533	1,968	82,607	34,928	61,039
Vegetable, other than essential:						
Castor Oil ..... ,,	554	377	487	32,835	20,057	28,186
Coconut Oil, unrefined ..... ,,	19	27	90	958	1,063	4,081
Cotton-seed Oil, Unrefined ..... ,,	535	86	346	23,160	3,264	14,146
Linseed Oil .... ,,	8,837	2,065	2,224	338,835	97,621	110,967
Olive Oil, unrefined ,,	5	5	2	373	244	115
Palm Oil, unrefined ,,	1,204	23	162	55,991	720	6,221
Palm Kernel Oil, unrefined ..... ,,	2,500	595	1,967	128,618	21,877	76,552
Rape Seed Oil ... ,,	499	525	359	26,716	21,989	15,312
Soya Bean Oil .. ,,	2,019	318	827	113,450	13,690	33,402
Other Seed Oils .. ,,	1,392	33	61	82,979	1,579	2,586
Other Vegetable Oils, not elsewhere specified . ,,	559	111	336	29,015	3,107	12,058
Tar, Coal Tar .... tons	92	2,572	770	984	11,831	5,909
Pitch, Coal Tar Pitch ,,	21,845	32,742	36,208	77,736	133,404	244,275
Cement, Calcareous, for Building and Engineering purposes:						
To Netherlands .. tons	747	3,787	6,451	2,353	6,419	8,558
,, France..... ,,	1	—	3	41	—	11
,, Brazil ..... ,,	1,027	2,742	1,870	6,150	7,426	4,130
,, Argentine Rep. ,,	1	367	755	40	1,061	2,628
,, Brit. S. Africa . ,,	295	2,299	2,026	1,412	6,174	6,115
,, Brit. East Indies ,,	11,061	8,146	22,259	56,091	25,673	59,827
,, Australia..... ,,	1,838	6,473	3,938	8,498	18,712	10,869
,, New Zealand .. ,,	6	151	88	132	442	279
,, Other C'tries .. ,,	8,707	15,431	40,548	39,714	47,600	115,797
Total ..... ,,	23,683	39,396	77,938	114,451	113,507	208,217
Fertilisers not elsewhere specified:						
Basic Slag..... tons	1,159	97	1,826	3,626	341	2,607
Superphosphates ,,	805	200	815	4,114	1,174	5,721
Guano, Manufactured and Compound Manures (including Bone Meal, and other Manufactured Fertilisers) ..... tons	2,914	3,171	4,592	22,849	36,913	19,521
Gelatine ..... cwts.	537	641	696	8,077	7,290	6,889
Glue and Size .. ,,	9,713	13,841	16,128	23,551	26,390	32,582
Lead:						
To Russia ..... tons	—	3	—	—	88	—
,, Sweden ..... ,,	57	112	114	1,496	3,174	3,407
,, Germany..... ,,	511	936	60	9,815	16,195	1,708
,, France..... ,,	999	383	629	24,553	9,649	16,058
,, China (including Hong Kong) ,,	5	14	28	162	472	966
,, Japan ..... ,,	50	—	—	760	—	—
,, U.S.A. ..... ,,	—	—	2	—	—	148
,, Brit. S. Africa ,,	60	31	21	1,721	1,168	1,131
,, Brit. E. Indies ,,	253	320	356	8,904	11,014	12,382
,, Canada ..... ,,	161	52	48	4,127	1,821	1,828
,, Other C'tries . ,,	423	580	624	12,371	17,903	20,010
Total Pig ..... ,,	2,084	1,754	1,028	48,050	37,040	26,543
Total Sheet ... ,,	288	509	630	10,358	17,361	22,052
Total Pipes ... ,,	61	102	139	2,575	3,448	4,750
Total Foil ..... ,,	2	—	3	235	231	366
Total Manufactures not elsewhere specified ,,	84	66	82	2,691	3,404	3,927
Total ..... ,,	2,519	2,431	1,882	63,909	61,484	57,638
Tin: Blocks, Ingots, Bars and Slabs:						
To Russia ..... tons	—	4	352	—	476	68,280
,, Sweden ..... ,,	30	30	177	5,060	4,785	34,623
,, Germany..... ,,	165	5	76	26,117	804	15,236
,, France..... ,,	278	265	330	43,738	42,757	64,796
,, Turkey ..... ,,	5	1	6	849	161	1,170
,, U.S.A. ..... ,,	35	430	1,450	5,600	68,928	289,810
,, Canada ..... ,,	32	49	99	4,981	7,880	19,733
,, Other C'tries . ,,	214	287	536	33,580	46,959	95,751
Total ..... ,,	759	1,071	3,026	119,925	172,750	589,379
Zinc, Crude, and Manufactures thereof ,,	610	496	274	17,742	15,593	13,342

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

Interesting information is now available as to the intentions of the tar producers who formerly sent their tar to the chemical works of Brotherton Bros., Ltd., at Workington Docks. It may be remembered that the Leeds firm were unable to obtain a renewal of the lease of the site on which they erected their works some years before the war. The plant is now being dismantled, and in the meantime, the tar from the collieries with whom Brotherton's had an agreement (which expires at the end of this year), is being sent to Sunderland. There are now good grounds for stating that the tar producers who were concerned in that agreement have entered into an agreement with the United Steel Company for the laying down of a distillation plant near the latter firm's by-product coking plant at Lowca. The coal and coking industries are exceedingly busy. All the coal is being readily disposed of, and the landsale trade has become very active during the last ten days. The call for industrial fuel alone is dull, but that too is likely to be heavier. The steelworks at Workington will be re-started on Monday and the rail mill, it is said, will roll for three weeks in succession. That being the case a large proportion of the output of ordinary iron will have to be reserved for local consumption, so that in the New Year when the steel plant is expected to be employed three weeks in four, additional furnaces will have to be put into blast. At the present time only seven furnaces are in draught in West Cumberland, and of the seven in the Furness district there are very few that use the local coke. The time is coming, it is hoped, when there will be forthcoming sufficient coal of the quality required to yield the coke that is wanted for the smelting of low phosphorus iron, and then also there will be an important extention of the coking plants in this district. Meantime, the ovens are disposing of nearly the whole of the output of small coal from the Cumberland collieries, the proportion that can be spared for the open market being indeed negligible. Prices are unchanged at 25s. to 26s. 6d. per ton according to carbon content. For export the price is 35s. per ton, but little coke is now going to the Continent. East Coast coke supplies this week are slightly under 10,600 tons.

NEW COMPANIES.

Latex Developments, Ltd.—Capital £6,250., in 5,000 £1. ordinary shares and 25,000 1s. deferred. Manufacturers of and dealers in rubber, rubber latex, and rubber goods of all kinds, etc. Office: 7 and 8, Great Winchester Street, E.C. 2.

Alsace-Lorraine and General Products Company, Ltd.—Private company. Capital £10,000., in 6,000 7 per cent. cumulative preference and 3,600 ordinary shares of £1. and 8,000 founders' of 1s. Importers and manufacturers of and dealers in chemicals, metals, oils, paints, etc. Solicitors: Hutchinson and Cuff, 6, Stone Buildings, Lincolns Inn, W.C.

Bellamy and Wakefield, Ltd.—Private company. Capital £3,000. Manufacturing, wholesale, and retail chemists, at 1, Easy Row, Birmingham.

C. V. Aluminium Syndicate, Ltd.—Private company. Capital £1,000. Office: 8, Drapers' Gardens, E.C. 2.

John J. Clark Company, Ltd.—Private company. Capital £1,500. Wholesale and retail chemists, etc. Office: 18, Southwark Street, S.E.

Mineral Deposits, Ltd. — Private company. Capital £2,100., in 2,000 £1. 10 per cent. cumulative preference and 2,000 1s. ordinary. Miners, smelters, etc. Office: 17, Mincing Lane, E.C.

Senior, Crozier and Co., Ltd.—Private company. Capital £5,000. Wholesale and retail chemists, etc. Office: Union Works, Main Street, Stratford, E.

Sanaphos, Ltd. — Private company. Capital £2,000. Manufacturers of foods, medicinal preparations, etc. Solicitors: C. Butcher and Simon Burns, 32, Gresham Street, E.C.

Calumite Lead Products, Ltd.—Private company. Capital £10,000. Manufacturers of and wholesale dealers in chemical compounds, etc. Office: Calumite Works, Linwood, Renfrew.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Basic Slag and Phosphate Companies, Ltd. (late Slag Phosphate Company, Ltd.), London, S.W.—Registered November 8, deb., to Lloyds Bank, Ltd., securing all moneys due or to become due to the bank.

Collier (John) and Co., Ltd., Liversedge, soap manufacturers.—Registered November 8, agreement extending time for payment and securing increased rate of interest on £4,700. 1st debs., to Mrs. F. M. Stephens, 130, Kyverdale Road, Stamford Hill, and ors.

Flinn and Son, Ltd., Fishergate, dyers.—Registered November 9, £1,450. mort., to Sir B. S. Johnson, Abbots Lea, Woolton, and ors.

Laycocks (Ashton-under-Lyne), Ltd., lard compound manufacturers.—Registered November 12, mort., to London Joint City and Midland Bank, Ltd., securing all moneys due or to become due to the bank.

Northern Smokeless Fuels, Ltd., London, S.W.—Registered November 6, £7,000. deb., to Bishopsgate Nominees, Ltd., 15, Bishopsgate, London, E.C.

Organam, Ltd. (late Elstree Chemical Works (1922), Ltd.), London, E.C.—Registered November 8, £250. debs., part of £2,000.

Smiths (Hampton), Ltd., soap manufacturers.—Registered November 7, charge collateral to charge dated July 1, 1921, securing £9,000 outstanding, to W. A. Jones, 39, Orchard Road, Kingston-on-Thames.

Standardised China Clay Company, Ltd., London, E.C.—Registered November 12, £1,800. debs., part of £30,000.

Tidy Betty, Ltd., Leeds, stove-polish manufacturers.—Registered November 8, £400. further charge, to J. H. Broughton, Ferrybridge.

Whelpton (G.) and Son, Ltd., Hemel Hempstead, manufacturing chemists.—Registered November 7, mort., to Westminster Bank, Ltd., securing all moneys due or to become due to the bank.

SATISFACTIONS.

Frater (Geo. A.) and Co., Ltd., Gateshead, paint manufacturers.—Satisfaction registered November 13, £6,000., registered February 16, 1921.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Rare Metals, Ltd.—Resolved November 3: That the company be voluntarily wound up. C. Comins, 50, Cannon Street, E.C., liquidator.

Waferleaf Gelatine, Ltd.—Resolved October 5, confirmed October 24: That the company be voluntarily wound up. R. A. McQuitty, 78-81, Fetter Lane, E.C., liquidator.

BANKRUPTCY INFORMATION.

Calvert, Jackson, Wagaraw, Greenhead Rd., Huddersfield, manufacturing chemist. 1st and final dividend, 4s. 10¾d., at O.R.'s, Bradford, November 20.

Myer, Robt. H., trading as Ross Supply Company, 186, Wandsworth Road, S.W., manufacturing perfumer. 1st and final, 4s. 4d., at D. Hart's, 5, Argyll Street, London, November 22.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Burlington Industrial Laboratory, Ltd., 6 and 7, Charing Cross Chambers, 15, Duke Street, Adelphi, London, W.C.; £23. 19s. 7d.. October 9.

Lambert (Samuel) and Co., Ltd., 10, Great St. Helens, druggists; £19. 12s. 6d.. October 9.

Whitehead, Harold, 7, Newton Park, Lightcliffe; dyer and finisher; £22. 4s. 6d. October 8.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 12 to 17 (inclusive).

Emulsions of Bituminous Compounds. Billinghame, W. E. 28,419 and 28,420.
Acylacetyl Compounds. Bloxam, A. G. (*Chemische Fabrik Griesheim-Elektron*). 28,997.
Fuel-binding Agent. Brechin, W. M. 29,069.
Reverberatory Furnace. British Reverberatory Furnaces, Ltd.; and Sklenar, W. F. 28,834.
Electrolytic Tanks. Carrera, L. A. 29,097.
Dehydration of Oils. Chase, D. E. 28,866.
Wood Pulp and By-products. Cross, C. F.; and Engelstad, A. 28,864.
Tunnel Kilns. Duckham, Sir A. M.; and Woodall, Duckham and Jones (1920), Ltd. 28,527.
Sulphur from Gas Containing Hydrogen Sulphide. Farbenfabriken vorm. F. Bayer and Co. 29,008.
Producing or Reactivating Decolourising Carbon. General Norit Co., Ltd.; and Naamlooze Vennootschap Algemeene Norit Maatschappij. 28,620.
Indicating Presence of Smoke or Dust in Gases. Kelvin, Bottomley, and Baird, Ltd. 28,575.
Cooling Gases. Lameda, E. A. 28,885.
Printing Inks. Leadbetter, J. W. 28,784.
Refining Hydrocarbons. Lomax, E. L.; Lucas, O. D.; and V.L. Oil Processes, Ltd. 28,699.
Testing Gas Mixtures. Marks, E. C. R. (*Siemens and Halske Akt.-Ges.*). 28,759.
Peat. Perkin, F. M. 28,758.
Conveyer-elevator-drier for Sulphate of Ammonia. Poulson, J. 28,901.
Diaphragm for Electrolytic Processes. Reinhardt et Cie, P. 28,853.
Fertilisers. Soc. Chimique de la Grande Paroisse (Azote et Produits Chimiques). 28,464.
Plating Aluminium. Vautin, C. T. J. 28,744.
Calcium Oxalate from Vegetable Material. Wade, H. (*Fraymouth and Bhopal Produce Trust, Ltd.*). 28,766.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.

1922.

Purification of Oils, Waxes, and the Like. Oil Refining Improvements Co., Ltd.; and Hood, J. J. 12,628. **206,535**
Cellulose Ethers. Lilienfeld, Dr. L. 16,308. **181,393**
Transferring Heat to or from a Viscous Liquid. Griscom-Russell Co. 18,502. **184,443**
Rotary Filters. Brackett, F. W.; and Brackett and Co., Ltd., F. W. 18,896. **206,557**
Blue Vat Dyestuff of the Anthracene Series. Badische Anilin- and Soda-Fabrik. 21,366. **184,193**
Alkali-silicate Solutions. Codd, L. W. 21,436. **206,572**
Centrifugal Separators. Grange Iron Co., Ltd.; and Hoyle, H. P. 21,600. **206,585**
Treating Solid Material in a Finely Divided State with Heating or Cooling Gases. Lehmann Co., Inc., J. M. 21,696. **199,340**
Rotary Furnaces. Pehrson, A. H. 22,543. **184,810**
Magnetic Separators. Thompson, H. H.; Davies, A. E.; and Box, W. 22,620. **206,610**
Vat Colouring-matters. Johnson, J. Y. (*Badische Anilin- and Soda-Fabrik*). 25,121. **206,638**
Distilling Tars. Duplan, F. 26,108. **186,616**
Peroxides of Nitrogen. Stacey, F. 27,760. **206,671**
Softening Water. Marks, E. C. R. (*Wayne Tank and Pump Co.*). 28,950. **206,683** and **206,684**
Solvent Recovery. Lacy, S. A. de. 31,901. **206,711**
Intermediate Compounds. British Dyestuffs Corporation, Ltd.; and Hodgson, H. H. 34,483. **206,734**

1923.

Absolute Alcohol. Marks, E. C. R. (*U.S. Industrial Alcohol Co.*). 1,022. **206,747**
Evaporating-apparatus. Lillie, S. M. 4,239. **201,134**
Resistibility Against Corrosion by Ammonium-chloride Solutions. Krupp Akt.-Ges., F. 19,574. **201,914**
Resistibility Against Attack of Sulphurous Acid at a High Temperature and Pressure. Krupp Akt.-Ges., F. 19,575. **201,915**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Hydrogen. L'Oxhydrique Française. 25,936. **206,822**
Acid Azo Dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning. 27,219. **206,831**
Rustless Iron. Electro Metallurgical Co. 27,848. **206,836**
P-Cymene from Monocyclic Terpenes. Austerweil, G.; and Peufaillit, L. 28,190. **206,848**
Producing or Reactivating Decolourising Carbon. Naamlooze Vennootschap Algemeene Norit Maatschappij. 28,620. **206,862**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Para-Nitrophenetol. W. Lewcock, and Gas Light and Coke Company, London. British Patent **204,594**, of 1922.

p-Nitrophenetol is prepared by heating an aqueous alcoholic solution of *p*-nitrochlorbenzene of low concentration with a quantity of an alkaline reagent, such as sodium ethoxide, not substantially in excess of that chemically equivalent to the chloro-derivative, at or above the normal boiling point of the aqueous alcohol and without ebullition. For concentrations of the chloro-derivative of 3 per cent. and upwards, less than the equivalent of the alkali may be used. According to examples, concentrations of 3 and 5 per cent. of *p*-nitrochlorbenzene in 85 per cent. alcohol are heated with sodium ethoxide and caustic soda respectively in an autoclave at temperatures of 90-120° C. To prevent reduction to azoxy-compounds the autoclave is lined with enamel, silver, or nickel.

Black Pigment. W. J. Mellersh-Jackson, London. (American Cotton Oil Company, New York, U.S.A.) British Patent **204,393**, of 1922.

A black pigment is produced by burning or carbonising, preferably in an open pan, fuller's earth containing vegetable oil. Fuller's earth which has been used for refining vegetable oil is preferably used, and the heating is continued until the mass burns quietly. The carbon formed in the carbonising operation may be collected and utilised separately or mixed with the pigment. The product is ground, and may be mixed with other pigments or fillers and a vehicle such as linseed oil, with or without driers, to form a paint, or for making printers' ink or shoe polish, and may be compounded with rubber with or without other pigments, fillers, and vulcanising agents.

Borneol and Isoborneol. J. Schindelmeiser, Dorpat, Esthonia. British Patent **204,662**, of 1923.

The monobasic fatty acid esters of borneol and isoborneol are saponified by adding solid caustic alkali and then pouring in water. The caustic alkali should preferably be in excess. An example is given of the production of borneol by the saponification of bornyl acetate by adding dry caustic soda, followed by hot water, and then maintaining the temperature at 100° C.

Nitrogen Peroxides. F. Stacey, Birmingham. British Patent **204,543**, of 1922.

Apparatus for producing peroxides of nitrogen by drawing atmospheric air through an electric arc comprises, as one machine, two, three, or more gas-producing units operative independently for the production of different grades, strengths, or standards of gas, but all driven mechanically from one drive, and all fed electrically from one supply. The units may be of the type comprising an arc chamber supplied with air by a pump, and are chain-driven from a shaft through clutches mounted thereon, and so constructed that engagement is only possible in the one position which allows the correct sequence of operations. The upper electrodes are connected through variable resistances and ammeters to independent switches. The apparatus is illustrated.

Lactic Acid in Vat Dyeing. J. Morton, Midlothian; and K. R. Wood, Gretna, Dumfriesshire. British Patent, **202,757**, of 1922.

In the vat dyeing of animal fibres, such as wool and silk, or materials containing them, by the caustic soda-sodium hydrosulphite process, to prevent the deleterious action on the fibres of the caustic alkali, lactic acid is added to the dyebath.

Crystallising. E. Passburg, Berlin; and H. Griffiths, London. British Patent **204,559**, of 1922.

In obtaining large crystals by passing a saturated solution through a rocking trough from an inlet to an outlet, provision is made to prevent the cooler solution from the outlet end passing towards the inlet end owing to accumulation of small crystals near the outlet, and to prevent longitudinal surges of liquid owing to the movements of the crystals in the solution. For this purpose the trough is divided by transverse partitions, which may be fixed or removable. A single spiral partition may be used. The partitions may be supported so as to leave a clearance at one side or at the bottom. The partitions may be supported by a rod extending above the trough, and may move with the trough or be held stationary. The rod or the individual partitions may be adjustable vertically. Scrapers which move across or lengthwise of the trough may be provided in the separate compartments.

Chloranthraquinone. H. Dodd, W. C. Sprent, and United Alkali Company, Ltd., Liverpool. British Patent **204,528**, of 1922.

o-Dichlorbenzene, or a mixture thereof with *p*-dichlorbenzene, is heated with phthalic anhydride and aluminium chloride under certain conditions, and the resulting chlorbenzoylbenzoic acid heated with sulphuric acid to yield 2-chloranthraquinone, one chlorine atom being eliminated; the *p*-dichlorbenzene remains unchanged. The phthalic anhydride and aluminium chloride are added to the dichlorbenzene, the mixture heated gradually to about 115° C., cooled, poured into water, and made alkaline; after separating unchanged dichlorbenzene the alkaline liquor is acidified, the precipitated chlorbenzoylbenzoic acid heated with sulphuric acid at 100°-155° C., and the 2-chloranthraquinone precipitated by pouring into water; instead of isolating the chlorbenzoylbenzoic acid the reaction mixture may be added directly to the concentrated sulphuric acid. An example of the method is given.

Alumina. A. Hurter, London. British Patent **203,798**, of 1922.

Alumina is obtained in a form soluble in acids by heating crude aluminium sulphate with solid, liquid, or gaseous reducing agents to a dark red heat. Sulphuretted hydrogen, sulphur dioxide, and sulphur are among the products. Sulphur may be used as a solid reducing agent in conjunction with reducing gases, and the issuing gases containing sulphuretted hydrogen can be again used for reduction of a new charge. The iron may be removed by treating the product with dilute acids. The aluminium sulphate may be made by calcining kaolin at 800° C., adding sulphuric acid, heating to render silica insoluble, leaching, and crystallising or evaporating to dryness. The aluminium sulphate may be heated in hydrogen at 500° C. in an externally-heated oven. The charge is preferably moved in counter-current against the hydrogen. Or the charge may be internally heated by admitting oxygen, air, chlorine, or the like to the hydrogen, but not in such amount as to destroy the reducing character of the gases. Or the sulphate may be conveyed upwards in an upright channel containing pipes of ferro-silicon or of iron coated with silica or of a metal not attacked by sulphuretted hydrogen, while a stream of a mixture of hydrogen, sulphuretted hydrogen, and nitrogen which have been preheated in the tubes, is passed downwards against the sulphate. Air is admitted at the top where the alumina leaves. A revolving furnace can also be employed. Specification 895/79 is referred to.

Lead Arsenate. I. McDougall and F. Howles, Manchester. British Patent **204,223**, of 1922.

Lead arsenate is obtained by reacting with arsenic acid upon a colloidal solution of lead oxide in water, aqueous solution, or other suitable dispersion medium, preferably at a raised temperature. The arsenate precipitates in a finely divided form. An example describes the production of the arsenate $PbHAsO_4$ in this manner, the colloidalising of the lead oxide in water being effected in a Plauson mill, steam being passed through the jacket of the mill so as to raise the temperature to 80-100° C. The arsenic acid is run into the mill and the re-action is effected in a few minutes.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

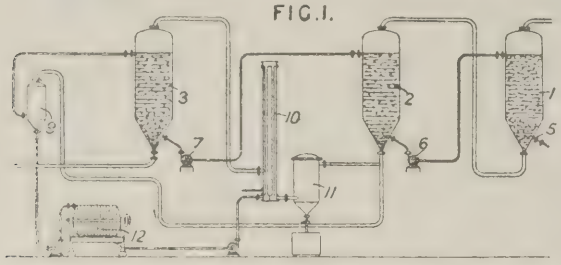
Storing Compressed and Liquefied Gases. Soc. Anon d'Applications des Gaz Liquéfiés, Paris. British Patent **204,715**. Convention date, September 27, 1922.

The opening and closing of a screw-stoppered capsule or cylinder of compressed or liquefied gas are effected by a co-acting screw and nut, the screw being connected to rotate with either the capsule or its stopper and the nut similar connected with the stopper or capsule accordingly. The relative longitudinal movement of the nut and screw during the opening movement energises a spring which effects the closure. Several types of apparatus are illustrated.

Digesting and Evaporating Apparatus. Appareils et Evaporateurs Kestner, Lille, France. British Patent 204,670. Convention date, September 28, 1922.

In digestors for effecting reactions under pressure, agitation of the materials is effected by injection of steam, and the steam passing from the digestor is used as heating-agent in an evaporator, the steam generated in which is passed into a second digester in which lower pressure is maintained. In a plant, applicable, for instance, for forming caustic soda and evaporating the solution obtained, liquid is fed in succession through digesters 1, 2, 3, and from an inlet 5 by pumps 6, 7 between the digesters, and thence to an expansion chamber

FIG.I.



9, a filter 12, and an evaporator comprising a tubular heater 10 and a vapour-separator 11. Steam is injected into the lower end of digester 3, and passes from its upper end into the evaporator. The steam generated in the evaporator passes from the separator 11 into the base of digester 2, and from the top of this digester into the base of digester 1. The steam from the digester 3 may be compressed by a rotary or a jet compressor before use in the evaporator. Four digesters may be combined with a quadruple-effect evaporator, the last effect of which is under vacuum and is connected to a barometric condenser.

Vulcanisation Accelerators. Pirelli and Co., Milan, Italy. British Patent, 201,912. Convention date, August 5, 1922.

Trisubstituted thio-ureas are used as accelerators in the vulcanisation of rubber mixings. The preferred substances are monoaryl-dialkyl derivatives, such as phenyldimethyl-thiourea, and monoaryl-alkylene derivatives, such as phenyl-pentamethylene-thiourea. They are prepared by condensing an aryl sulphocyanide with a secondary aliphatic or alicyclic base.

Barium and Strontium Salts. Rhenania Verein Chemischer Fabriken Akt.-Ges., Aachen, Germany. British Patent, 201,528. Convention date, July 31, 1922.

Residues obtained in extracting barium or strontium sulphides from the reduced sulphates, are treated with calcium, magnesium, or ferrous salt solutions for extracting the remaining barium or strontium. The salts mentioned are the chlorides and nitrates, and waste or residual liquors containing the salts may be used. Barium or strontium chloride or nitrate are obtained from the solutions by concentration. Strontium carbonate is obtained by treating the strontium chloride with sodium carbonate.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," December 1, 1888.)

The Chemical Expert in the Law Court.—Recent cases, both in our own country and abroad, have shown strongly the great necessity for a closer definition of the position to be occupied by the chemist giving evidence on behalf of a litigant, and of the extent to which legal prejudice is to interfere with the statement of scientific facts in a scientific manner. Some chemists, taking upon themselves the office of advocate for the party in whose interests they appear, incur the odium of the court and weaken their own case by such advocacy; but as from the very nature of things the scientific witness is generally intended to be more or less of an advocate, it is only just and fair to all parties so to define the functions of the experts that the facts and explanations he has to offer may be given in such a manner as to throw the greatest possible light on the point at issue, and that, while on the one hand he is enabled to do full justice to his clients' interests, he may, on the other, be guarded from that depreciation in the value of his evidence which would follow upon any unintentional display of advocacy or bias. In order, then, to avert most of the evils resulting from the procrustean treatment that chemical cases generally receive at the hands of the law, we would suggest the appointment of a duly qualified committee of experts, who should receive the technical evidence, examine the experts retained by the litigants, and, after the manner of a jury, hand in their report to the judge. This committee of experts would, of course, be differently constituted according to the exigencies of different actions, but it would probably be well that one of the members should be a permanent official who should act as a chairman of the committee, and be the recognised medium of communication between the committee and the court. It must be thoroughly understood that we are in no wise advocating here the formation of a technical board of arbitration or of a chemico-legal bench. Our object is simply and strictly to provide for the settlement of any chemical question arising in the law courts by chemists and chemists only. When the chemical question is solved the chemists' work is done, and the judge must adjudicate upon the solution.

PUBLICATIONS RECEIVED.

"The Fiftieth Anniversary."—The first fifty years of Brunner, Mond and Co., 1873-1923. A Review of this publication appears on page 644.

Pharmaceutical and Food Analysis. — Azor Thurston. London: Chapman and Hall; 21s. net.

The Netherlands East Indies.—D.O.T. report on the economic situation (to June, 1923), by Mr. H. A. N. Bluett, British Commercial Agent for the Netherlands East Indies, Batavia. London: H.M. Stationery Office; price 3s. net.

Royal Technical College, Glasgow.—Annual report of the 128th Session, adopted at the meeting of Governors, held on October 16, 1923.

"Dyestuffs."—October, 1923. Textile Exposition Number. The monthly publication of the National Aniline and Chemical Company, Incorporated, 40, Rector Street, New York.

Tariffs and Agriculture.—"A short statement on the need of a tariff, and of a regenerated agriculture in Great Britain." By Samuel Turner. Published by E. Wrigley and Sons, Rochdale. Single copies 1½d., by post 2d.

Lime and Plant Disease.—"An Experiment on Finger-and-Toe by Liming," by Professor James Hendrick, B.Sc., F.I.C., of Aberdeen. Bulletin No. 29 of the North of Scotland College of Agriculture.

Norway's Foreign Trade.—We have received from the Swedish Consulate General in London (Bank Chambers, 329, High Holborn, W.C. 1) a brochure with parallel texts in English and Swedish containing data on some phases of the development of Swedish industrial life during the last few decades. The compilation was produced in connection with the Gothenburg Jubilee Exhibition, held last summer.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Although there is no material improvement in the demand, prices are holding firmly, and in many directions advances are expected. Continental supplies are offering in limited lots only, and at much higher prices. Now that the German Government have defaulted

on the 26 per cent. levy, any supplies brought in from that source are bound to be at much higher prices. **Acetic Acid,** 80% technical, £47.; 80% pure, £48. 10s. to £49.; 98% glacial, £60. in casks and £73. in glass demijohns, ex wharf London; spot prices are dearer, with the market holding quite firm, stocks are limited; demand slow. **Acetone,** British Government specification, about £124. per ton, in drums; prices for spot supplies are very steady, with business poor. **Alum,** lump, £10. to £10. 10s. per ton, in casks; dealers continue to offer at this price, with inquiry small. **Arsenic,** Cornish, white powdered, £64. per ton, f.o.r. Cornwall; supplies are limited, with values steady, but demand has fallen off. **Anhydrous Ammonia,** 90.95%, about 1s. 5d. per lb.; importers are offering at about this price, with no great demand at present. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; this market, although rather quiet, keeps very steady. **Barium Chloride,** 98—100%, £15. per ton; a further hardening in spot values is recorded; Continental prices are firm. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P., crystals, about 1s. 4½d. to 1s. 5d. per lb., less 5%; after the recent slight improvement this market has fallen back, and is again dull and unsteady. **Cream of Tartar,** 99—100%, about 85s. per cwt., in one-ton lots; dealers continue to quote at about this figure, with not much demand; the market is very steady. **Epsom Salts,** commercial quality, about £4. 10s. to £4. 15s. per ton, in bags; plenty of spot material offering; demand slow; prices steady. **Formaldehyde,** 40% volume, about £65. per ton; this item is very steady on spot, although there is not much business about; Continental prices are very firm. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton; there is still but little inquiry for this product; prices are unchanged. **Lead Acetate,** brown, about £43.; white, about £44. per ton; it is doubtful if there are any large stocks now available on spot; prices are very firm indeed; little to be obtained on the Continent. **Litharge,** imported, about £37. 10s. per ton; dealers are now quoting at about this higher rate; forward offers are slightly cheaper. **Lithopone,** imported, about £23. 5s. to £24. per ton for 30% Continental red seal; dealers' prices as given are firm, with supplies short, and spot very limited on the Continent. **Ammonium Chloride,** grey galvanising, £31. per ton; holders of spot material are firm at this value, and higher prices are expected; supplies here are short. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at about these figures. **Oxalic Acid,** about 5¾d. per lb.; business remains quiet; the market continues rather unsteady. **Carbonate of Potash,** 90—92%, about £25. 10s.; 96—98%, about £27. 10s. per ton, on spot; dealers are offering from stocks at these rates, with not much business about; fresh imports will cost more. **Chlorate of Potash,** crystals and granular, 2¾d. to 3d. per lb.; the spot position shows no change; business slow; prices steady. **Caustic Potash,** 88—92%, £31. to £32. per ton, in drums; the spot position is now very firm at these rates, with not much material available; at present business is slow; fresh imports dearer. **Permanganate of Potash,** commercial quality, about 9d. per lb.; dealers are quoting at about this price, with little doing. **Prussiate of Potash,** yellow, about 10¼d. per lb.; dealers are offering British material round about this price, but are not finding much good business. **Sulphate of Potash,** 90%, £11. per ton; the position is as last reported. **Mercury,** about £10. per bottle of 75—76lb.; the spot position has not been at all active, and, as quoted, is rather easy and inclined to weaken a little. **Red Lead,** imported, about £37. 10s. per ton, on spot; dealers are offering at this figure, and quote about £36., c.i.f. forward. **Salammoniac,** dog-tooth crystals, fully £50.; medium, £44. to £45.; fine white crystals, £28. to £29. per ton; holders of spot stocks are finding business at about these prices, with not much material available; Continental prices will be much dearer. **Saltcake,** ground and unground, about £4. 10s. per ton, for home trade; this market keeps very steady, and is likely to hold to the end of the year. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; merchants are offering at about these prices, with still but small inquiry. British makers' prices for domestic consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags free; British makers quote at this price, for home trade only; dealers are offering at competitive rates. **Bichromate of Soda,** home trade, about 4½d. per lb., delivered; British makers continue to quote at this rate; their prices for export are generally slightly higher. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers quote at this level for export. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in bags; British makers' price to domestic consumers on contract is unchanged at this rate, packages free, carriage paid to destination; their prices for export vary according to destination. **Hyposulphite of Soda,** pea crystals, about £15. to £15. 10s. per ton; commercial quality, about £10. 10s. per ton, in casks; dealers' prices are fully maintained, and tend to advance; Continental offerings are dear. **Nitrate of Soda,** 96%, £13. 5s. per ton, f.o.r. or f.o.b. U.K. port; this item keeps very steady. **Nitrite of Soda,** 100%, about £26. 10s. per ton; the position is as last reported, with the market quiet. **Prussiate of Soda,** about 5½d. per lb.; dealers who are offering British-made material at about this figure are still doing but small business. **Sodium Sulphide,** 60—62% solid, about £14. 10s.; broken, about £15. 5s. per ton, in drums; dealers' prices are somewhat firmer at these rates; business, however, is still slow. **Tin Crystals,** about 1s. 3½d. per lb.; at this price the market keeps steady. **Tartaric Acid,** B.P., crystals, 1s. 1½d. per lb., less 5%; dealers are offering spot supplies freely at about this figure, with still but a very small inquiry; the market is not at all steady. **White Lead,** imported, about £40. per ton; dealers holding limited stocks are quoting at about this rate. **Zinc Oxide,** B.P., £52.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers are quoting at about these figures.

Pharmaceutical Chemicals.—The spot shortage of supplies is becoming more acute each day in many items, and prices are still moving upwards. The tone throughout is strong, with holders showing every confidence. Any further movements up to the end of the year are almost certain to be towards still higher values. **Acetanilid,** crystals and powder, about 3s. per lb.; a further jump in spot values is recorded, with the market firm and supplies short. **Acetyl-Salicylic Acid,** B.P., 3s. 9d. per lb.; the spot position is fully maintained, with business brisk for the limited stocks available. **Benzoic Acid,** B.P., about 3s. 6d. per lb., nominal; owing to the refusal of the Board of Trade to grant import permits, the spot market is bare of supplies; there is a big demand. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. per lb.; dealers' quoted prices are maintained, with little interest shown. **Salicylic Acid,** B.P., fully 2s. 6d. per lb.; this market is again firmer at the higher price quoted, and the tendency is towards still higher values. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; business has been good, and the market tends to move up to the higher figure quoted. **Amidopyrin,** about 15s. per lb.; the market remains dull; dealers quoting at about this figure. **Ammonium Bromide,** B.P., about 9d. per lb.; a further sharp advance is recorded here, with business brisk; Continental offerings are much above the spot parity. **Benzonaphthol,** about 5s. per lb.; this market is still dull, with the quoted price unchanged. **Betanaphthol,** resublimed, about 2s. 6d. per lb.; dealers are offering at this figure, with the demand slow. **Benzaldehyde 03,** about 3s. per lb.; prices are level on the week, with the market dull. **Calcium Lactate,** about 2s. 6d. per lb.; this article is quoted at much higher values for spot supplies, and the tendency is for further advances. **Chloral Hydrate,** duty paid, fully 4s. 3d. per lb.; the few lots of spot material available are firm at this figure. **Creosote,** B.P., about 2s. 6d. per lb.; although the demand remains slow, prices are fully

maintained. **Creosote Carbonate**, about 8s. 3d. per lb.; spot supplies are very limited, but at present there is little demand. **Guaiacol Carbonate**, about 14s. per lb.; spot supplies seem to be very scarce, and a further advance is recorded, with a rising tendency on the market. **Hexamine**, fully 4s. 6d. per lb.; at the further advanced price mentioned this article is very firm, and still higher prices may be expected. **Hydroquinone**, 4s. to 4s. 3d. per lb.; this market is rather irregular on quotation; some moderate business has been done. **Methyl Salicylate**, 2s. 10d. to 3s. per lb.; a good business has been done during the past week, and prices as stated are very firm on spot. **Methyl Sulphonal**, about 25s. per lb.; spot values are close up to the quoted price, and the market is gradually firming up to this figure; supplies are short. **Paraformaldehyde**, about 3s. 9d. per lb.; spot values are fully maintained, with a fair volume of business being done. **Paraldehyde**, 1s. 7d. to 1s. 8d. per lb.; the market quoted at last week's prices has a firmer tone. **Phenacetin**, about 8s. per lb.; the few holders of spot supplies are now asking close up to the figure quoted. **Phenazone**, fully 8s. 9d. per lb.; a further advance in spot values is recorded, with business brisk and spot supplies now limited. **Phenolphthalein**, 8s. 3d. to 8s. 6d. per lb.; it is difficult to locate supplies of any size; prices are likely to go still higher. **Potassium Bromide**, B.P., crystals and granular, 8d. per lb.; this item continues to harden on spot, with spot values again higher, and supplies well sought after. **Potassium Permanganate**, B.P., about 9½d. per lb.; this is about the lowest price now mentioned on spot; the market has a rising tendency. **Potassium Sulphoguaiacolate**, about 7s. per lb.; there is little interest shown in this article; quoted rates unchanged. **Resorcin**, about 6s. 6d. per lb.; spot prices are again higher, and the market is firm. **Salol**, about 4s. 3d. per lb.; a further advance in spot values is recorded, and this movement may continue. **Sodium Benzoate**, about 2s. 9d. per lb.; practically no supplies available, owing to continued stoppage or imports of acid. **Sodium Bromide**, B.P., crystals and granular, about 9d. per lb.; the spot price of this article shows a further jump, and the tone of the market is firm. **Sodium Diethylbarbiturate**, about 18s. per lb.; dealers quote at about this figure on a dull market. **Sodium Salicylate**, B.P., crystals, 3s.; powder, about 2s. 10d. per lb.; at these prices the spot position is now very firm, with a rising tendency; business has again been brisk. **Sulphonal**, about 20s. per lb.; spot supplies appear to be scarce, and the market is likely to hold at this figure. **Terpin Hydrate**, about 1s. 9d. per lb.; this item keeps very steady at this price, with a fair demand for spot supplies. **Thymol**, 15s. 6d. to 16s. per lb.; spot prices continue to be quoted at about these figures.

Coal-tar Products, Etc.—Pitch continues slow in demand, with the price gradually falling away. Other items are generally very steady, and some little better business has been done. **Aniline Oil**, 9d. to 9½d. per lb., naked at works; prices are unchanged, with the market dull. **Aniline Salt**, about 9½d. per lb., naked, at works; the market remains dull, with prices unchanged. **Betanaphthol** is quoted unchanged at about 1s. 1d. to 1s. 2d., with the market still sluggish. **Carbolic Acid**, crystals, 1s. to 1s. 1d. per lb.; this market remains dull and weak at the price quoted. **Cresylic Acid** has been more called for, and the price is steady for 97—99% at 2s. to 2s. 2d. per gallon. **Benzol**: The following are British makers' prices—crude 65's, 8d. to 10d.; standard motor, 1s. 1d. to 1s. 4d.; pure, 1s. 6½d. to 1s. 8d. per gallon, in tank wagons; no change on the week. **Toluol** continues to be quoted round about 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; 90%, about 1s. 4d. per gallon. **Xylol**, pure, is steady as quoted at 2s. 3d. per gallon, on a dull market. **Creosote Oil** has been in better demand, with dealers' prices steady at about 9½d. per gallon, f.o.b. in bulk. **Naphtha** (crude) remains slow of sale, with the price about 8½d. to 8¾d. per gallon; solvent naphthas are quiet features, with the price for 90/160 and heavy 90/190 about 1s. 2d. to 1s. 3d. per gallon. **Naphthalene** is improving, with the price already up to £19. 10s. per ton, and likely to move still higher; there has been more inquiry, and supplies are limited. **Pyridine** is firm on spot, with dealers quoting fully 22s. per gallon. **Hexamethylene**, 3s 9d. to 4s. per gallon; dealers quote firmly at these rates for the limited spot stocks offering. **Pure Methyl Alcohol**, about £90. per ton, in drums, ex wharf London; importers' prices are fully maintained at this old level, with a fair inquiry being received. **Pitch**, about 125s. per ton, f.o.b. East Coast; prices are again easier this week, with the market still showing but little life; the tone at the close is by no means steady, and further declines are possible. **Wood Tar**, steady but quiet at £4. 15s. to £6. per ton, according to quality.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £62. 12s. 6d. to £62. 15s., cash; £63. 7s. 6d. to £63. 10s., three months; electrolytic, £67. 10s. to £68. **Tin**: Standard, £236. 15s. to £237., cash; £237. 5s. to £237. 10s., three months; Straits, £237. 15s.; English, £237. 10s. **Lead**, soft foreign, £30. 15s., prompt; English, £32. 5s.; chemical sheet, 37s. per cwt. for 2-ton lots, delivered. **Spelter**, prompt, £33. 7s. 6d.; hard, £28. **Antimony**, English regulus, 99%, £36.; special brands, £42. **Aluminium**, 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel**, 130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 15s. to £9. 17s. 6d. **Bismuth**, 10s. **Platinum**, £29. per oz.; scrap, £27. **Wolfram**, spot, 12s. to 12s. 3d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** prices as a whole are unchanged, with a firm tendency: Highest grade English, 93—95%, £48. per ton, delivered; Beaver brand, 90—92%, £47. 10s.; American, 92—94%, £47. 10s.; Continental, 85—88%, £45. 10s.

MANCHESTER CHEMICAL MARKET. Wednesday.

Business generally continues on the quiet side, and there is not much likelihood of improvement during the present disturbed conditions. Quotations for alkali products remain unchanged at recent rates—namely: **Caustic Soda**, 76%, £19. 7s. 6d.; **Bicarbonate of Soda**, 2cwt. bags, £10. 10s. per ton; **Ammonia Alkali**, 58%, £7. 10s.; **Soda Crystals**, £5. 5s. per ton, all carriage paid. **Bleaching Powder** remains dull at £11. 5s., softwoods, on rails works. Owing to interference with German supplies, **Chlorates** are firmer; **Potash** 3¼d. per lb. and **Soda** 3d. per lb., ex store. **Bichromates** are unaltered at recent rates. The demand for **Sulphate of Copper** remains quiet, and prices are nominal at £25. to £25. 10s., f.o.b. Liverpool. Roasted **Saltcake** easy at £4. 10s. in bulk, carriage paid. There is little or no inquiry for **Phosphate** and **Commercial Hyposulphite of Soda. Nitrite of Soda** is dearer at £28. per ton, ex store. Concentrated **Sodium Sulphide**, dull at £14. 10s., carriage paid. Supplies of white powdered Cornish **Arsenic** continue scarce, and price firm at £70., net, carriage paid. **Yellow Prussiates** are easier; **Potash** at 9¾d. and **Soda** 5½d. per lb. **Carbonate** and **Caustic Potash** have advanced in price, owing to the new situation in Germany, and spot supplies are short. **Acetic Acid** and **Acetate of Soda** have also an upward tendency. Grey **Acetate of Lime** is firm at £22. per ton; brown, £14. 10s. per ton, carriage paid. **Barium Chloride**, steady at £14. 10s. to £15., ex store. **Lead Salts** are firmer; white **Acetate** £45., brown £45.; and **Nitrate** £44., carriage paid. Green **Copperas** is moving off freely, and stocks are low. **Oxalic Acid**, quiet at 5¾d. per lb. **Permanganate of Potash**, commercial quality, 8½d. to 9d. per lb., carriage paid.

SWANSEA MARKET REPORT. Wednesday.

Tinplates had an improved demand, the quotation being higher on the basis of £1. 3s. 6d. per standard box, f.o.b. **Galvanised Steels** in fair demand at £19. 2s. 6d. per ton. **Copper** easier at £61. 2s. 6d. per ton for prompt, and £61. 17s. 6d. three months. **Tin** prices firm at £227. 7s. 6d. cash, and £228. 7s. 6d. per ton three months. **Lead** steady at £30. 7s. 6d. per ton prompt, and forward £28. 17s. 6d.; English, £32. **Spelter**, fair business passing at £33. 2s. 6d. per ton prompt, and £33. 12s. 6d. forward. **Zinc Sheets** in good demand at £39. 7s. 6d. per ton, on rail at makers' works. **Sulphate of Copper** slow, with prompt at £25. 7s. 6d. per ton, and forward £25. 12s. 6d., less 5%, in casks, f.o.b. **Sulphate of Ammonia** steady at £14. 15s. per ton, delivered home stations. **Nitrate of Soda** quiet, with prompt at £13. 7s. 6d. per ton. **Bone Meal** dull, with Indian, prompt, at £9. 2s. 6d. per ton. **Sulphuric Acid**, active sales, quotations being unaltered. **Oxalic Acid** in poor demand at 6¼d. per lb., f.o.b. **Arsenic** in better call, with poor supplies of white powdered at £68. 7s. 6d. per ton prompt. **Pitch** again easier, with slow demand at £6. 3s. 6d. per ton, delivered docks. **Copperas**, trade dull at £2. 2s. 6d. per ton, delivered London or equal. **Benzol** less active at 1s. 2d. to 1s. 4½d. per gallon. **Creosote** very firm at 8¾d. per gallon. **Tar** in fair demand at £1. 13s. 6d. per 40-gallon cask. **Seed Oils** firmly held; raw **Linseed Oil** £2. 6s. 9d., and boiled £2. 8s. 9d.

per cwt., f.o.b. **Cottonseed Oil** in good demand, with common edible at £2. 5s. 2d., and deodorised £2. 7s. 3d. per cwt., net. **Rape Oil** quiet; best refined, £2. 7s. 3d. per cwt. **Cod Oil** steady; Newfoundland, prompt, £2. 5s. 3d. per cwt.; and English, £1. 14s. 3d., f.o.b. **Coconut Oil** steady, with Ceylon at £2. 6s. 8d. per cwt. **Castor Oil** dearer at £2. 16s. 3d. per cwt., net, in barrels. **Olive Oil** steady, with fair inquiry at £67. 7s. 6d. per ton, ex ship. **Palm Oil** steadily held, but in good call, with Lagos £37. 12s. 6d. prompt, and £37. 17s. 6d. forward; softs, £37. 2s. 6d. prompt, and £37. 7s. 6d. forward; mediums, £37. 17s. 6d., and hards £37. 12s. 6d., all per ton. **Turpentine** rather quiet at £3. 13s. 9d. per cwt. for prompt American. **Coal** in more active inquiry: Best Admiralty smokeless, £1. 8s. to £1. 8s. 6d.; seconds, £1. 7s. to £1. 7s. 6d.; ordinaries, £1. 5s. to £1. 6s., all per ton. **Anthracite** prices firm: Best large £2. 5s., seconds £1. 15s.; Paris and French nuts, £2. 17s. 6d. per ton. **Patent Fuel**, good demand at unchanged rates. **Cokes** very firm and active; export, £2. 7s. 6d. to £2. 12s. 6d. per ton; foundry, £2.; and furnace, £1. 10s. per ton.

LIVERPOOL CHEMICAL MARKET. Wednesday.

A steady and very fair demand for chemicals of the heavier class, for use in the United Kingdom, can be reported, with interest still being shown in prices and supplies for the early part of the coming year. In the export branch of the trade business has been rather more active, and shipments have been on a large scale. **Bleaching Powder** has been in quietly steady demand on home-trade account, and has had a fair shipment to foreign ports; the price for spot and for export is £11. 5s. per ton; in contracts special prices are quoted, according to requirements. **Chloride of Calcium** has again been in moderate request for the home trade and for export; it is £5. 12s. 6d. per ton. **Caustic Soda** has been in somewhat freer request for use in the U.K., and has had an active shipment to foreign ports; spot, for home-trade use, is £19. 7s. 6d. per ton, carriage paid in Great Britain; contract terms are quoted, according to requirements. **Bicarbonate of Soda** has been in good request for home-trade use, and has had a fairly large shipment; it is £10. 10s. per ton, carriage paid, to home-trade users. **Soda Crystals** have been in very fair request on home-trade account, but are still quiet in the export branch; the price is £5. 5s. per ton, carriage paid, for the home trade. **Nitrate of Soda** has had a moderate inquiry, and is £13. 5s. to £13. 10s. per ton. **Borax** has sold rather more readily for use in the U.K., but has been quiet in the shipping branch; commercial crystals are £25. per ton, and powdered £26.; higher grades are—crystals £29. per ton, powdered £30., and superfine £31. per ton, in 2cwt. bags, carriage paid to home-trade users. **Saltcake** has sold more freely for use in the United Kingdom, and supplies at hand are still light; prices are £4. 10s. to £5. per ton for use by the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has had a quietly steady sale, and the price has eased slightly; it is 4½d. to 4¾d. per lb. **Ammonia Alkali** continues to be well inquired for on home-trade account and for export; shipments have been on a large scale; the price is £7. 10s. per ton for use by the home trade, and £8. per ton for export, varied according to destination; for contracts special prices are quoted, according to requirements. **Hyposulphite of Soda** has been in very fair demand; it is £10. per ton, in 2cwt. bags, for commercial; and £15. per ton for photographic. **Sulphide of Soda** has been quieter, but the price is firm; it is £14. 15s. to £15. 15s. per ton for solid, and £9. 2s. 6d. to £9. 17s. 6d. per ton for crystals. **Chlorate of Soda** has moved but slowly, and is 3d. per lb. **Phosphate of Soda** has had a limited inquiry, and is £14. 10s. to £15. per ton. **Prussiate of Soda** has been but little in request, and is 6d. per lb. **Yellow Prussiate of Potash** has been in quietly steady demand, and is 10½d. to 11d. per lb. **Red Prussiate** has been quiet, and the price has been easier; it may be given as 2s. 9d. per lb. **Carbonate of Potash** has been more in request, and the price has tended to harden, through the new German complication; it may be given as ranging from £24. to £28. per ton, according to test. **Nitrate of Potash** continues to sell with some freedom, and is £29. to £30. per ton. **Chlorate of Potash** has had a small sale, and is 3½d. to 4d. per lb. **Caustic Potash** has been rather more in demand, and the price is very firm; it is £31. to £32. per ton. **Permanganate of Potash** has been quieter, and is 9d. to 9½d. per lb. **Bichromate of Potash** has been in quietly steady demand, and is 5¼d. to 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in fair request; first quality is £57. per ton, and second quality £54. per ton. **Sulphate of Ammonia** has been quiet in the home-trade department, but has had a fairly large shipment for foreign ports; neutral of 25¾% is £14. 15s. per ton, and ordinary of 25¼% £13. 12s. per ton. **Carbonate of Ammonia** has been in very fair demand, and is 4d. per lb. **Muriate of Ammonia** has been but little in request, and is £32. per ton. **Magnesia** has been rather more in demand; **Carbonate** is £2. 5s. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has had a quietly steady sale; the price is £11. per ton for the home trade, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been rather more in request, and is £8. to £11. per ton, according to quality. **Sulphur** continues to meet with a very fair inquiry; flowers are £10. per ton; roll is £8. 10s. per ton; rock, £8. to £8. 10s. per ton; and American, £5. 10s. per ton. **Tartaric Acid** has been in moderate demand, and is 1s. 1d. to 1s. 1½d. per lb. **Cream of Tartar** has had a fair inquiry, and the price has eased; it may be given as £4. 6s. to £4. 8s. per cwt. **Boric Acid** has been in quietly steady demand; commercial is £48 per ton, and powdered £51.; B.P. grades are £54. to £60. per ton. **Citric Acid** has been quieter, and the price is 1s. 5d. per lb. **Oxalic Acid** has been inactive, and is 6d. per lb. **White Acetate of Lead** has had a moderate sale, and the price has hardened; it is £43. 10s. to £44. per ton. **Sulphate of Copper** has been but little in demand for home-trade uses, and shipments have been on a small scale; the price is £25. to £25. 10s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been quieter, but the price is high and firm; white powdered is £64. to £69. per ton.

WEST OF SCOTLAND CHEMICALS. Wednesday.

The usual day-to-day demand for chemicals on home-trade account continues fair, and it is encouraging to note an improvement in inquiry in the export market. There is little to record in price alterations other than arsenic, which has advanced to £70. per ton on spot. Tartaric and citric acids are firm, though quotations are unchanged. **Alum**, lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic**, white powdered, scarce and still dearer at £70. per ton on spot; an improving market. **Barium Chloride**, £14. 10s. per ton; at this price the market remains steady; foreign imported material offered round £13. 10s. **Bleaching Powder**, quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid**, crystals, £48. per ton, carriage paid in the U.K., makers' prices; demand rather poor. **Borax**, crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities competing strongly. **Calcium Chloride**, 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted below this figure. **Citric Acid**, 1s. 5d. per lb., less 5%; a little business about. **Copper Sulphate**, £26. 15s. per ton, less 5%; a rather neglected market. **Cream of Tartar**, £4. 2s. 6d. per cwt. for 99% at Glasgow, quotation steady, and inquiry small. **Lead Acetate**, white, £42. 15s. per ton on spot; brown, more inquiry at £45. per ton; Continental material offering at cheaper rates. **Magnesium Chloride**, £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at much under this figure. **Oxalic Acid**, quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax**, 2½d. per lb.; a steady export trade. **Potassium Bichromate**, 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate**, crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate**, 1s. per lb.; at this reduced price there is a rather better inquiry, with some export business. **Salammoniac**, first and second lump, £55. and £52. 10s. per ton respectively; crystals, £48. 10s. per ton; at these reduced quotations the market is rather inactive. **Saltpetre**, £1. 11s. 6d. per cwt., net; a better market, with price unaltered; fresh arrivals are cheaper. **Sodium Bichromate**, 4½d. per lb.; unchanged. **Sodium Chlorate**, 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate**, 7d. per lb., ex store; the spot market remains fairly steady, with but little demand. **Sodium Bicarbonate**, £9. 15s. per ton, in 2cwt. bags; £11. 5s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic**, 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid**, 1s. 0¾d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending November 24.

BARYTES—
Antwerp, 350 bgs.

BORAX—
Wilmington, 500 sks.

BORON MINERAL
Wilmington, 7,028 sks.

CALCIUM CARBIDE—
Trondhjem, 1,350 drms.

CARBON BLACK—
New York, 71 cs.

DEXTRINE—
Baltimore, 462 bgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 25 cks., 130 pkgs.

GLUCOSE—
Danzig, 105 brls.

GLUE—
Antwerp, 229 bls.

IRON OXIDE—
Marseilles, 32 cks.

MANGANESE ORE—
Calcutta, 2,000 t.

OCHRE—
Rouen, 53 cks.

PHOSPHATE (*otherwise undes.*)—
Sfax, 900 t.

RED LEAD—
Genoa, 18 cks.

SALAMMONIAC—
Antwerp, 7 cks.

SALT—
Hamburg, qnty. and 105 cks., 1,300 bgs., 1 cs.

SOAP—
Genoa, 280 cs.
Melbourne, 600 cs.

SODA CRYSTALS—
Baltimore, 16 cks.

SODIUM ACETATE—
Antwerp, 36 cks.

SODIUM HYPOSULPHITE—
Marseilles, 20 cks.

STEARINE—
Buenos Ayres, 115 trcs.
Monte Video, 61 pkgs.

SULPHUR—
Catania, 337 pkgs.

TANNING MATERIALS—
Quebracho
Buenos Ayres, 1,037 bgs.
Sumac
Palermo, 120 bls.
Valonia
Smyrna, 10 t.
Wattle
Durban, 6,524 bgs.

TAR (*otherwise undescribed*)—
Hamburg, 199 cks.

TAR (WOOD)—
Danzig, 125 brls.

ZINC OXIDE—
Antwerp, 36 cks.

GOOLE.

Week ending November 24.

FORMIC ACID—
Antwerp, 239 crbys.

GLUE—
Boulogne, 50 bls.

MAGNESIUM CHLORIDE—
Hamburg, 80 drms.

GRANGEMOUTH.

Week ending November 24.

ACETIC ACID—
Rotterdam, 6 cks.

ACID (*otherwise undescribed*)—
Rotterdam, 5 cs.

CALCIUM CARBIDE—
Christiansand, Christiania, and Skien, 200 drms.; Trondhjem, 4,800 drms.

CAUSTIC POTASH—
Antwerp, 70 drms.

COPPER SULPHATE—
Antwerp, 40 bgs.

SODA—
Rotterdam, 40 cks.

TALLOW—
Christiansand, Christiania, and Skien, 120 brls.

ZINC OXIDE—
Rotterdam, 50 cs.

GRIMSBY.

Week ending November 24.

CALCIUM CARBIDE—
Fredrikshald, 400 drms.

COLOURS (*otherwise undescribed*)
Antwerp, 18 pkgs.
Rotterdam, 1 ck.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 40 cks.

GLUE—
Antwerp, 12 bgs.

KAINIT—
Hamburg, 29 t.

MAGNESITE—
Hamburg, 1,392 bgs.

NITRIC ACID—
Fredrikshald, 379 drms.

POTASSIUM SALTS (*otherwise undescribed*)—
Antwerp, 11 t.

ROSIN—
Farmosgrund, 55 brls.

SOAP—
Antwerp, 3 cs.

HULL.

Week ending November 24.

BORIC ACID—
Dunkirk, 20 t. 5 c.

CARBON (DECOLOURISING)—
Amsterdam, 9 t. 17 c.

CHEMICALS (*otherwise undescribed*)
Christiania, 2 c.; Hamburg, 13 t. 14 c.; Malaga, 1 t.; Rotterdam, 2 t. 2 c.

COAL TAR PRODUCTS—
Aniline Oil
Riga, 4 t. 2 c.
Tar Oil
Gothenburg, 12 c.

DEXTRINE—
Amsterdam, 5 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 480 lb.
Rotterdam, 940 lb.

FERRO CHROME—
Gothenburg, 15 t.

FERRO SILICON—
Christiania, 22 t.

FERTILISERS (*otherwise undes.*)—
Stavanger, 155 t.

FULLER'S EARTH—
Bremen, 19 t.

GLUE—
Amsterdam, 2 t.
Antwerp, 2 t. 3 c.

PHOSPHATE (*otherwise undescribed*)
Pt. Tampa, 107 t. 19 c.

SOAP—
Marseilles, 3 c.
New Orleans, 11 t. 8 c.

SULPHUR—
Catania, 1 t.

TALLOW—
Christiania, 60 t.

TANNING MATERIALS—
Valonia
Smyrna, 10 t.
Wattle
Durban, 570 t.

TURPENTINE—
Bremen, 1 t. 3 c.

LEITH.

Week ending November 24.

ACETIC ACID—
Antwerp and Ghent, 25 cks.

ALUMINIUM SULPHATE—
Dunkirk, Rouen, and Grangemouth, 100 bgs.

BASIC SLAG—
Antwerp, 500 bgs.

CHEMICALS (*otherwise undescribed*)
Dunkirk, Rouen, and Grangemouth, 2 cylds.; Hamburg, 8 cs., 17 drms.

FERTILISERS (*otherwise undes.*)
Antwerp and Ghent, 1,125 t.

GELATINE—
Antwerp and Ghent, 3 cs.

GLUE—
Amsterdam, 52 cks., 23 bls., 1 cs.

LITHOPONE—
Hamburg, 40 cks.
Rotterdam, 40 cks.

MAGNESIUM SULPHATE—
Hamburg, 10 bgs.

SILICO MANGANESE—
Gothenburg, 39 cs.

SOAP—
Copenhagen, 22 cs.
Rotterdam, 15 cs.

LIVERPOOL.

Week ending November 24.

ACETATE OF LIME—
U.S., 1,172 bgs.

ACETONE—
Czecho-Slovakia, 33 drms.

ALBUMEN—
China, 275 cks., 15 cs.

ANTIMONY REGULUS—
Argentine, 10 t.

ARGOLS—
Italy, 137 sks.
Spain, 207 sks.

ARSENIC—
Brazil, 100 bxs.
Japan, 100 cs.

BARYTES—
Germany, 520 bgs., 91 cks.

BEESWAX—
W.C. Africa, 13 pkgs.

BISMUTH ORE—
China, 2 t. 10 c.

CARBON BLACK—
U.S., 10 cs.

CREAM OF TARTAR—
France, 20 kgs.
Italy, 100 kgs.

DIPHENYLGUANIDINE—
U.S., 16 cs.

DYESTUFFS (NATURAL)—
Annatto
Denmark, 2 brls.
Cutch
Borneo, 600 bgs.
F. M. S., 100 bxs.
Fustic
France, 5 cks.
Logwood
France, 75 cks.
Unspecified
France, 5 cks., 16 cs.

FERRO SILICON—
Norway, 150 t.
Porsgrund, 264 cs.

FORMALDEHYDE—
Germany, 25 cks.

GELATINE—
Belgium, 24 bls.

GLUE—
Belgium, 100 bgs., 5 bls.
Germany, 1 bg.

HYDROGEN PEROXIDE—
Canada, 2 cs.

IRON OXIDE—
Spain, 50 bgs.

KIESELGUHR—
France, 500 bgs.

MAGNESITE (CALCINED)—
Holland, 40 bgs.

MANGANESE ORE—
India, 4,620 t. 15 c.

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 12 cks.

MOLYBDENITE ORE—
China, 2 t.

PARAFFIN SCALE—
U.S., 211 bgs., 1,629 brls.

PARAFFIN WAX—
U.S., 312 bgs.

PHOSPHATE OF LIME—
Belgium, 500 bgs.

PITCH (*otherwise undescribed*)—
U.S., 298 drms., 213 drms.

POTASSIUM CHLORATE—
France, 500 cs.
Sweden, 300 kgs., 200 cs.

POTASSIUM SULPHATE—
Germany, 250 bgs.

POTASSIUM SULPHITE—
Germany, 10 cks.

RED LEAD—
Germany, 17 cks.

ROSIN
Straits, 250 brls.
U.S., 3,350 brls.

SALT—
Germany, 5 t.

SALTPETRE—
Belgium, 40 kgs.

SILICEOUS EARTH—
Germany, 600 bgs.

SIZE (ROSIN)—
U.S., 50 brls.

SOAP—
Denmark, £63.; Holland, £30.; Italy, £165.; U.S., £741.

SODIUM BICHROMATE—
U.S., 32 cks.

SODIUM CHLORATE—
Germany, 100 bgs.
Spain, 20 brls., and £40.

SODIUM PHOSPHATE—
Belgium, 20 cks.

SODIUM PRUSSIATE—
U.S., 53 brls.

STEARINE—
Belgium, 102 bgs.
Germany, 94 bgs.

SULPHUR—
Italy, 234 pkgs.

SUPERPHOSPHATE—
U.S., 522 brls.

TALLOW—
Argentine, 1,592 cks.; Holland, 211 brls.; Norway, 12 brls.

TANNING MATERIALS—
Chestnut
France, 2,736 cks., 397 bgs.
Italy, 166 cks., 63 cs.
Gambier
F.M.S., 264 cs.; Straits, 313 cs.; W.C. Africa, 84 bgs.
Quebracho
Argentine, 1,812 bgs.
Italy, 205 brls.
Sumac
Italy, 150 bgs.; Sicily, 950 bgs.; Spain, 250 bgs.
Valonia
Smyrna, 692 bgs.
Unspecified
France, 49 cks.

TAR (*otherwise undescribed*)—
Holland, 219 brls.

TAR (WOOD)—
Danzig, 40 cks.

TIN ORE—
Bolivia, 948 t.; Chile, 84 t.; India, 53 t. 10 c.; Portugal, 11 t.; W.C. Africa, 6 t.

TURPENTINE—
U.S., 400 brls.

WHITE LEAD—
Germany, 66 cks.
Holland, 6 brls.

ZINC ASHES—
U.S., 122 t. 5 c.

ZINC DUST—
Belgium, 4 t. 10 c.
U.S., 40 t.

ZINC OXIDE—
Belgium, 40 cks.; Holland, 18 cks.; U.S., 250 brls.

LONDON.

OFFICIAL AMENDMENTS.

In return for week ending September 15—

SODIUM BICHROMATE—
U.S.A., 7 t.
should read—
U.S.A., 10 t. W. J. Crook

In return for September 3—

CHEMICALS (*otherwise undescribed*)
Holland, £400. W. H. Muller
should read—
Holland, £74.

From return for week ending November 10 deduct—

CHEMICALS (*otherwise undescribed*)
Madagascar, £8.

In return for week ending November 10—

TANNING MATERIALS—
Unspecified
Jugo Slavia, 33 pkgs.
should read—

TANNING MATERIALS—
Oak
Jugo Slavia, 33 pkgs.

Week ending November 24.

ACETONE—
Czecho-Slovakia, 24 t. 15 c.

ACETYL SALICYLIC ACID—*
——— £564.

ACETIC ACID—
Germany, 40 pkgs. V. Blagden

ACID (*otherwise undescribed*)—
Japan, 400 pkgs.

ALBUMEN—
U.S.A., £712. Morris
China, £890. Baxter, Hoare

AMMONIUM NITRATE—
Germany, 45 pkgs. Stott & Hotopf
212 cks.

AMMONIUM PHOSPHATE—
Belgium, 20 t.

ANTIMONY REGULUS—
Belgium, 9 t.

ARGOLS—
France, 456 pkgs.
Italy, 562
Spain, 63

ARSENIC—
Germany, 2 t.

BARYTES—
Belgium, 100 bgs. Felton & Crepin
Germany, 66 cks. Taylor & Cox
,, 190 cks. Pallister, Luck
,, 450 bgs. W. Harrison

BEESWAX—
B.W.I., 3 pkgs. Weber, Smith & Hoare
Pt. E. Africa, 79
N.S.W., 7

BORATE OF LIME—
Chile, 1 t. 6 c. Borax Consol.
Germany, 10 7 Fellows, Morton & Clayton

BORAX—
U.S.A., 65 t. W. Jones, Dooly

BORIC ACID—
Irish Free State, 10 pkgs.

BROMINE—
Germany, £260. C. F. Blaufus

BUTYL ALCOHOL—*
——— £1,358.

CALCIUM CHLORIDE—
Germany, 9 t. 17 c. J. Bailey

CAMPHOR—
Japan, 75 cs.
,, 25 cs. Thornett & Fehr
,, 259 R. Warner

CARBON BLACK—
U.S.A., 50 cs. Binney, Smith
,, 320 Anchor Chem.

CARNAUBA WAX—
Brazil, 69 bgs. Weber, Smith & Hoare

CASEIN—
Brit. India, £749. J. Nathan
,, £56. Pitt & Scott
,, £280. J. Latham
France, £133. Mory
Germany, £229. Lewis Hawkins
N.Z., £1,800. Ray

CAUSTIC POTASH—
Germany, 39 drms. C. Tennant
,, 40 J. M. Steel

CHEMICALS (*otherwise undescribed*)
Canada, £146. Charles & Fox
France, £8.
Germany, £87. Ronsheim & Moore
,, £17.
,, £176. J. Schnurmann
Holland, £66. Stancourt & Muir
,, £19.
Italy, £117. F. Boehm
U.S.A., £89. Beck & Pollitzer
,, £196.
,, £250. J. S. Holt & Moseley

CHEMICALS (*otherwise undes.*)—*
——— £2,440.

COAL TAR PRODUCTS—
Unspecified
Germany, £115. Burt, Boulton & Haywood
Holland, £140.
Straits, £42. J. S. Holt & Moseley

COCAINE HYDROCHLORIDE—*
——— £259.

COLOURS (*otherwise undescribed*)—
Germany, 15 cks. T. Foster

CREAM OF TARTAR—
France, 200 pkgs. E. W. Taylor
,, 72 R. Warner
Spain, 33 Schenkers

DEXTRINE—
Germany, 11 t. 3 c.
Holland, 50 K. J. Mulder
,, 3 19
U.S.A., 21
Poland, 2 9 H. Hill

DYESTUFFS (ARTIFICIAL)—
Unspecified
Egypt, £300. J. W. Cook
Germany, 47 pkgs. Greeff
,, £596.
Switzerland, 3 pkgs.
,, £96.

DYESTUFFS (NATURAL)—
Annatto
Brit. India, 8 pkgs. D. H. Gaskain
Indigo
Holland, 13 cs. Thornett & Fehr

ETHYL ACETO ACETATE—*
——— £169.

FERTILISERS (*otherwise undes.*)—
Belgium, 40 t.
Germany, 250 Hollingshurst
Holland, 5 W. H. Muller
Irish F. State, 4
Norway, 13 Hollingshurst

FORMALDEHYDE—
U.S.A., 50 pkgs. V. Blagden

FUSEL OIL—
Latvia, 1 ck. J. Bush

GELATINE—
Belgium, £140. Societe des Prod. Chim.
,, £2,090. Duche
,, £85.
France, £210. Mory
,, £125. P. Ingenlath
,, £1,305. G. T. Symons
Germany, £37. Williams & Geils
,, £113. Crowe
,, £302. C. W. Hartrodt
,, £161. Amer. Exp.
,, £138. E. Friedlander
Holland, £225. W. H. Muller
U.S.A., £87. Soc. des Prod. Chim.

GLUE—
Belgium, £1,288.
,, £114. Cazaly Mills
,, £25. P. Ingenlath
France, £38. Van Oppen
,, £14. Crowe
,, £212. A. J. Malicet
,, £28.
,, £198. G. T. Symons
,, £70. Stonecourt & Muir
,, £40. Sheppy Glue & Chem.
Holland, £18. Stancourt & Muir
,, £54. J. Spurling
,, £203. P. Ingenlath
,, £100. Cazaly, Mills
Hungary, £74. Van Oppen
Italy, £400.
U.S.A., £30. Union Glue & Gel.
,, £120. Knight & Morris

HYDROGEN PEROXIDE—
Germany, 2 qrs. H. Smart

ISINGLASS—
Brit. India, 72 pkgs. Slann & Davies
Brit. Guiana, 3 cks.
,, 6 cs.
,, 3 cks. Slann & Davies
Japan, 15 bls.
,, 35 R. Warner

KIESELGUHR—
Spain, 12 t. A. Cohen

LEAD ACETATE—
Germany, £257. Reitmayer, Calburn & Kindersley

LITHARGE—
France, 21 cks. G. T. Symons
,, £84.

LITHIUM CARBONATE—*
——— £376.

LITHOPONE—
Holland, 40 cks. W. H. Muller
,, 400
,, 100 F. T. H. Nye
,, 50 M. Ashby

MAGNESITE—
Holland, £190.
,, £98. Ray

MANGANESE ORE—
Brit. India, 75 t.

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slovakia, 9 cks.
France, 2 cs.
,, 1 G. T. Symons
Germany, 29 cks. E. W.
,, 35 bgs. Taylor
,, 50
Holland, 3 cks.
Italy, 68 brls. Farmiloe
Spain, 31 bgs. Houlder
,, 270 S. Bramwell
,, 32 brls. T. & W. Farmiloe
,, 32 cks.

MONTAN WAX—
Germany, 300 bgs. Holroyds Oil & Cer.

NOVOCAIN—*
——— £388.

OCHRE—
France, 83 cks. Taylor & Cox
Spain, 1 brls. Spurling
U.S.A., 20 J. Johnson

PARAFFIN WAX—
Dutch Borneo, 2 t. Asiatic Petr.
Germany, 15 Holroyds Oil & Cer.
U.S.A., 70 12 c. Prices Pat. Candle
,, 139 18 H. Hill
,, 19 10 A. C. E. Garnham
,, 25
,, 26 Anglo-Amer. Oil

PARAFORMALDEHYDE—*
——— £124.

PARALDEHYDE—*
——— £193.

PHOSPHATE (*otherwise undes.*)
Holland, 5 t. W. H. Muller

PITCH (*otherwise undescribed*)—
France, 1 pkg.

PLUMBAGO—
Belgium, 24 bgs. G. T.
53 cks. Symons
France, 100 bgs. A. Branwell
,, 1 ck.
Japan, 750 cks.
Madagascar, 98 bgs. W. Wallace
U.S.A., 6 cks. H. Johnson
,, 7 brls. Pitt & Scott

POTASH ALUM—
Germany, 11 pkgs. Johnson

POTASSIUM CARBONATE—
Germany, 12 pkgs. J. Bailey
,, 1 Petri
,, 9
,, 80 J. M. Steel
,, 17 Scheuer

POTASSIUM CHLORATE—
Germany, 29 pkgs. Reitmayer, Calburn & Kindersley
Sweden, 80 J. J. Masters

QUININE ETHYL CARBONATE—*
——— £322.

ROSIN—
Brazil, 1 cs. H. Gardner
France, 50 cks.
,, 18 brls.
Portugal, 187 Rosin & Turps. Imp.
,, 71 Bigland & Jeffrey
Spain, 59 cks. Lowden Connell
U.S.A., 1,589 brls.
,, 200 M. H. Winkley
,, 250 Bigland & Jeffrey
,, 1,275. Fairclough, Dodd & Jones
,, 400 Lowden, Connell

SALAMMONIAC—
Germany, 12 pkgs. Bush, Beach & Gent.

SALVARSAN—*
——— £185.

SALT—
Germany, 75 t.
,, 15 A. G. Smith
,, 25 Hollingshurst
,, 2 Gas, Light & Coke

SALTPETRE—
Sweden, £9.

SHELLAC—
Brit. India, 24 t. 19 c. J. W. Cook
,, 30 11 Litchfield & Saundy

SOAP
Belgium, £8.
Denmark, £320.
Canada, £131. H. C. Hackney
France, £173. Leach
,, £180. J. E. Maeder
,, £18. Europ & Gen. Exp.
,, £85. C. J. Perren
,, £300.
,, £14. Pronk Davis & Rushby
,, £53. Weigel, Leygonie
,, £12. Pereau & Moreau
France, £10. Symons
,, £55. E. A. Kimpton

* Entered under the Safeguarding of Industries Act.

SOAP—
Germany, £55.
,, £21. Gerhard & Hey
,, £37. Amer. Exp.
Holland, £33. Litchfield & Saundy
U.S.A., £26.
,, £27. F. Newberry
,, £105. F. L. Smith
,, £275. H. C. Hackney
,, £1,288. Knight & Morris
Victoria, £5,100. L. F. Smith

SODA CRYSTALS—
Belgium, 5 t. Paul Winn

SODIUM HYPOSULPHITE—
France, 5 t.

SODIUM SALTS (*otherwise undes.*)
Germany, 17 c.
,, 1 t. Stott & Hotopf

SODIUM SULPHITE—*
£101.

STEARINE—
Belgium, 13 bgs. H.H.Poole

SUPERPHOSPHATE—
Belgium, 10 t. Perkins & Homer

TALLOW—
Germany, 30 brls.
N.S.W., 50 t. 3 c. Thornett & Fehr.
,, 10 5 J. W. Cook
N.Z., 11 1 Weber, Smith & Hoare
,, 13 3 Thornett & Fehr
,, 155 13
,, 58 drms.
,, 11 t. 16 c. Goad, Rigg
,, 30 15 H. Hill
Victoria, 70 Weber, Smith & Hoare
,, 6 11

TANNING MATERIALS
Chestnut
Italy, 100 pkgs. H. G. Harper
Gambier
Dutch Indies, 340 pkgs. A. J. Humphrey
,, 170
Straits, 101 A. Everingham
,, 85 Beresford
,, 99 Fisher, King

TANNING MATERIALS—
Myrabolans
Brit. India, 400 pkgs. Boutcher, Mortimer
,, 616 I. J. Williamson
,, 100 R. Warner
Sumac
Italy, 300 pkgs.
Unspecified
U.S.A., 4 pkgs.

TAR (*otherwise undescribed*)—
Latvia, 28 brls. Russian Prod.
Poland, 88 Thornett & Fehr
,, 165 Smith & Moeller
,, 144 Sale
,, 203 W. Rogers
,, 100 cks.
Russia, 300 brls. White Sea & Baltic

TARTARIC ACID—
Italy, 60 pkgs.

THYMOL—*
£738.

TURPENTINE—
Belgium, 3 brls. Langley Smith
France, 50 brls. Fairclough Dodd & Jones
,, 50
Greece, 14 S. Harvey
Latvia, 5 G. McCall
Poland, 2 Thornett & Fehr
,, 15 drms. Sale
U.S.A., 5,075 brls. Fairclough, Dodd & Jones
,, 1,000
,, 900 Goodlake & Nutter

ULTRAMARINE—
Belgium, 15 cks. Burrell
,, 1

WAX (*otherwise undescribed*)—
Czecho-Slovakia, £15. Crowe
Germany, £9. Europ & Gen. Exp.
,, £56.

WHITE LEAD—
Belgium, 10 cks. T. & W. Farmiloe
U.S.A., 23 Greeff

ZINC OXIDE—
Holland, 125 cks. M. Ashby
,, 75 F. T. H. Nye
,, 100 brls.
U.S.A., 250 cks. M. Ashby

ZINC SULPHIDE—
France, £280. Typke & King

ZINC WHITE—
France, 5 brls. G. T. Symons

MANCHESTER.

Week ending November 24.

ACETIC ACID—
Montreal, 604 brls.

BORIC ACID—
Leghorn, 174 brls.

CALCIUM CARBIDE—
Gothenburg, 200 drms.
Skien, 320 drms.

CARBON BLACK—
New Orleans, 325 cs.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 31 cks.; Hamburg, 212 drms.; Rotterdam, 78 bxs.

DYESTUFFS (NATURAL)—
Unspecified
Philadelphia, 25 brls.

FERRO SILICON—
Sarpsborg, 34 brls.

FORMALDEHYDE—
Philadelphia, 136 brls.

GLUCOSE—
Hamburg, 86 cks.

GLUE—
Rotterdam, 36 cks.

LITHOPONE—
Hamburg, 20 brls.

MAGNESITE—
Rotterdam, 207 bgs.

PARAFFIN WAX—
Baltimore, 265 brls.

PHOSPHORUS—
Montreal, 94 drms.

POTASSIUM CARBONATE—
Hamburg, 54 brls.

POTASSIUM PRUSSIATE—
Hamburg, 20 cks.
Rotterdam, 8 cks.

SALAMMONIAC—
Hamburg, 15 cks.

SALTPETRE—
Rotterdam, 10 bgs.

SOAP—
Philadelphia, 600 bxs.

SODIUM BICHROMATE—
Baltimore, 64 cks.

SODIUM CHLORATE—
Gothenburg, 100 kgs.

SODIUM NITRITE—
Skien, 184 cks.

SULPHUR—
Catania, 823 bgs., 100 brls.

TALLOW—
Fredriksstad, 600 brls.

TANNING MATERIALS—
Unspecified
Norfolk, Va., 53 brls.

WAX (*otherwise undescribed*)—
Philadelphia, 150 brls.

NEWCASTLE-ON-TYNE

Week ending November 24.

ACETIC ACID—
Rotterdam, 10 cks.

CALCIUM CARBIDE—
Gothenburg, 200 drms.

CALCIUM PHOSPHATE—
Sfax, 3,050 t.

IRON OXIDE—
Malaga, 19 brls.

LEAD ASHES—
Rotterdam, 36 cks., 1 bg.

LITHOPONE—
Rotterdam, 20 cks.

MAGNESITE—
Rotterdam, 50 kgs.

PLUMBAGO—
Hamburg, 36 cs.

SALAMMONIAC—
Hamburg, 40 brls.

SALT—
Hamburg, 1,634 bgs.

WHITE LEAD—
Rotterdam, 20 cks.

N. & S. SHIELDS.

Week ending November 24.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending November 24.

BITUMEN—
Perth, 4 t. 12 c.

BORIC ACID—
Adelaide, 1 t.
Brisbane, 1 2 c.
Melbourne, 10
Perth, 6
Sydney, 5

CHEMICALS (*otherwise undescribed*)
Auckland, 50 pkgs.: Beira, 286 pkgs.; Bombay, 1 pkgs.; Cape Town, 105 pkgs.; Delagoa Bay, 909 pkgs.; Durban, 45 pkgs.; East London, 2 pkgs.; Hong Kong, 1,373 pkgs.; Kingston, Ja., 103 pkgs.; Kobe, 153 pkgs.; Manila, 10 cs.; Melbourne, 24 pkgs.; New York, 1,000 pkgs.; Rio de Janeiro, 190 pkgs.; Shanghai, 20 pkgs.; Singapore, 10 pkgs.; Sydney, 284 pkgs.; Wellington, 151 pkgs.

CHLOROFORM—
Yokohama, 10 c.

COAL TAR PRODUCTS—
Pitch
Famagusta, 3 c.
Gibraltar, 2 t. 10
Nantes, 894
Pt. Said, 64
Tar
Durban, 2 t. 10 c.
Cape Town, 67 19
Famagusta, 12

COAL TAR PRODUCTS—
Tar
Delagoa Bay, 31 t. 15 c.
Penang, 14
Pt. Said, 50
P. Swettenham, 6
Rangoon, 337
Sourabaya, 2
Unspecified
Beira, 10 t. 2 c.; Cape Town, 80 t.; Delagoa Bay, 20 t. 4 c.; Gothenburg, 21 t.; Rangoon, 95 t.; Singapore, 2 c.

DISINFECTANTS (*otherwise undes.*)
Algoa Bay, 8 t. 14 c.; Beira, 7 c.; Cape Town, 8 t. 14 c.; Durban, 24 t. 9 c.; Delagoa Bay, 17 t. 8 c.; East London, 8 t. 14 c.; Dunedin, 13 c.; Melbourne, 17 c.; Mossel Bay, 8 t. 14 c.

DYESTUFFS (NATURAL)—
Unspecified
Melbourne, 1 t.

GLUE—
Dunedin, 1 t.

MAGNESIA (CALCINED)—
Singapore, 3 t.

MAGNESITE (CALCINED)—
Rangoon, 2 t. 3 c.

PARAFFIN WAX—
Bonbay, 4 t. 3 c.; Bordeaux, 1 t. 13 c.; Brisbane, 10 t.; Genoa, 2 t.; Kobe, 90 t.; Leghorn, 37 t. 10 c.; Malta, 3 t.; Melbourne, 7 t.; Naples, 10 t.

POTASSIUM BICHROMATE—
Bordeaux, 1 t. 3 c.; Dunedin, 1 t. 3 c.; Gothenburg, 7 c.; Melbourne, 3 t.; Wellington, 1 t. 3 c.; Yokohama, 5 t.; Sydney, 1 t. 2 c.

SHEEP DIP—
Auckland, 2 t. 16 c.; Buenos Ayres, 30 t. 15 c.; Pto. Alegre, 4 t. 6 c.; Rio de Janeiro, 13 c.; Wellington, 7 t. 14 c.

SOAP—
Beira, 8 t.; Buenos Ayres, 3 t. 18 c.; Cape Town, 6 t. 4 c.; Malta 1 c.; Penang, 1 c.; Pt. Swettenham, 9 c.; Rangoon, 8 t. 17 c.; Singapore, 9 c.; Vancouver, 14 c.

SODA CRYSTALS—
Beira, 2 c.; Pt. Said, 2 t.

SODIUM BICHROMATE—
Bordeaux, 4 t.; Cape Town, 19 c.; Dunedin, 2 t. 16 c.; Gothenburg, 1 t. 19 c.; Marseilles, 16 t.; Melbourne, 10 t.; Sydney, 5 t. 17 c.; Wellington, 19 c.

SODIUM CYANIDE—
Fremantle, 3 t.
Padang, 10
Sydney, 3
Vera Cruz, 3

SPERMACETTI WAX—
New York, 1 t. 12 c.

TANNING MATERIALS—
Unspecified
Auckland, 6 t. 18 c.; Dunedin, 9 c.; Melbourne, 11 t. 15 c.; New York, 1 t. 10 c.; Sydney, 3 t. 11 c.

GRANGEMOUTH.

Week ending November 24.

NIL.

HULL.

Week ending November 20.

AMMONIUM SULPHATE—
Catania, 300 bgs.
Rotterdam, 20 kgs., 2,032 bgs.

BLEACHING POWDER—
Mantyluoto, 281 cks.

CAUSTIC SODA—
Helsingfors, 17 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 6 cs., 100 drms.; Antwerp, 7 cks.; Christiansund, 1 kg.; Christiania, 25 cs., 3 pkgs., 6 kgs., 2,127 slbs.; Copenhagen, 1 cs., 2 cks., 4 drms.; Gothenburg 2 pkgs.; Helsingfors, 212 drms.; Hamburg, 263 cs., 22 cks., 45 drms.; Piraeus, 30 kgs.; Rotterdam, 4 drms.; Stockholm, 50 drms.; Wasa, 250 drms.; Wiborg, 100 bgs., 100 drms.

COAL TAR PRODUCTS—
Creosote
Piraeus, 6 drms.
Pitch
Bilbao, 8 cs.
Tar
Copenhagen, 5 cks.
Unspecified
Trieste, 2 drms.

* Entered under the Safeguarding of Industries Act.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiania, 4 kgs.
Gothenburg, 3 pkgs., 1 drm.

FULLER'S EARTH—
Hamburg, 220 brls.

GLUE—
Gothenburg, 80 bgs.
Helsingfors, 94 bgs.

RED LEAD—
Kalmar, 18 cks.

SALT—
Amsterdam, 150 cs. ; Christiania, 22 cs. ; Stockholm, 37 cs.

SOAP—
Christiania, 5 cs. : Copenhagen, 3 cs., 2 cks. : Helsingfors, 300 cs.

TALLOW—
Copenhagen, 60 cks.
Rotterdam, 1 cs., 20 cks.

TURPENTINE—
Gibraltar, 1 brl.

LEITH.

Week ending November 24.

ALBUMEN—
Copenhagen, 21 cs.

COAL TAR PRODUCTS—
Creosote Oil
Amsterdam, 23 cks.

DISINFECTANTS (*otherwise undes.*)
Rouen, 55 cks.

PITCH (*otherwise undescribed*)—
Rotterdam, 1 bxs.

SODA—
Copenhagen, 8 cks.

TALLOW—
Newfairwater, 33 cks.

LIVERPOOL.

Week ending November 22.

ALUM—
Rangoon, 2 t. 4 c., £22.

ALUMINIUM OXIDE—
Rio de Janeiro, 4 c., £12.

ALUMINIUM SULPHATE—
Calcutta, 75 t. 6 c., £649.

AMMONIUM CARBONATE—
Amsterdam, 3 t. 10 c., £100. ; Alexandria, 1 t., £35. : Alexandretta, 19 c., £26. : Barcelona, 1 t. 19 c., £66. ; Bilbao, 10 c., £12. ; Bordeaux, 10 c., £30. ; Calcutta, 10 c., £17. ; Galatz, 2 t. 10 c., £63. ; Hamburg, 4 t. 18 c., £119. ; Monte Video, 1 t. 19 c., £70. ; Mauritius, 10 c., £14. ; Melbourne, 4 t., £133. ; Mollendo, 10 c., £22. ; Piraeus, 1 t., £26. ; Rangoon, 5 c., £10. : Valencia, 1 t., £27. ; Vera Cruz, 1 t., £38. ; Yokohama, 5 t., £135.

AMMONIUM CHLORIDE—
Alexandria, 8 t. 17 c., £367. ; Auckland, 1 t. 10 c., £58. ; Barcelona, 2 t., £55. : Bourgas, 10 c., £21. ; Kobe, 9 t. 19 c., £294. ; Rouen, 5 t., £152.

AMMONIUM SULPHATE—
Almeria, 49 t. 7 c., £642. ; Hong Kong, 80 t., £1,240. ; Kobe, 200 t., £2,700. ; Las Palmas, 70 t., £1,047. ; Malaga, 148 t. 6 c., £2,003. ; Sourabaya, 299 t. 2 c., £4,285. ; Samarang, 565 t. 4 c., £8,769.

ANTIFOULING COMPOSITION—
Buenos Ayres, 8 c., £22. ; Oporto, 12 c., £29. ; Piraeus, 8 t. 2 c., £852. ; Rangoon, 3 t., £303. ; Rio de Janeiro, 2 t. 9 c., £340.

ARSENIC—
Barcelona, 19 c., £65.
Seville, 2 t., £168.

BARIUM CARBONATE—
Buenos, 6 t. 3 c., £110.

BLEACHING POWDER—
Amsterdam, 4 t. 19 c., £44. : Buenos Ayres, 25 t. 1 c., £300. ; Bangkok, 1 t. 6 c., £16. ; Calcutta, 63 t. 17 c., £675. ; Colon, 10 c., £15. ; Copenhagen, 1 t. 2 c., £10. ; Corfu, 4 t. 9 c., £54. ; Madras, 5 t., £60. ; Oporto, 4 t. 12 c., £17. ; Piraeus, 3 t. 15 c., £45.

BLEACHING POWDER—
Roumania, 10 t. 2 c., £89. ; Rio de Janeiro, 10 t., £120. ; Singapore, 1 t., £12.

BOILER COMPOSITION—
Auckland, 2 t. 4 c., £133.
Varna, 4 c., £35.

BORAX—
St. John's, N.F., 1 c., £1 10s.

BORIC ACID—
Cape Town, 1 c., £4.
Pt. Elizabeth, 11 c., £32.

CALCIUM CHLORIDE—
Calcutta, 1 t. 11 c., £9.
Durban, 5 t., £28.
Rangoon, 20 t., £113.
Singapore, 3 t. 11 c., £23.

CAUSTIC POTASH—
Cape Town, 5 t., £161.

CHEMICALS (*otherwise undescribed*)
East London, 1 t., £50. ; Galatz, 2 t., £18. ; New York, 9 t. 15 c., £24. ; Sydney, 10 c., £26. ; Wellington, 19 c., £420.

CHLORINE—
Calcutta, 1 t. 6 c., £34.

COAL TAR PRODUCTS—
Carbolic Acid
Bombay, 14 c., £53. ; Calcutta, 2 c., £17. ; Kobe, 24 t. 19 c., £3,046. ; Montreal, 2 t., £290. ; Rotterdam, 1 t. 1 c., £122. ; Shanghai, 9 c., £79. ; Switzerland, 2 t. 7 c., £307.
Creosote
Durban, 27 t. 3 c., £335.
Orthonitrophenol
Switzerland, 4 t. 15 c., £865.
Pitch
Lagos, 1 t. 7 c., £13.
Pyridine
New York, 2 t. 3 c., £500.

COBALT CHLORIDE—
Melbourne, 1 c., £25.

COBALT OXIDE—
Buenos Aires, 5 c., £290.
Sydney, 2 qrs., £19.

COPPER OXIDE—
Rio de Janeiro, 5 c., £21.

COPPER SULPHATE—
Chinde, 10 c., £12. ; Colombo, 1 t., £27. : Dunedin, 2 t., £52. ; Galatz, 177 t. 4 c., £4,117. ; Karachi, 10 t., £277. : Laurenco Marques, 5 c., £6. ; Montreal, 16 t., £398. ; Madras, 1 t., £26. ; New York, 4 t., £118. ; St. John's, 5 t. 18 c., £147. ; Sourabaya, 20 t. 17 c., £522. ; Wellington, 1 t., £26.

CREAM OF TARTAR—
Fremantle, 1 t., £80.
Newcastle, 5 t., £430.

DISINFECTANTS (*otherwise undes.*)
Amsterdam, 9 c., £212. ; Alexandria, 7 t. 12 c., £242. ; Antwerp, 2 t. 3 c., £35. ; Batavia, 19 c., £32. ; Bombay, 9 c., £23. ; Durban, 6 t. 3 c., £261. ; Hong Kong, 2 t. 7 c., £107. ; Lagos, 1 t. 14 c., £157. ; Marseilles, 4 c., £25. ; New York, 35 t. 4 c., £1,359. ; St. John's, N.F., 6 c., £50. ; Singapore, 1 t. 2 c., £53. ; Sandakan, 2 t. 15 c., £166. ; Switzerland, 4 c., £25. ; Vera Cruz, 5 c., £12.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 16 t. 10 c., £2,156.
Indigo
Melbourne, 1 t., £158.
Sydney, 1 t., £159.
Unspecified
Barcelona, 1 c. 1 qr., £36. ; Bordeaux, 8 c., £75. : Lisbon, 1 c. 2 qrs., £30. : Madras, 2 c., £63. ; Melbourne, 4 t. 3 c., £2,179. ; Montreal, 2 t. 18 c., £1,063. ; Rangoon, 5 c., £133. ; Rouen, 8 c., £96. ; Shanghai, 18 c., £258. ; Sourabaya, 1 c., £37. ; Suva, Fijis, 1 c., £13. ; Wellington, 12 c., £180.

DYESTUFFS (NATURAL)—
Cutch
Christiania, 10 c., £10.

FERTILISERS (*otherwise undes.*)—
Bombay, 5 t., £89.

FORMALDEHYDE—
Perth, 1 t., £72. ; Para, 4 c., £13.

GLYCERINE—
Antwerp, 10 c., £42. ; Galatz, 1 t. 19 c., £162. ; Hong Kong, 15 t., £1,244. ; Karachi, 1 t., £87. ; La Libertad, 12 c., £55. ; Monte Video, 1 t. 19 c., £173. ; Rangoon, 19 c., £72. ; Shanghai, 3 t., £268. ; Sourabaya, 10 c., £10.

GUANO—
Guernsey, 20 t., £125.

LEAD ACETATE—
Melbourne, 1 t. 1 c., £44.

MAGNESIA—
Vera Cruz, 10 c., £66.

MAGNESIUM CARBONATE—
Mayaquez, 1 t. 15 c., £95.
Sydney, 10 c., £33.

MAGNESIUM SULPHATE—
Demerara, 10 c., £5. ; Montreal, 3 t. 14 c., £30. ; Pt. Elizabeth, 1 c., £1. ; St. John's, N.F., 11 c., £14. ; Suva, 12 c., £11.

NICKEL OXIDE—
Rio de Janeiro, 2 c., £13.

NICKEL SULPHATE—
Colombo, 3 c., £16.

PHOSPHORUS (AMORPHOUS)—
Kobe, 6 t. 14 c., £1,231.

PHOSPHORUS SESQUISULPHIDE
Melbourne, 1 t. 9 c., £323. ; Pasages, 5 t. 17 c., £1,212. ; Tampico, 3 c., £33.

PITCH (STOCKHOLM)—
Iquique, 1 t. 8 c., £21.

POTASSIUM BICHROMATE—
Galatz, 20 t. 5 c., £492. ; Pasages, 1 t. 16 c., £82. ; Sourabaya, 1 t., £47.

POTASSIUM CARBONATE—
Manaos, 12 c., £23.

POTASSIUM CITRATE—
Bombay, 4 c., £52.

POTASSIUM IODIDE—
Bombay, 1 c., £93.

POTASSIUM PERMANGANATE—
Fremantle, 5 c., £13.

POTASSIUM PRUSSIATE—
Kobe, 5 t., £455.
Melbourne, 10 c., £58.

SHEEP DIP—
Buenos Aires, 44 t. 10 c., £1,662. ; Braila, 10 c., £35. ; Cape Town, 13 c., £33. ; Durban, 8 t., £373. ; Fremantle, 1 t. 7 c., £59. ; Monte Video, 8 t. 18 c., £542. ; Pto Deseado, 27 t., £1,050. ; Rio Gallegos, 7 t., £262. ; San Julian (Argentine), 4 t. 14 c., £175.

SULPHURIC ACID—
Antofagasta, 8 c., £27. ; Beira, 14 c., £44. ; Durban, 8 c., £30.

TANNING MATERIALS—
Unspecified
Antwerp, 31 t. 12 c., £588. ; Auckland, 2 t. 2 c., £45. ; Hamburg, 3 t. 1 c., £78. ; Mossel Bay, 3 t., £75. ; Melbourne, 11 t. 10 c., £360. ; Rotterdam, 2 t. 8 c., £67. ; Sydney, 2 t. 4 c., £70. ; Stavanger, 2 t. 3 c., £30.

TARTARIC ACID—
Sydney, 8 t., £1,039.
Suva, Fijis, 5 c., £13.

TIN CRYSTALS—
St. Lucia, 1 t. 7 c., £277.

TIN OXIDE—
Sydney, 5 c., £60.

VANILLIN—
Amsterdam, 4 c., £124.
Switzerland, 2 qrs., £49.

WOOD PRESERVATIVE—
Batavia, 1 t. 2 c., £63.

ZINC AMMONIUM CHLORIDE—
New York, 3 t. 1 c., £86.

ZINC CHLORIDE—
Bombay, 1 t. 14 c., £35. ; Philadelphia, 17 c., £22. ; Sourabaya, 1 t., £27.

ZINC OXIDE—
New York, 4 t. 19 c., £208.

ZINC SULPHATE—
Antwerp, 5 t., £55.

Week ending November 23.

CALCIUM CHLORATE—
Bombay, 92 pkgs.

CAUSTIC SODA—
Alexandretta, 120 drms. ; Amsterdam, 44 drms. : Bahia, 458 drms. ; Batavia, 160 drms. ; Bombay, 10 drms. ; Brisbane, 22 drms. ; Buenos Ayres, 331 drms. : Calcutta, 40 drms. ; Cartagena (Col.), 30 drms. ; Christiania, 70 drms. ; Colombo, 4 drms. ; Corral, 125 drms. ; Constantinople, 36 drms. ; Corinto, 44 pkgs. ; Fremantle, 14 drms. ; Guayaquil, 18 drms. ; Hamburg, 590 drms. ; Lyttleton, 10 drms. ; Melbourne, 437 pkgs. ; Monte Video, 200 tins, 75 drms. ; Oporto, 102 drms. ; Penang, 10 drms. ; Piraeus, 249 drms. ; Pto. Mexico, 254 drms. ; Rangoon 60 drms. ; Riga, 66 drms. ; Rosario, 68 drms. ; Rotterdam, 238 drms. ; Santos, 100 drms. ; Shanghai, 756 drms. ; Sourabaya, 90 drms. ; Sydney, 393 drms., 45 cs. ; Tampico, 473 drms. ; Toulouse, 20 cs. : Trieste, 40 drms. ; Vancouver, 89 drms. : Varna, 250 drms. ; Vera Cruz, 975 drms. Victoria, B.C., 15 drms. ; Walvis Bay, 10 cs. ; Wellington, 115 drms 80 cs.

FERRO MANGANESE—
Baltimore, 1,139 t. : Boston, 25 t. ; Gijon, 30 t. : Montreal, 20 t. ; New Orleans, 450 t. ; S. Francisco, 280 t. ; Valparaiso, 5 t.

FERROPRUSSIATE— (*otherwise undes.*)
Buenos Ayres, 3 cs.

GLUE, SIZE, AND GELATINE—
Algoa Bay, 2 pkgs. : Auckland, 12 pkgs. ; Bangkok, 5 cs. ; Barcelona, 10 cks. ; Bombay, 20 bgs. ; Boston, 160 pkgs. ; Calcutta, 10 pkgs. ; New York, 155 cs. ; Piraeus, 10 pkgs. ; Shanghai, 201 bgs.

MANGANESE ORE—
Pto. Colombia, 5 bgs.

SALT—
Aalborg, 632 t. ; Antwerp, 305 t. ; Auckland, 35 t. ; Bergen, 20 t. ; Buenos Ayres, 31 t. ; Calabar, 65 t. ; Calcutta, 3 t. ; Christchurch, 50 t. ; Christiania, 100 t. ; Christiansand, 40 t. ; Coquimbo, 15 c. ; Demerara, 13 t. ; Duala, 35 t. ; Gefle, 50 t. ; Ghent, 150 t. ; Grand Bassam, 12 t. ; Gothenburg, 50 t. ; Iddo, 240 t. ; Koko, 2 t. ; Malmo, 20 t. ; Montreal, 870 t. 10 c. ; New York, 50 t. ; Onitsha, 6 t. ; Rosario, 81 t. ; Pt. Harcourt, 22 t. ; Rangoon, 12 t. ; Riga, 1 t. ; Rouen, 10 t. ; Sapele, 5 t. ; Sydney, 4 t. ; Wellington, 40 t.

SOAP—
Akyab, 150 pkgs. : Accra, 218 bxs. ; Alexandria, 1,208 pkgs. ; Algiers, 2 pkgs. ; Antofagasta, for Bolivia, 445 bxs. ; Arica, 100 bxs. ; Auckland, 621 bxs. ; Arecliffe, 61 bxs. ; Arzila, 125 bxs. ; Bangkok, 234 pkgs. ; Barbzdos, 452 cs. ; Barcelona, 1 cs. ; Barranquilla, 2 cs. ; Belawan, 2,103 bxs. ; Belize, 105 cs. ; Bombay, 3,387 pkgs. ; Boston, 2 cs. ; Bolivia, 345 pkgs. ; Buenos Aires, 23 drms. ; Burutu, 184 cs. ; Calabar, 751 bxs. ; Calcutta, 151 bxs. ; Cartagena (Col.), 50 pkgs. ; Christiania, qnty. ; Christchurch, 40 pkgs. ; Ceuta, 9 pkgs. ; Colon, 250 pkgs. ; Corral, 5 pkgs. ; Colombo, 225 pkgs. ; Copenhagen, 306 pkgs. ; Curacao, 6 pkgs. ; Delagoa Bay, 2 cs. ; Demerara, 5,402 pkgs. ; Diego Suarez, 250 pkgs. ; Dominica, 13 pkgs. ; Duala, 524 pkgs. ; Dunedin, 85 pkgs. ; Founie, 20 pkgs. ; Gibraltar, 54 pkgs. ; Gothenburg, 10 pkgs. ; Grenada, 100 pkgs. ; Huacho, 50 pkgs. ; Iddo, 65 bxs. ; Iquique, 10 bxs. ; Jaffa, 1 cs. ; Karachi, 600 pkgs. ; Kingston, Ja., 276 bxs. ; Lagos, 3 cs. ; La Guaira, 2 pkgs. ; Las Palmas, 222 bxs. ; Leghorn, 500 pkgs. ; Larache, 244 pkgs. ; Livingston, 10 pkgs.

SOAP—
Madras, 457 bxs.; Majunga, 200 bxs.; Malacca, 50 bxs.; Malta, 101 pkgs.; Manta, 112 bxs.; Mauritius, 3,920 bxs.; Medellin, 1 cs.; Melilla, 400 bxs.; Montreal, 3 cs.; Montserrat, 60 cs.; Naples, 100 cs.; New York, 3 cs.; Nossi Be, 125 bxs.; Orotava, 25 bxs.; Paita, 50 cs.; Palembang, 1,300 bxs.; Panama, 730 bxs.; Petone, 620 pkgs.; Paramaribo, 96 bxs., 13 cs.; Pimental, 5 cs.; Pto. Barrios, 32 cs., 100 bxs.; Pto. Colombia, 2 cs.; Pt. Louis, 125 bxs.; Pt. Harcourt, 2 cs.; Pt. Maria, 120 bxs.; Pt. Said, 460 pkgs.; Rangoon, 2,192 pkgs.; Rio de Janeiro, 2 cs.; Rosario, 610 cs.; Rotterdam, 7 cs.; Rouen, 50 bxs.; Salonica, 1 cs.; Sandakan, 65 bxs.; Sapele, 5 t.; Shanghai, 1,016 pkgs.; Sekondi, 162 cs.; Sierra Leone, 26 cs.; Singapore, 70 cs.; Smyrna, 40 cs.; Stockholm, 5 bxs., 81 cs., 10 drms.; St. Vincent, 100 cs.; Surinam, 30 cs.; St. Lucia, 40 cs.; San Fernando, 100 cs.; Talcahuano, 70 cs.; Tamatave, 550 bxs.; Tangiers, 95 bxs.; Teneriffe, 237 pkgs.; Tetuan, 6 bxs.; Tocopilla, 6 cs.; Trieste, 2 pkgs.; Trinidad, 505 cs.; Tumaco, 51 bxs.; Valparaiso, 260 cs.; Varna, 4 pkgs.; Victoria, W.C.A., 25 bxs.; Wellington, 40 cs.

SODA ASH—
Adelaide, 18 pkgs.; Auckland, 12 pkgs.; Balik Pappan, 60 kgs.; Brisbane, 59 bgs.; Buenos Ayres, 11,840 pkgs., 86 cks.; Calcutta, 7,954 pkgs.; Copenhagen, 200 pkgs.; East London, 50 pkgs.; Fremantle, 42 pkgs.; Gothenburg, 850 pkgs.; Hamburg, 500 pkgs.; Kalmar, 998 cks.; Malmo, 100 pkgs.; Melbourne, 1,205 pkgs.; Moji, 2,705 bgs.; Monte Video, 49 bgs.; Montreal, 500 bgs.; Penang, 14 pkgs.; Pimental, 22 brls.; Rangoon, 180 pkgs.; Rotterdam, 600 pkgs.; Rio de Janeiro, 249 pkgs.; San Francisco, 300 bgs.; Santos, 98 cks.; Shanghai, 84 cks.; Skein, 4,942 bgs.; Sourabaya, 100 pkgs.; Sydney, 1,455 cks.; Tampico, 529 cks.; Vera Cruz, 600 bgs.

SODA CRYSTALS—
Algoa Bay, 20 cs.; Batavia, 26 pkgs.; Buenos Ayres, 20 kgs.; Colombo, 100 pkgs.; Famagusta, 20 brls.; Kingston (Ja.), 35 pkgs.; Malta, 30 bgs.; Pernambuco, 25 pkgs.; Pto. Mexico, 15 brls.; Rangoon, 100 pkgs.; St. Lucia, 10 kgs.; Sourabaya, 20 kgs.; Sydney, 71 pkgs.; Trinidad, 10 pkgs.

SODIUM BICARBONATE—
Adelaide, 22 pkgs.; Alexandretta, 10 bgs.; Bourgas, 170 kgs.; Catania, 30 pkgs.; Cape Town, 20 pkgs.; Colombo, 220 pkgs.; Constantinople, 50 pkgs.; Copenhagen, 17 pkgs.; Durban, 30 pkgs.; East London, 10 pkgs.; Famagusta, 10 kgs.; Fremantle, 158 pkgs.; Hamburg, 50 pkgs.; Larnaca, 10 kgs.; Malta, 25 kgs.; Melbourne, 275 pkgs.; Moji, 1,077 kgs.; Naples, 150 kgs.; Penang, 4 pkgs.; Pt. Swettenham, 4 kgs.; Singapore, 10 kgs.; Sydney, 802 kgs., 121 drms.; Varna, 70 kgs.; V. Cruz, 20 kgs.

SODIUM HYDROSULPHITE—
Sydney, 44 kgs.

SODIUM PHOSPHATE—
Perth, 20 kgs.

SODIUM PRUSSIATE—
Kobe, 300 pkgs.

SODIUM SILICATE—
Auckland, 8 cs.; Buenos Ayres, 146 pkgs.; Manzanillo, 397 bgs.; Melbourne, 868 pkgs.; Messina, 32 cks.; Montreal, 16 pkgs.; Parahyba, 32 pkgs.; Pt. Said, 57 pkgs.; Pernambuco, 16 pkgs.; Rangoon, 49 pkgs.; Rio de Janeiro, 33 pkgs.; Shanghai, 473 bgs.; Suva, 11 pkgs.; Vera Cruz, 251 bgs.

SODIUM SULPHIDE—
Sydney, 64 drms.

SODIUM SULPHITE—
Algoa Bay, 12 pkgs.
Genoa, 17 pkgs.

STEARINE—
Bordeaux, 13 bgs.
Concepcion, 16 bgs.
Philadelphia, 5 pkgs.
Rangoon, 234 bgs.

TALLOW—
Catania, 50 brls.
Danzig, 71 brls.

TURPENTINE—
Tripoli (Syria), 1 ck.

ZINC DUST—
Hamburg, 10 t.

LONDON.

OFFICIAL AMENDMENTS.

From return for week ending July 18, 1923, deduct—

AMMONIUM CARBONATE—
Wellington, 8 c., £20.

Week ending November 21.

ACETIC ACID—
Brisbane, 6 cs., £21.; Buenos Aires, 1 cs., £5.; Dunedin, 30 cs., £97.; Hamilton, 5 cs., £13.; Sydney, 6 cs., £18.; Timaru, 2 cs., £6.

ACETONE—
Antwerp, 3 drms., £118.
Sydney (F.), 3 drms., £43.

ACETYL SALICYLIC ACID—
Cape Town, 3 cs. (pt.), £11.; Irish Free State, 1 cs. (pt.), £7.; Singapore, 1 cs. (pt.), £9.

ALUM—
Durban, 20 cs., £9.; East London, 20 cs., £9.; Wellington, 1 kg., £16.

ALUMINIUM SULPHATE—
Wellington, 5 cs. (pt.), £5.

AMMONIA—
Beira, 6 cs., £13.; Bombay, 7 cs., £12.; Buenos Aires, 9 cs., £28.; Calcutta, 28 cs., £47.; Callao, 9 cs., £26.; Cape Town, 5 cs., £9.; Delagoa Bay, 20 cs., £35.; Durban, 41 cs., £73.; East London, 10 cs., £17.; Irish Free State, 12 cs., £76.; Nairobi, 2 cs., £7.

AMMONIA (ANHYDROUS)—
Cape Town, 20 cylds., £156.; Durban, 50 cylds., £375.; East London, 50 cylds., £375.; Pt. Elizabeth, 20 cylds., £150.; Rotterdam, 68 cylds., £451.; Singapore, 30 cylds., £195.

AMMONIUM ACETATE—
Calcutta, 1 cs., £8.

AMMONIUM CARBONATE—
Antwerp, 3 t., £84.; Calcutta, 1 t. 2 c., £87.; Cape Town, 4 c., £8.; Colombo, 1 c., £5.; Demerara, 13 c., £35.; Genoa, 1 t., £28.; Monte Video, 6 c., £16.; Pt. Elizabeth, 4 c., £8.

AMMONIUM CHLORIDE—
Wellington, 1 brl., £6.

AMMONIUM SULPHATE—
Barcelona, 148 t., £1,955.; Cape Town, 100 t., £1,375.; Jamaica, 100 t., £1,450.; Kobe, 100 t., £1,394.; Mauritius, 400 t., £5,575. Oporto, 50 t., £675.; Piraeus, 200 t., £2,700.

ANTIMONY OXIDE—
Durban, 180 kgs., £125.
Sydney, 1 ck., £11.

ANTIMONY SULPHIDE—
Bilbao, 7 cks., £124.; Copenhagen, 2 cks., £35.; Ghent (F.), 4 cks., £54.; Singapore, 5 cs., £93.; Trelleborg, 4 cks., £78.

ARSENIC—
Alexandria, 16 drms., £73.; Buenos Aires, 1 ck., £9.; Prague, (F.), 1 ck., £13.; Rotterdam (F.), 1 ck., £12.

ARSENIOUS ACID—
Bombay, 1 cs., £7.

BARIUM SULPHATE—
Paris, 2 cks., £100.

BISMUTH SALTS (*otherwise undes.*)
Athens, 1 cs. (pt.), £32.
Alexandria, 5 cs. (pt.), £15.

BITUMEN—
Bombay, 11 bgs., £22.
Melbourne, 1 cs., £9.

BONE FERTILISER—
Hamburg, 4 t. 1 c., £57.

BONE MEAL—
Antwerp (in transit), 25 t., £200.

BORAX—
Bombay, 4 c., £19.; Delagoa Bay, 2 c., £5.; Durban, 10 c., £22.; Irish Free State, 1 c., £5.; Petrograd, 10 t. (F.), £245.; Petrograd, 5 t. 9 c., £120.; Pt. Elizabeth, 1 t., (F.) £15.; Rotterdam, 2 t. 10 c. (F.), £65.

BORIC ACID—
Bolivar, 4 c. (F.), £10.; Buenos Ayres, 2 t., £108.; Canton, 2 c., £7.; Colombo, 3 c., £18.; Demerara, 3 c., £9.; Dominica, 1 c., £5.; New Plymouth, 1 c., £9.

CALCIUM HYDRATE—
Brussels, 10 bgs., £48.

CALCIUM SULPHATE—
Irish Free State, 5 cks., £23.

CHEMICALS (*otherwise undescribed*)
Alexandria, 10 cs., £22.; Antwerp, 2 cs., £81.; Switzerland, via Antwerp, 110 pkgs., £304.; Barbados, 4 pkgs. (pt.), £6.; Beira, 21 pkgs., £78.; Bombay, 22 pkgs. (pt.), 6 cs., £105.; Bourgas, 6 pkgs., £15.; Brisbane, 16 cs. (pt.), £298.; Broom, 7 pkgs., £116.; Buenos Ayres, 5 cs. (pt.), £23.; Calcutta, 22 cs. (pt.), £74.; Cape Town, 4 cs. (pt.), £18.; Christchurch, 4 cs. (pt.), £18.; Colombo, 23 pkgs. (pt.), £64.; Constanza, 50 pkgs., £125.; Dalny, 2 cs. (pt.), £5.; Delagoa Bay, 32 pkgs., £83.; Demerara, 6 pkgs., £10.; Demerara, 2 cs. (pt.), (F.), £6.; Durban, 12 pkgs., £30.; Durban, 2 pkgs., (F.), £6.; East London, 3 pkgs., £5.; Hamburg, 15 pkgs., £38.; Hong Kong, 5 cs., £87.; Irish Free State, 3 cs. (pt.), £11.; Jamaica, 1 cs., £9.; Karachi, 4 c., £27.; Kilindini, 1 cs., £16.; Lourenco Marques, 2 pkgs., £5.; Madras, 13 cs. (pt.), £42.; Malta, 5 pkgs., £10.; Mossel Bay, 1 pkg., £5.; Nairobi, 9 pkgs., £11.; New York, 3 cs. (pt.), £8.; Pt. Elizabeth, 1 cs. (F.), £8.; Pt. Elizabeth, 4 pkgs., £6.; Pt. Said, 5 cs., £15.; Rangoon, 10 pkgs., £14.; Ronneby, 100 pkgs., £250.; Shanghai, 18 pkgs. (pt.), £43.; Singapore, 9 cs. (pt.), £20.; St. Lucia, 3 cs., (pt.) £33.; Sydney, 12 cs. (pt.), £130.; Trinidad, 10 cs. (pt.), £25.; Wellington, 7 pkgs., (pt.) £27.; Zanzibar, 28 pkgs. (pt.), £14.

CITRIC ACID—
Calcutta, 2 c., £18.; Dunedin, 3 c., £18.; Durban, 16 c., £128.; East London, 3 c., £24.; Hong Kong, 4 c., £30.; Sydney, 10 c., £75.; Timaru, 1 c., £17.; Toronto, 1 t., £183.

COAL TAR PRODUCTS—
Carbolic Acid
Calcutta, 2 cs., £22.; Mauritius, 10 drms., £17.; Singapore, 2 cs., £9.

Creosote
Pt. of Spain, 5 brls., £21.
Sydney, 2 cts., £7.

Naphthalene
Antwerp, 1,000 bgs., £1,010.; Irish Free State (F.), 5 brls., £7.; Lagos, 5 cs., £7.

Pitch
Antwerp (bulk), 160 t., £983.; Dunkirk (bulk), 2,107 t., £14,135.; France (bulk), 470 t., £2,471.; Durban, 4 brls., £14.; Ferrol, 10 bxs., £26.; Genoa, 15 brls., £53.; Irish Free State, 20 drms., £10.; Napier, 4 cks., £6.; Pt. Said, 200 pkgs., £253.

Tar
Alexandria, 61 brls., £123.; Cape Town, 200 drms., £19.; Durban, 350 drms., £69.; Pt. Elizabeth, 80 drms., £11.

COBALT ACETATE—
Amsterdam, 1 cs., £21.
Copenhagen, 1 cs., £25.
Esbjerg, 1 cs., £25.

COBALT CHLORIDE—
Sydney, 6 cs., £98.

COBALT OXIDE—
Delagoa Bay, 1 cs., £7.
Genoa, (F.), 6 pkgs., £680.
Seville (F.), 3 pkgs., £135.

COLOURS (*otherwise undescribed*)—
Bombay, 1 cs., £6.

COPPER SALTS (*otherwise undes.*)
Sydney, 1 cs. (pt.), £6..

COPPER SULPHATE—
Delagoa Bay, 1 t. 3 c., £34.
Durban, 15 c., £25.
Jamaica, 100 t., £1,450.
Sydney, 3 c., £5.

CREAM OF TARTAR—
Calcutta, 1 c. (F.), £10.; Cape Town, 2 c. (F.), £14.; Durban, 1 c., £6.; Durban, 9 c. (F.), £59.; Karachi, 2 c., £12.; Karachi, 1 c. (F.), £6.; Pt. Elizabeth, 3 c., (F.), £19.; Pt. Said, 3 c., £13.; Sydney, 1 t., £86.

DISINFECTANTS (*otherwise undes.*)
Aden, 11 c., £37.; Bangkok, 8 t. 17 c., £299.; Berbice, 7 c., £15.; Bombay, 3 t., £71.; Calcutta, 2 t. 12 c., £129.; Cape Town, 18 t. 11 c., £684.; Christchurch, 4 t. 19 c., £730.; Colombo, 1 t. 6 c., £34.; Delagoa Bay, 5 t. 16 c., £215.; Dunedin, 3 c., £39.; Durban, 8 t. 13 c., £340.; Hong Kong, 12 c., £25.; Irish Free State, 9 c., £27.; Kilindini, 4 c., £13.; Mauritius, 16 c., £43.; New Plymouth, 15 c., £145.; Paris, 4 t. 12 c., £75.; Penang, 2 t. 2 c., £75.; Pt. Sudan, 2 t. 6 c., £49.; Rangoon, 4 c., £5.; Sekondi, 4 c., £11.; Singapore, 12 t. 5 c., £411.; St. Lucia, 1 c., £9.; Sydney, 5 c., £41.; Toronto, 3 c., £40.; Vancouver, 1 t. 14 c., £60.; Wellington, 7 t. 8 c., £472.; Zanzibar, 4 c., £8.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 20 kgs., £170.
Madras, 1 kg., £9.

Unspecified
Adelaide, 1 cs., £6.; Adelaide (F.), 1 cs., £19.; Brussels, 2 kgs., £23.; Delagoa Bay, 4 pkgs., £55.; Dunedin, 1 kg., £9.; Durban, 1 cs., £11.; Melbourne, 8 pkgs., £714.; Sydney, 1 kg., £12.; Wellington (F.), 1 kg., £14.

ETHER—
Pt. Said, 10 cs., £23.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 99 t. 4 c., £961.; Irish Free State, 5 c., £6.; New York, 2 t., £51.

HYPOPHOSPHITE OF LIME—
Genoa, 8 cs., £149.

HYPOPHOSPHITE SALTS—
Paris, 5 cs., £71. (*otherwise undes.*)

IODIDES (*otherwise undescribed*)—
Shanghai, 1 cs. (pt.), £86.

IODINE—
Athens, 1 cs., £53.; Alexandria, 5 cs. (pt.), £5.; Calcutta, 1 cs., £26.; New York, 1 cs., £11.; Paris, 1 t., £26.; Sydney, 1 cs., £105.

FORMALDEHYDE—
Calcutta, 5 cs., £13.; Rio de Janeiro, 2 cs., £10.; Trinidad, (F.), 8 cs., £29.

GLYCERINE—
Bangkok, 1 c., £6.; Bombay, 2 cs., £6.; Calcutta, 2 c., £17.; Demerara, 2 c., £9.; Hong Kong, 1 c., £6.; Madras, 2 c., £10.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
New York, 1 cs. (pt.), £7.

GUANO—
Demerara (F.), 50 t., £813.

HYDROCHLORIC ACID—
Calcutta, 6 c., £11.

HYDROGEN PEROXIDE—
Irish Free State, 2 cs., £31.

IODINE (RESUBLIMED)—
Bombay, 4 cs., £439. ; Brisbane, 3 cs. (pt.), £5. ; Buenos Ayres, 1 cs., £118. ; Karachi, 2 cs. (pt.), £5. ; Melbourne, 1 cs., £53.

IRON AMMONIUM CITRATE—
Bombay, 8 cs. (pt.), £20. ; Calcutta, 2 cs., £11. ; Shanghai, 1 cs., £6.

IRON PERCHLORIDE -
Sydney, 5 drms., £7.

IRON SULPHIDE—
Melbourne, 4 drms., £7.
Sydney, 3 drms., £5.

KIESELGUHR—
Rio de Janeiro (F.), 1 t. 1 c., £18.

LEAD ACETATE—
Buenos Aires, 1 ck., £7.
France, 4 cks., £46.
Sydney, 1 cks., £15.

LEAD ARSENATE—
Durban, 1 cs., £6.
Sydney, 20 kgs., £50.

MAGNESIA—
Brisbane, 4 cs., £10. ; Havana, 2 cs., £56. ; Lyttleton, 10 cs., £24. ; New Plymouth, 15 cs., £36. ; Wellington, 10 cs., £24.

MAGNESIA (CALCINED)—
Buenos Ayres, 3 cs. (pt.), £21. ; Sydney, 1 cs., £5. ; Wellington, 1 cs., £5.

MAGNESIUM CARBONATE—
Bombay, 3 cs., £14. ; Havana, 1 cs., £7. ; Rio de Janeiro, 4 cs., £16. ; Sydney, 7 cs. (pt.), £15.

MAGNESIUM CITRATE—
Havana, 1 cs., £8.

MAGNESIUM SULPHATE—
Auckland, 16 c., £19. ; Barbados, 9 c., £18. ; Bombay, 5 c., £6. ; Calcutta, 3 c., £8. ; Cape Town, 13 c., £16. ; Co.mbo, 1 t., £14. ; Delagoa, 6 c., £8. ; Durban, 1 t. 12 c., £40. ; Irish Free State, 1 t., £16. ; Jaffa, 1 t., £26. ; Karachi, 7 c., £12. ; New Plymouth, 1 t. 3 c., £27. ; Pt. Elizabeth, 16 c., £21. ; The Bluff, 1 t. 5 c., £28. ; Timaru, 1 t. 10 c., £33. ; Trinidad, 2 t. 1 c., £25. ; Wanganui, 6 c., £8. ; Wellington, 5 t., £111.

MANGANESE BORATE—
Antwerp, 6 c., £17.

MANGANESE DIOXIDE—
Bilbao, 9 cks., £97.

MERCURY BICHLORIDE—
Havana, 1 cs., £14.
Melbourne, 1 cs., £20.

MERCURY CHLORIDE—
Habana, 1 cs. (pt.), £9.
Havana, 2 cs., £38.

MERCURY SUBCHLORIDE—
Sydney, 1 cs. (pt.), £6.

NICKEL SALTS (*otherwise undes.*)—
Sydney, 11 cs. (pt.), £34.

NITRIC ACID—
Calcutta, 2 c., £7.

PARALDEHYDE—
Sydney, 1 cs., £6.

POTASSIUM CARBONATE—
Cape Town (F.), 4 kgs., £8.

POTASSIUM CITRATE—
Bombay, 2 cs. (pt.), 2 cs., £39. ; Calcutta, 2 cs., £19. ; Melbourne, 2 cs., £19. ; Wellington, 2 cs., £11.

POTASSIUM CYANIDE—
Brisbane, 3 cs. (pt.), £5.
Switzerland, 1 cs., £6.

POTASSIUM FLUORIDE (ANHYDROUS)—
Napier, 1 cs., £15.

POTASSIUM IODIDE—
Addah, 2 cs., £29. ; Antwerp, 1 cs., £86. ; Bangkok, 3 cs., £289. ; Bombay, 6 cs., £455. ; Brisbane, 3 cs. (pt.), £9. ; Buenos Ayres, 1 cs., £46. ; Colombo, 1 cs. (pt.), £22. ; Demerara, 1 cs. (pt.), £12. ; Durban, 1 cs. (pt.), £24. ; Rio de Janeiro, 2 cs., £190. ; Trinidad, 1 cs. (pt.), £6.

POTASSIUM NITRATE—
Zanzibar, 28 pkgs. (pt.), £9.

POTASSIUM PERMANGANATE—
Melbourne, 7 kgs., £37. ; Paris, 2 kgs., £10. ; Sydney, (F.) 5 cs., £16.

POTASSIUM PRUSSIATE—
Antwerp, 5 cks., £89. ; Paris, 28 pkgs., £297. ; Rouen, 5 kgs., £48.

PRUSSIAN BLUE—
Melbourne, 1 cks., £98.
Paris, 4 cks., £154.

ROCHELLE SALTS—
Montreal, 3 c., £20.

SALAMMONIAC—
Callao, 2 cks., £14.

SALICYLATES (*otherwise undes.*)—
Cape Town, 1 cs. (pt.), £10.
Sydney, 3 cs. (pt.), £33.

SALTPETRE—
Adelaide, 1 t., £41. ; Auckland, 1 t., £42. ; Beira, 5 c. (F.), £9. ; Copenhagen, 7 c., £54. ; Durban, 2 t. 9 c., £112. ; East London, 16 c., £35. ; Irish Free State, 5 c., £20. ; Pt. Elizabeth, 1 t. 2 c., £48. ; Santos, 1 t. 5 c., £19. ; Seychelles, 5 c., £11. ; Zwolle, 1 t., £45.

SHEEP DIP—
Buenos Ayres, 3 t. 19 c., £200. ; Durban, 10 t. 6 c., £474. ; Irish Free State, 18 c., £24. ; Pt. Elizabeth, 1 t. 7 c., £62.

SILVER NITRATE—
Beira, 1 cs. (pt.), £10.

SODIUM ARSENITE—
Delagoa Bay, 2 t. 18 c., £208. ; Durban, 4 t. 9 c., £308. ; Pt. Elizabeth, 1 t. 2 c., £81.

SODIUM BENZOATE—
Calcutta, 9 c., £117.
Paris, 2 c., £30.

SODIUM BICARBONATE—
Brussels, 9 c., £13. ; Calcutta, 2 t. 1 c., £121. ; Cape Town, 10 c., £15. ; Durban, 2 t. 16 c., £79. ; East London, 14 c., £20. ; Karachi, 2 c., £6. ; Melbourne, 6 c., £6. ; Pt. Elizabeth, 2 t., £60. ; Seville, 4 c., £8.

SODIUM BISULPHITE—
Amsterdam, 5 t., £107. ; Buenos Ayres, 10 t., £213. ; Paris, 1 t., £26. ; Rotterdam, 5 c., £20.

SODIUM CARBONATE—
Singapore, 4 c., £7.
Zanzibar, 9 c., £6.

SODIUM CITRATE—
Bombay, 1 c., £6.
Calcutta, 2 c., £16.

SODIUM HYPOPHOSPHITE—
Bombay, 1 c., £10. ; Calcutta, 8 c., £8. ; Genoa, 4 c., £86. ; Madras, 10 c., £9.

SODIUM HYPOSULPHITE—
Shanghai, 5 c., £6.

SODIUM IODIDE—
Bombay, 1 cs. (pt.), £25.
Sydney, 1 cs. (pt.), £25.

SODIUM PRUSSIATE—
Genoa, 10 t. 1 c., £467.
Hamburg, 10 c., £25.

SODIUM SALICYLATE—
Colombo, 1 c., £12.
Demerara, 1 c., £16.
Singapore, 1 c., £7.

SODIUM SILICATE—
Durban, 3 c., £6.

SODIUM SULPHATE—
Auckland, 3 kgs., £6.
Bombay, 2 c., £20.

SODIUM SULPHIDE—
Sydney, 1 c., £7.
Wellington, 18 t. 9 c., £240.

SODIUM TARTRATE—
Sydney, 10 c., £36.

SPENT OXIDE—
France, 185 t., £322.

SULPHUR—
Auckland (F.), 1 t. 19 c., £19.

SULPHUR (FLOWERS)—
Cape Town (F.), 10 c., £6.

SULPHURIC ACID—
Amsterdam, 17 c., £65. ; Channel Islands, 8 c., £19. ; Colombo, 1 c., £8. ; Shanghai, 2 c., £5.

SUPERPHOSPHATE—
Channel Islands, 135 t., £347.

TANNIC ACID—
Shanghai, 7 cks. (pt.), £11.

TARTARIC ACID—
Durban, 9 c., £64. ; Durban, 2 c. (F.), £18. ; Hong Kong, 4 c., £24. ; Karachi, 1 c., £8. ; Montreal, 15 c., £120. ; Pt. Antonio, 2 c., £14. ; Timaru, 1 c., £33. ; Toronto, 1 t. 6 c., £173.

ZINC CHLORIDE—
Haiphong, 10 drms., £19.
Sydney, 2 cs., £9.

ZINC OXIDE—
Aalesund, 20 cks., £38. ; Cape Town, 2 kgs., £7. ; Copenhagen, 185 cks., £659. ; Durban, 20 bgs., £46. ; Paris, 10 cks., £43. ; Wellington, 9 bgs., £26.

Week ending November 21.

CARNAUBA WAX—
Paris, 12 c.

DYESTUFFS (NATURAL)—
Cochineal
Delagoa Bay, 2 c.

FERRO VANADIUM—
Paris, £460.

FULLER'S EARTH—
Constanza, 30 t. ; Galveston, 170 t. ; Marseilles, 6 t.

GLUE, SIZE, AND GELATINE—
Bombay, 5 t. ; Demerara, 2 c. ; Durban, 1 t. 6 c. ; Dunkirk, 2 t. ; Kilindini, 2 c. ; Kobe, 5 t. 5 c. ; Madras, 1 c. ; Melbourne, 1 t. 7 c. ; Montreal, 2 t. ; Napier, 1 c. ; Panama, 5 c. ; Pt. Elizabeth, 1 t. ; Paris, 10 t. 9 c. ; Pt. Said, 1 c. ; Rotterdam, 9 c. ; Shanghai, 1 c. ; Sydney, 2 c. ; V'couver, 9 c.

ISINGLASS—
Hiogo, 6 c.

LEAD RESIDUE—
Antwerp, 7 t.

MINERAL WAX—
Brussels, 1 t. ; Christiania, 1 t. ; Irish Free State, 5 c.

PLUMBAGO—
Hong Kong, 2 t. ; Rangoon, 2 t.

QUININE—
Amoy, 1,100 oz. ; Calcutta, 1,200 oz. ; Colombo, 900 oz. ; Karachi, 344 oz. ; Kilindini, 44 oz. ; Melbourne, 1,072 oz. ; Mombasa, 250 oz. ; Rangoon, 100 oz. ; Tanga, 80 oz.

SALT—
Alexandria, 3 c. ; Hobart, 2 t. 5 c. ; Hong Kong, 2 c. ; Kilindini, 6 c. ; Launceston, 4 t. 3 c. ; Madras, 1 t. 5 c. ; Mombasa, 3 c. ; Pernambuco, 5 c. ; Rangoon, 8 c.

SOAP—
Aden, 4 c. ; Alexandria, 11 c. ; Auckland, 1 c. ; Bangkok, 10 c. ; Beira, 5 c. ; Bombay, 1 t. 2 c. ; Colombo, 5 c. ; Dunedin, 1 c. ; Hankow, 3 c. ; Irish Free State, 8 c. ; Karachi, 5 c. ; Kilindini, 3 c. ; Launceston, 1 t. ; Madras, 3 c. ; Malta, 1 c. ; Mombasa, 9 c. ; Montreal, 3 t. 3 c. ; Piraeus, 2 t. ; Perth, 1 c. ; Pt. Elizabeth, 16 c. ; Pt. Harcourt, 2 t. ; Pt. Sudan, 3 c. ; Riga, 1 c. ; Rotterdam, 7 c. ; Singapore, 2 c. ; Toronto, 16 c. ; Trinidad, 3 t. 3 c. ; Valparaiso, 1 t. 15 c. ; Zanzibar, 1 c.

STEARINE—
Shanghai, 1 t. 10 c.

TALLOW—
Harlingen, 2 t. 11 c. ; Nantes, 25 t. ; Pasages, 84 t. 18 c. ; Paris, 9 t. 12 c. ; Rotterdam, 23 t. 14 c.

WAX (*otherwise undescribed*)—
New York, 2 t.

WHITE LEAD—
Auckland, £36. ; Bombay, £110. ; Buenos Ayres, £86. ; Cape Town, £14. ; Dunedin, £187. ; East London, £15. ; Grenada, £6. ; Hobart, £64. ; Jamaica, £90. ; Melbourne, £551. ; Mollendo, £8. ; Napier, £251. ; Pt. Elizabeth, £9. ; Shanghai, £130. ; Sydney, £86.

ZINC ASHES -
Antwerp, 5 t.

MANCHESTER.

Week ending November 23.

ALUM—
Canada, 133 brls.

AMMONIUM SALTS (*otherwise undescribed*)
Marseilles, 10 cks.

CHEMICALS (*otherwise undescribed*)
Canada, 28 drms.
Copenhagen, 15 cks.
Montreal, 21 cs.

COAL TAR PRODUCTS—
Unspecified
Sweden, 1 drm.
U.S.A., 400 bgs.

DYESTUFFS (ARTIFICIAL)
Unspecified
Switzerland, 71 drms., 11 cks.

GLUE—
Canada, 10 bgs.
Montreal, 300 bgs.

SALT—
Ghent, 4,000 sks.
Montreal, 4,000 sks.

SIZE—
Belgium, 2 cks.

SOAP—
Cairo, 31 cs.
Montreal, 14 cs.

SODIUM CYANIDE—
Sydney, 10 cs.

NEWCASTLE-ON-TYNE

Week ending November 21.

ALUMINA—
Antwerp, 200 bgs.
Hamburg, 500 bgs.

ANTIMONY—
Antwerp, 85 cks., 205 kgs.
Hamburg, 1 kg., 1 cs.
Rotterdam, 1 ck.

BLEACHING POWDER—
Gothenburg, 274 cks.
Rotterdam, 346 cks.

CAUSTIC SODA—
Bergen, 104 drms.
Gothenburg, 132 drms.

COPPER RESIDUE—
Hamburg, 25 bgs.

COPPER SUBOXIDE—
Bergen, 5 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bergen, 3 kgs.

GLUE—
Antwerp, 202 cks., 20 bgs.

LEAD SULPHATE—
Antwerp, 110 cks.

LITHARGE—
Antwerp, 40 cks., 10 kgs. ; Gothenburg, 20 cks. ; Hamburg, 56 kes., 80 kgs. ; Rotterdam, 12 cks., 12 pkgs.

MAGNESIA—
Antwerp, 140 bgs., 118 cs., 5 cks.
Portland Maine, 51 cs.

RED LEAD—
Antwerp, 350 kgs., 31 cks.
Gothenburg, 70 cks.
Hamburg, 70 kgs., 77 cks.
Rotterdam, 60 kgs., 260 cks.

SOAP—
Antwerp, 5 t. 5 c.
Gothenburg, 784 cs.

SODIUM SULPHITE—
Antwerp, 150 t., 7 cks.

WHITE LEAD—
Antwerp, 88 cks., 530 kgs. ; Hamburg, 65 cks., 10 kgs. ; Portland, 200 pkgs. ; Rotterdam, 106 cks.

ZINC ASHES—
Antwerp, 261 bgs.
Hamburg, 10 bgs.

N. & S. SHIELDS.

Week ending November 21.

NIL.

PRICES CURRENT.

WEDNESDAY, NOV. 28. 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	£3- / &	46/-	
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	90	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	5
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	4	0
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	1½
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9
Anthracene, 40/45%, "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	4
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	2
Creosote	*gallon	0	0	9½
Cresylic Acid, 95%	*gallon	0	2	3
Naphtha, crude, 30%	*gallon	0	0	9
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	6	7	6
Pyridin	gallon	1	3	0
Tar, crude	ton	4	10	0
Tar, refined	barrel	2	4	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	10	10	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	15	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	70	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	11	5	0
Bleaching Liquor, 7%	*ton	4	5	0
Calcium Chloride	†ton	5	10	0
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	81	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	0	0
Formaldehyde, 40%	ton	64	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*†ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	2	6
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	45	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	47	0	0
Lead Nitrate	ton	44	0	0
Lime Acetate (brown)	*ton	14	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	5	0
Litharge (British)	ton	45	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	1	16	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	0	0
Magnesium Sulphate, B.P.	ton	6	0	0
Manganese Borate, 85%	ton	112	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	3	1
Naphtha (Wood), Solvent	*gallon	0	5	9
Naphtha (Wood), Miscible, 60° p.	gallon	0	5	9
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	30	0	0
Potassium Chlorate	lb.	0	0	3¼
Potassium Hydrate (Caustic Potash), 88/90%	ton	38	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	34	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	20	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8½
Potassium Prussiate (yellow)	lb.	0	0	9¼
Potassium Prussiate (red)	lb.	0	2	6
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	55/- &	52/3	
Sodium Acetate	ton	24	0	0
Sodium Arsenate, 45%	ton	45	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	3
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	15	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	28	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	14	10	0
Sodium Prussiate	lb.	0	0	5½
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Salteake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	10	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	0	0
Sulphur (Roll Brimstone)	ton	8	0	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	3½
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	42	0	0
Copper	ton	62	7	6
Lead (Chemical Sheet), delivered	cwt.	1	17	6
Lead (Foreign Pig)	ton	30	15	0
Nickel	ton	130	0	0
Silver	oz.	0	2	8 1/16
Tin, English Ingots	ton	233	0	0
Zinc (Spelter)	ton	33	5	0
Zinc Dust, 90/92%	ton	46	0	0
OILS.				
Cottonseed	*ton	44	0	0
Linseed, Raw	*ton	46	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	40	0	0
Turpentine	cwt.	3	12	9

* *Packages extra or returnable*; otherwise prices usually include packing.

† Makers' prices for home consumption only

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
Leucite and the Fixation of Nitrogen	667
Fine Chemicals and Rubber Manufacture	668
Silicate of Soda in Road Construction	668
Co-operation between Chemical Societies	668
Electrolytic Methods in Organic Chemistry	669
Chemical Manufacture in Russia	672
Organic Vulcanisation Accelerators	673
The Chemistry of Rubber	674
The Trade and Industry of the Dutch East Indies	675
Concentrated Hydrogen Peroxide	676
The Chinese Dyestuffs Market	676
Notes on the Italian Chemical Industry	677
The Decay of Building Stone	677
Items of Interest	678
Coming Events	679
Correspondence	680
Stock and Share List	680
Gazette News	681
Fertiliser News	681
Reports of Companies	683
Cumberland Coking and By-product Industries	683
Thirty-five Years Ago	683
Chemical Trade of the Netherlands	683
Trade Inquiries	684
New Companies	684
The Patent List:—	
Applications for British Letters Patent	684
Complete Specifications Accepted	684
Complete Specifications Open to Public Inspection before Acceptance	684
Abstracts of Latest Complete Specifications	684
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	685
Publications Received	685
Market Reports:	
London "Open Market" Report	685
Italian Chemical Market	687
London Metal Market	687
Manchester Chemical Market	688
Swansea Market Report	688
Liverpool Chemical Market	688
West of Scotland Chemicals	689
Imports of Chemical Products	689
Exports of Chemical Products	692
Prices Current	696

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CURRENT TOPICS.

LEUCITE AND THE FIXATION OF NITROGEN.

THE unique potentialities of Italian leucite as a raw material for chemical manufacture, which were brought to the notice of the British chemical industry by Professor Hinchley a fortnight ago, have aroused the keenest interest, and it is only natural to suppose that investigations on the material will be commenced in this country. Meanwhile Italy possesses a commanding lead, both in the scientific investigation and the industrial exploitation of the mineral. In addition to the various plants described by Professor Hinchley, we now learn that the manufacture of potassium nitrate from leucite is to be commenced under the auspices of Dr. Carlo Rossi, the well-known Italian chemical engineer. A company with a capital of four and a half million lire has been formed, and is erecting a factory at Civita Castellana for this purpose. It is anticipated that the factory will be in full operation by the spring of next year and that a daily production of ten tons of pure potassium nitrate will be realised. The method to be adopted is the decomposition of the potassium-aluminium silicate by treatment of the mineral with a solution of sodium nitrate under a pressure of 25 atmospheres, and the separation of the resultant potassium nitrate by fractional crystallisation. Professor Hinchley foreshadowed the elaboration of a method of utilising leucite whereby the fixation of atmospheric nitrogen and the conversion of the potash into the soluble form could be simultaneously accomplished. It appears that considerable work to this end has already been carried out, the most recent being that of Professors Montemartini and Lósana, of Turin, who have worked out a method, the principal feature of which is the heating of an intimate mixture of finely ground leucite and carbon in a current of nitrogen. By this operation the whole of the potash is volatilised, mainly, it appears, in the form of metallic potassium, but a small amount is obtained as potassium cyanide. The alumina is converted wholly into aluminium nitride, from which ammonia and aluminium compounds are obtained by the well-known process. From experiments that have been carried out on the semi-large scale, excellent yields are to be expected from the process. The construction of the furnace, however, presents difficulties from the points of view of large-scale and continuous working. For the reaction to be successful the mass of the original mixture must be raised to a temperature of at least 2,000° C., and the problem of

constructing a furnace capable of withstanding the severe conditions of the process without undergoing too rapid depreciation is yet to be solved. This proved the main stumbling block in the original aluminium-nitride process of nitrogen fixation, but once the problem is attacked in earnest by the chemical engineer, there can be little doubt that its eventual solution will be forthcoming.

FINE CHEMICALS AND RUBBER MANUFACTURE.

It is just about eighteen months ago that the British Dyestuffs Corporation added organic accelerators of rubber vulcanisation to the list of its manufactures, but from the details given by Major Lefebure before the Institution of the Rubber Industry on Monday night, it is evident that the venture has met with marked success. Experience has shown that of the multitudinous accelerators now on the market, para-nitroso-dimethylaniline, diphenylguanidine, triphenylguanidine, hexamethylene tetramine, and aldehyde-ammonia are, in general, the most serviceable, and these products are among those at present being made by the Corporation. In the past the manufacture of organic accelerators has been wholly in the hands of comparatively small firms, and while the credit for the greater part of the pioneer work in educating the British rubber manufacturer to the manifold advantages of accelerated vulcanisation must be accorded these smaller firms, yet the entry of the dyestuffs-making industry into the field has probably been an inevitable development. It was in the laboratories of the Bayer Company that the value of piperidine as a vulcanisation accelerator was discovered in 1912, and the impetus given to the search that has since proved so fruitful. It is interesting to note that as a result of investigations by the Dyestuffs Corporation, the exceptional all-round value of para-nitroso-dimethylaniline as an accelerator has been confirmed. The activity of this product, it may be remembered, was discovered by Peachey in 1914, and its action in rubber vulcanising seems to differ from that of the other accelerators in that it is directly connected with the nitroso group, and is not a function of basicity. By putting on the market accelerators of standard and guaranteed purity, the dyestuffs industry is undoubtedly rendering a great service to the British rubber industry. At the same time it must not be overlooked that the application of the accelerators is by no means so simple a matter as the application of dyestuffs, and that their successful employment depends to a large extent upon the patience and perseverance of the user in finding the accelerator which best serves his purpose. Not only does the composition of the rubber mix, but also the method and temperature of vulcanisation, influence the activity of the accelerator. A list of the comparative activities of the various accelerators in a mixing composed wholly of rubber and sulphur, useful as it may be as a general guide, does not do away with the necessity for the user carrying out what in the majority of cases prove to be lengthy experiments to determine the most suitable accelerators for his own manufacturing practice. Still, there is no doubt that in the past the uncertain purity of some of the organic accelerators has been a bar to their extended use by British rubber manufacturers, and that the standardisation of the products in the hands of our largest dyestuffs manufacturing firm will prove of great assistance to our rubber industry.

SILICATE OF SODA IN ROAD CONSTRUCTION.

The recognition of the value of sodium-silicate solutions for adhesive purposes has extended considerably the field of application of the material. It seems now, however, that a new use for the product has been discovered, which should lead to the consumption of much larger quantities of silicate than could possibly be the case with even the widest use of silicate-containing adhesives. We refer to the employment of sodium-silicate solutions for the surface treatment of concrete roads. In the United States some thousands of square yards of concrete have been treated with success. The method used has been to spray the clean road several times with a very dilute solution, allowing the surface about 24 hours in which to dry between each successive application. What apparently happens is that the hydrated lime liberated during the setting of the cement reacts with the sodium silicate to give a calcium silicate, which hardens rapidly and effectively. The result is the formation on the road surface of a hard non-porous layer, not only highly resistant to abrasion and dusting, but also perfectly waterproof. We believe that the process has been tried in Great Britain, but that the results have not been very satisfactory, and that in consequence a considerable amount of prejudice exists in the matter. It is now contended, however, that these failures were resultant upon an unsuitable silicate and wrong methods of application. Thus, whereas ordinary commercial waterglass contains approximately two parts of silica to one part of soda, for concrete road work a much higher percentage of silica in the product is necessary. We understand that Brunner, Mond and Company, who within recent months have given particular attention to this subject are now putting on the market a brand of sodium silicate specially adapted for roadwork. Roads treated with silicate will not, it is believed, require further treatment with tar, and increased supplies of the latter material should be available for the patent-fuel makers of South Wales.

CO-OPERATION BETWEEN CHEMICAL SOCIETIES.

Glancing through a heap of old papers the other day, we came across the programme of a joint conversazione and reception held on July 8, 1885, by the presidents of the Chemical Society, the Institute of Chemistry, and the Society of Chemical Industry, at the Royal Institute of Painters in Water Colours. We wonder how many of those who were present on that occasion are still with us, and what their views are on the progress that has been made towards closer co-operation between the three societies concerned during the last thirty-eight years.

ELECTROLYTIC METHODS IN ORGANIC CHEMISTRY.

PROCESSES WITH COMMERCIAL POSSIBILITIES.

By "Investigator."

ALTHOUGH Kolbe's pioneer preparation of ethane by the electrolysis of potassium-acetate solution dates from as far back as 1849, very little further progress had, until quite recently, been made in the field of electro-synthesis. Other types of process, however, have from time to time received much attention, and resort was had to electrolytic methods in order to meet the war-time demands for acetic acid and related materials.

In the past, many of the comprehensive claims advanced for organic electrolytic processes have, on examination, proved unfounded—a result attributable in part to the insufficient description of the large number of factors controlling the course of these processes. In this connection the exhaustive elucidatory studies of Fichter and his co-workers should be of great assistance.

Synthesis of Dibasic Acids and Their Derivatives.

Kolbe's original method has been extended by Sir J. Walker to the synthesis of complex dibasic acids. Thus by the electrolysis of sodium ethyl malonate $NaOOC.CH_2.COOEt$, ethyl succinate $EtOOC.CH_2.CH_2.COOEt$, is formed, and, from the mono-sodium derivative of this, by repeating the process, adipic ester $EtOOC.(CH_2)_4.COOEt$, may be prepared. In general, the electrolysis may be formulated as follows:—

$$2NaOOC.(CH_2)n.COOEt = 2Na + 2CO_2 + EtOOC.(CH_2)2n.COOEt.$$

Applying this synthesis to the potassium ethyl ester of azelaic acid, where n is 7, the acid of the resulting ethyl ester, which contains 14 (CH_2) groups, proved to be identical with the thapsic acid occurring in juniper berries (*Biochem. Z.*, p. 75, 1920). Up to the present, owing to conductivity difficulties connected with the soap-like nature of the more complex compounds, the synthesis has not been successful with the ester containing 16 (CH_2) groups, while useful results with aromatic compounds are yet wanting.

Willstätter has utilised this method in order to prepare tropine derivatives, the basic substances of the atropine, cocaine, and scopolamine alkaloids (*Ger. Pat.* 300,672, of 1917). Starting with citric acid, the potassium ethyl ester of acetone dicarboxylic acid $CO_2Et.CH_2.CO.CH_2.CO_2K$, is first prepared. From two molecules of this, by electrolysis in neutral solution, the ethyl ester of succinyl diacetic acid $CO_2Et.CH_2.CO.CH_2.CH_2.CO.CH_2.CO_2Et$ results, a product which combines with ammonia and amines to form derivatives containing the pyrrole ring. Thus the product of the reaction with methylamine readily yields tropinone.

The products of the electrolysis of the zinc, lead, and sodium salts of the fatty acids in the molten state approximate closely to those from their aqueous solutions, but the yields are much smaller (Petersen, *Z. Elektrochem.*, 1914). Unsaturated hydrocarbons result from the electrolysis of unsaturated acids. An instance of this is potassium citraconate $CO_2K.CH = C.CH_3.CO_2K$, which, in feebly acid solution, gives oxygen, carbon dioxide, and allylene $CH \equiv C.CH_3$, as anode products (Henrich and Schenk, *Berichte* 1919).

Electro-Chemical Chlorination.

Many cases of so-called electrolytic chlorination are simply processes for the direct utilisation of electrolytic chlorine. A case in point is the production of chlor-hydrocarbons by mixing olefine-containing gases with the liberated chlorine; or the anode may be maintained in an atmosphere of the unsaturated gases (*U.S. Pats.* 1,264,535-6, of 1918). For the preparation of chlorhydrins, a mixture of steam and oil-gas is blown into the anode chamber of an alkali cell with its contents at the boiling-point, and the vapours condensed. In another method, a liquid olefine is emulsified with the anode-salt solution, any chlorhydrin being removed subsequently by distillation with steam (*Brit. Pat.* 140,831, of 1917).

In a study of the progressive electro-chemical chlorination of aromatic hydrocarbons, Fichter and Glanzstein (*Berichte* 1916, pp. 2,473-2,487), worke! in a homogeneous medium. Their electrolyte consisted of benzene or toluene dissolved in glacial acetic acid containing hydrochloric acid, and their electrodes were of pla'inum With benzene, the products of progressive chlorination were chlorobenzene, *p*-dichlorobenzene, *symm.* tetrachlorobenzene, and hexachlorobenzene, the last-named product crystallising out practically pure. A point of interest is the formation of pentachloro-phenol by oxidation, if the chlorination is pushed beyond the tetrachlorobenzene stage. Some of the chloro-phenol reacts with the solvent to form a phenol acetate. Another oxidation product is chloranil (tetrachloro-quinone). Factors favourable to chlorination are high current density, low benzene concentration, and high temperature, while light is without appreciable effect.

On the contrary, with toluene, absence of light is essential, as otherwise complications ensue. Substitution takes place both in the nucleus and in the methyl group, but the latter is not affected until the ring has taken up at least three chlorine atoms. Here, again, there is a certain amount of oxidation, such products as 2.4.5-trichloro-3.6-dihydroxy-benzylidene chloride and hexachloro-benzene being present in the reaction product. Here, also, mention may be made of the electrolytic preparation of iodoform and bromoform, the former by the electrolysis of an aqueous alcoholic or acetone solution of sodium iodide, the latter from an aqueous-acetone solution of potassium bromide. Chloral may be obtained by the gradual addition of alcohol to the anode chamber of an alkali cell in action.

Formation of Quinones.

Quinones result from the anodic oxidation of benzene, naphthalene, and anthracene. In the case of benzoquinone, the benzene is allowed to rise through the electrolyte to the anode, whence the benzene solution of quinone is removed and continuously circulated through the cell until sufficiently concentrated for recovery. Similarly, by interchanging electrodes, it is possible to reduce the quinone solution to quinol (*U.S. Pat.* 1,322,580, of 1919). Another method is to oxidise an aniline-sulphate solution to quinone with the aid of small quantities of manganese sulphate (0.012 per cent.) or chromic acid. The latter is automatically regenerated in the anode compartment, it being only necessary to add about 5 per cent. of chrome alum at the start.

According to the detailed investigations of Ono (*J. Chem. Soc., Japan*, 1921), the products of the electro-chemical oxidation of naphthalene are naphthaquinone, phthalic acid, and a resinous substance, together with smaller quantities of α-naphthol and its compound with quinone. For the best results, the electrolysis should be carried out in the presence of acetone or acetic acid, with dilute sulphuric acid (1 acid : 4 water). Suitable current densities are 2 and 3 ampères per 100 sq. cms. for anodes of lead peroxide and platinum respectively. With a platinum anode, the yield of naphthaquinone increases with rise in temperature, but a lead peroxide electrode works best at ordinary temperatures. An increase in the current density leads to more oxidation, but does not result in a proportional yield of quinone. The oxidation is promoted by oxygen-carriers, a selection of these, arranged in diminishing order of effectiveness, comprising cerium nitrate, vanadic acid, potassium chlorate, potassium chromate, manganese sulphate, potassium ferrocyanide, and chrome alum.

Anthraquinone from Anthracene.

The formation of anthraquinone from anthracene constitutes the most important application in this field. In the absence of salts of chromium, vanadium, cerium, or manganese, there is no oxidation in a dilute sulphuric-acid medium, but under similar conditions as much as 80 per cent. of the anthracene will be oxidised when one of the above compounds is present.

According to Mollwo Perkin (*J. Soc. Dyers. Col.*, May, 1920), the most favourable conditions are as follows: 20 parts of anthracene paste (made by subliming the hydrocarbon with steam into cold water) are stirred with 1,000 parts of dilute sulphuric acid (20 per cent) by means of a lead cathode, which should be small in comparison with the anode. The electrolysis should be carried out in a lead cylinder which forms the anode, in the presence of chrome alum (15 per cent.), manganese sulphate (10 per cent.), or ceric sulphate (0.15 per cent.). Working at a temperature above 70° C., with a current density of 5 amps. per 100 sq. cms. at 2.8-3.5 volts, a current efficiency of almost 100 per cent. can be attained, a kilo. of anthracene requiring 1,000 ampère-hours according to theory. To prevent secondary changes, it is not profitable to carry the oxidation to an anthracene-content of less than 20 per cent. As carried out on the large scale in Germany, a vanadium salt is used as catalyst.

Oxidation of Toluene and Its Derivatives.

In the absence of a solvent, an emulsion of toluene and dilute sulphuric acid is completely oxidised to carbon dioxide and water. A similar result obtains with the xylenes. When acetone is present, however, and with a comparatively large platinum anode, there is a partial conversion to benzaldehyde and benzyl alcohol, a suitable electrolyte consisting of 50 parts toluene, 200 parts sulphuric acid (10 per cent.), and 275 parts acetone. Owing to the small yield, the process has not, up to the present, been commercially feasible.

An exhaustive study of this process has laid bare the complexity of its mechanism (Fichter and Uhl, *Helv. Chim Acta*, 1920, pp. 22-29). The successive products of the oxidation are benzyl alcohol and benzaldehyde. A portion of the latter is then converted into the highly oxygenated compound, dibenzylidene perox.de hydrate $C_6H_5CH(OH).O_2.(HO)$-CHC_6H_5, which, in turn, oxidises any unchanged aldehyde to benzoic acid The latter acid then undergoes a three-fold oxidation, one portion forming quinol, another salicylic acid, 2.5-dihydroxy- and 2.4.5-trihydroxybenzoic acid in successive stages, while the remainder yields quinone, 3.4-dihydroxy- and 2.4.5-trihydroxy acids, through the intermediate formation of *p*-hydroxybenzoic acid. From these, further oxidation products are possible.

By the anodic oxidation at 80° C. of *p*-nitrotoluene, the corresponding nitro-acid results. A suitable electrolyte for this process consists of 7½ parts of nitro-compound, 40 parts glacial acetic acid, and 20 parts of sulphuric acid. To catalyse the oxidation, the addition of 0.1 part of manganese sulphate is beneficial, while the current density should be 1.75 amp. per 100 sq. cms.

According to Plauson (*Brit. Pat.* 181,848, of 1921), substances of the nature of fatty acids may be prepared by the anodic oxidation of emulsions of mineral oil in alkali-bisulphate solutions containing a persulphate. For efficient oxidation, the anode should be of small size compared with the cathode, so that it can be maintained at a high temperature by the current. For general oxidations, the materials, as such or in solution, may be introduced into the anolyte through a tube, the end of which forms the anode.

The Rôle of Metallic Salts in Electrolytic Oxidations.

In order to elucidate the cause of the beneficial effect of small quantities of many metallic salts (the so-called "oxygen carriers") in electro-chemical oxidations, their action in the electrolytic formation of chlorates from alkali chlorides has been investigated (Schlötter, *Z Electrochem.*, 1921). One result of their presence is to minimise reduction at the cathode, and so to enhance the current efficiency. The effect of any salt was found to depend on its concentration and on the composition of the electrode. Thus with platinum electrodes concentrations of 0.5 and 0.21 gramme per litre of cupric chloride and lead peroxide respectively will totally eliminate cathodic reduction. On the other hand, an addition of 0.5 gramme stannous chloride per litre is without appreciable effect, although one-tenth of this amount results in considerable improvement.

In all probability, a network of metal is deposited on the cathode, the active favourable factor being the complex system, electrode metal—deposited metal—adsorbed hydrogen. This contention is supported by the following experimental results: (1) With a copper cathode, the amount of reduction is unaffected by copper salts, but diminished by iron salts; (2) with an iron cathode, copper salts exercise an unfavourable influence; (3) there is much more reduction with an iron than with a copper cathode. The beneficial effect of iron salts is attributed to the extensive adsorption of hydrogen by the electrolytically deposited metal (more than 100 times its own volume of hydrogen). A stable system thus arises, in which, moreover, the hydrogen is comparatively inactive.

The Oxidation of Phenolic Compounds.

By the anodic oxidation of α-naphthol at about 20° C. in the presence of acetone and dilute sulphuric acid (20 per cent.), using a lead peroxide anode and a lead cathode, Ono (*J. Chem. Soc. Japan*, 1921) obtained, as principal products, α-naphthaquinone, the compound of this with α-naphthol, and phthalic acid. αα-dinaphthol and the naphthol-quinone compound gave, on further oxidation, α-naphthaquinone and a mixture of this with phthalic acid respectively.

Vanillin is claimed as the main product of the electrolytic oxidation, at 60° C., of a 15-per-cent. solution of eugenol in excess caustic soda at a lead peroxide anode. A recent examination of this process by Lowy and Moore (*J. Amer. Electrochem. Soc.*, 1922) failed to substantiate this claim, as these investigators obtained for the most part only resinous products. In this connection, the preparation of purpurogallin from pyrogallol by A. G. and F. M. Perkin may be mentioned. This dyestuff, which gives alizarin-like shades with mordants, is obtained by the electrolytic oxidation of the above phenol in presence of sodium sulphate.

Salts of hydroxy acids result from the electrolysis of a fused mixture of the cresols and caustic soda (Pomilio, *Brit. Pat.* 103,709 of 1916). Thus, to prepare salicylic acid, 1 part of *o*-cresol is treated at 120° C., with 5 parts of caustic soda containing a little water. The mixture is then heated to about 250° C., and electrolysed with a current of about 6 amps. per 100 sq. cms. between electrodes of nickel, nickel-steel, or iron.

Acetaldehyde from Acetylene.

Aldehydes can be prepared electrolytically from alcohols. An early example was the formation of formaldehyde, in 80 per cent. yield, by the oxidation of a sulphuric-acid-solution of methyl alcohol (Elbs and Brunner, 1900). The ultilisation of acetylene as raw material for the production of acetaldehyde, acetic acid, and the like, led to many developments in this field. One such application is the regeneration, by anodic oxidation, of the mercury catalyst used in the hydration of acetylene. To this end, the gas in passed into an acid bath containing the mercury salt, the reduced metal itself forming the anode, while the cathode consists of mercury, lead, or platinum. In this way it becomes possible to use an electrolyte containing more than 10 per cent. of catalyst, with a consequent increased rate of absorption (*Brit. Pat.* 143,891, of 1920).

Continuous operation is possible by passing the acetylene through a porous anode impregnated with the mercury catalyst. The electrolyte consists of phosphoric acid (25 per cent.), maintained at about 50° C., at which temperature the aldehyde immediately vapourises, so that resinification is prevented. An E.M.F. of 2 volts suffices for the regeneration of the catalyst (*Brit. Pat.* 156,147, of 1920). An electrolytic recovery process has also been applied to the mercury sludges formed in similar hydration processes. Fairly pure mercury can be obtained by electrolysing a mixture of the sludge with 10 per cent. caustic soda solution (*Brit. Pat.* 10,140, of 1915). On the large scale, lead vessels are used in these catalytic processes. To prevent their deterioration by metallic mercury, a protective coating of lead peroxide, prepared and deposited electrolytically, has been recommended.

Electrolytic Reduction and Oxidation of Acetaldehyde.

Alcohol can be prepared by cathodic reduction of a dilute sulphuric-acid solution of aldehyde or paraldehyde in a diaphragm cell. To prevent the formation of condensation products, the concentration of aldehyde is kept as low as possible. Such materials as lead, antimonial lead, or mercury may form the cathode, and the cell is kept at about 40° C. by the use of a current density of 2-3 amps. per 100 sq. cms. Direct conversion of acetylene to alcohol is also possible by simultaneous hydration and reduction in a catholyte containing a mercury catalyst. Under certain condition, as, for example, with rise in temperature, secondary products, such as 1.3-butandiol, crotonyl alcohols, butyl alcohol, and ethyl ether, make their appearance. Of these, the crotonyl derivatives may serve as suitable alcohol denaturants (*Brit. Pats.* 140,115 and 140,527, of 1919).

Acetic acid results from the anodic oxidation of aldehyde. To separate the acid, the cell is operated at about 85° C. under a partial vacuum, the strength of the phosphoric-acid electrolyte being so adjusted that its boiling-point is above 130° C. Respective yields of about 80 and 15 per cent. of acid and aldehyde are claimed (*Brit. Pat.* 156,147, of 1920). To oxidise paraldehyde, a 10-15 per cent. solution in sulphuric acid (10 per cent.) is electrolysed between a gas carbon cathode and an anode made of magnetite or platinum. The process is facilitated by the usual catalysts (salts of metals capable of several degrees of oxidation), and is arrested when the acetic acid reaches a concentration of 40 per cent. (*Brit. Pat.* 124,195, of 1919).

By distilling the cell-contents with the equivalent quantity of ethyl alcohol, ethyl acetate is obtained; while cells have been devised which permit of the formation of this ester by the simultaneous reduction and oxidation of aldehyde at the cathode and anode respectively (*Brit. Pats.* 131,600, of 1919 and 140,115, of 1918).

Isopropyl Alcohol, Pinacone, and Glyoxalic Acid.

As the potential energy of the hydrogen absorbed in the cathode will depend on the composition of the latter, it should be possible by suitably selecting the electrode material, to influence the nature of the reduction product. An instance of this occurs in the reduction of acetone in acid or alkaline solution. With a mercury cathode the product is predominantly isopropyl alcohol, with only traces of pinacone, while with graphite, in alkaline solution, the result is chiefly pinacone. Using a pure-lead cathode, the ratio pinacone: alcohol is of the order of 2:1, but according to the Bayer Company this ratio becomes 30:1 with a lead-copper alloy, containing 40 per cent. of the latter metal (*Ger. Pat.* 306,523, of 1917). A similar fall in isopropyl alcohol results from the use of a cathode of lead-tin alloy (10 per cent. tin), brass, or bronze; or the formation of the alcohol may be repressed by the addition of salts of bismuth, mercury, manganese, nickel, antimony, silver, or iron to the acid electrolyte (*Ger. Pat.* 306,304, of 1917).

Oxalic acid, on reduction, yields glyoxalic acid. A recent patent proposes to accomplish this conversion by electrolysing a solution of oxalic acid containing salt and hydrochloric acid. Mercury and graphite compose the cathode and anode respectively (*Brit. Pat.* 198,855, of 1922). Baekeland claims the conversion of glyoxalates into salts of racemic or meso-tartaric acid by further cathodic reduction (*U.S. Pat.* 1,190,845, of 1916).

Electrolytic Hydrogenation of Unsaturated Compounds.

Acetylene can be reduced to ethylene electrolytically in the presence of a chromous salt, the catalyst being regenerated automatically (*Ger. Pat.* 287,565, of 1913). According to a recent specification, oils and hydrocarbons can be hydrogenated by cathodic reduction under the catalytic influence of the nascent alkali metal or of lead, palladium, or nickel, liberated from added salts. A comparatively small cathode should be used, and should be maintained at 120° C. by adjusting the current density (*Brit. Pat.* 181,849, of 1921). Pomilio's experiments on cathodic hydrogenation, appear to indicate that the higher fatty acids (such as oleic) offer great resistance to reduction in alcohol containing sulphuric acid. A similar solution of maleic acid, however, is reduced with ease, but difficulty is experienced with citraconic acid and its homologues (*Z. Elecktrochem.*, 1915).

Acid Reduction of Aromatic Nitro-compounds.

In the presence of moderately dilute sulphuric acid, the primary products of the electrolytic reduction of nitrobenzene are nitrosobenzene, phenylhydroxylamine, and aniline. With concentrated acid, however, the main product is *p*-aminophenol, a result due to the intramolecular change of the initial hydroxylamine. For the preparation of aniline, the cathode medium consists of nitrobenzene (25), alcohol (100), and 25 per cent. sulphuric acid (200 parts), and this is emulsified during the electrolysis by a rotating lead cathode. After reduction, the alcohol and any unchanged nitrobenzene are removed by distillation and steam distillation respectively, leaving an 80 per cent. yield of aniline sulphate in solution.

To obtain *p*-aminophenol, a mixture of 30 parts nitro-compound and 220 parts strong sulphuric acid (Sp. Gr. 1.86) is electrolysed at the cathode, the anode solution consisting of less concentrated acid. On account of the strong acid, the cathode must be either of platinum or carbon, while sulphonation must be avoided by keeping the temperature below 80° C. A source of difficulty in this preparation is the weakening of the cathode acid owing to anion migration. According to Shoji (*J. Chem. Ind., Tokyo*, 1918), to obtain a yield of over 40 per cent., and nearly theoretical current efficiency, good agitation and a current density of 8-9 amps. per 100 sq. cms, at 6-8 volts are necessary. This investigator regards the process as a successful competitor of the chemical reduction method, both on account of its simplicity and the comparative cheapness of nitrobenzene over phenol. In the presence of strong hydrochloric acid, small yields of *o*- and *p*-chloraniline can be obtained, through the intermediate formation of phenylchloramine.

In order to avoid a strongly acid electrolyte in this preparation, the use of a composite cathode has been suggested (*Brit. Pat.* 18,081, of 1915). Suitable electrodes may be prepared by depositing bismuth on a lead cathode; or mercury, lead and arsenic, and tin and arsenic, on a copper cathode; or, again, alloys may be used, or the metals may be deposited on a carbon cathode. Thus, with an acid concentration little more than sufficient to combine with the base formed, it is claimed that reduction with a simple lead cathode will give *p*-aminophenol and aniline in the proportion 2:3, while with a lead-bismuth cathode the ratio will be of the order of 5:1.

Phenyl-hydroxylamine can be obtained by reducing nitrobenzene, at ordinary temperature, in an aqueous-alcoholic electrolyte containing ammonium chloride. Zinc electrodes are recommended, and a diaphragm is unnecessary. The yield, however, is only about 25 per cent., being less than that obtained by chemical reduction with zinc dust (Frederiksen, *J. Amer. Electrochem. Soc.*, 1915).

The sulphonic acids of nitro-naphthalene can be reduced electrochemically with varying facility. Thus, using lead electrodes, the 1.5 and 1.8 mono-nitro-sulphonic acids, and the 1.3.6.8 nitro-trisulphonic acid will readily yield the corresponding amino-acids in 10 per cent. sulphuric acid. The 1.6 and 1.7 acids, however, reduce only to the hydroxylamines, compounds which tend to form tarry products very readily (Fierz and Weissenbach, *Helv. Chim. Acta*, 1920).

Alkaline Reduction of Nitro-compounds.

To prepare azoxybenzene, 10 parts of nitrobenzene are reduced at about 100° C. in a catholyte consisting of 50 parts of 3 per cent. caustic soda, using a cathode of nickel gauze and a current density of 10 amps. per 100 sq. cms. Vigorous stirring is essential, while the alkalinity of the cathode solution increases owing to the migration of sodium ions. Unchanged nitro-compounds may be removed by steam distillation, or the product, containing 40 per cent. of azoxy-compound, may be utilised as such for further reduction to benzidine. To this end water (50 parts) and sulphuric acid (20 parts) are added, and acid electrolysis carried out at the ordinary temperature to yield benzidine sulphate. By a similar process, tolidine sulphate may be prepared from *o*-nitrotoluene, through the intermediate formation of *o*-azoxy-toluene. Another method is to prepare hydrazobenzene, and then to pour the product into hot sulphuric acid, when benzidine sulphate results.

Azobenzene is the product when the catholyte consists of an aqueous-alcoholic solution of sodium acetate and the anolyte is a solution of sodium carbonate. A current efficiency of about 75 per cent is attained. By similar methods, diamines may be prepared from *o*- and *p*-nitranilines, the meta-compound, however, yielding *m*-diamino-azobenzene. Meta-nitro-dimethylaniline, on reduction, gives first, tetramethyl-*m*-diamino-azobenzene, and then the corresponding hydrazo-compound.

According to an early specification of the Bayer Company (1901) for these reductions, a double cell is used. This comprises a cathode of zinc, tin, or lead, immersed in an alkaline emulsion of the nitro-compound containing the cathode metal in solution, and an anode of carbon or platinum in a solution of soda, salt, or sodium sulphate. In order to prevent the deterioration of the cathode surface, when this contains lead, by the accumulation of decomposition products, the cathode may be placed horizontally, with its active surface downwards. By this means, the so-called "lead oil" falls away, to be removed or oxidised to peroxide at the anode (*Ger. Pat.* 303,303, of 1917).

Another process dispenses with a diaphragm, an emulsion of nitrobenzene in dilute caustic soda, produced by means of a high-speed rotary pump, being fed continuously by the latter on to the cathode, which consists of an iron-gauze cylinder. The bottom of the cell is of concrete, and is funnel-shaped, so as to facilitate the separation and removal of the heavy nitrobenzene-azobenzene mixture. A benzene solution of azobenzene may be further reduced to hydrazobenzene in a concrete cell with an iron floor to form the anode. The electrolyte consists of a caustic-soda solution containing lead oxide, and on this the benzene solution floats. Emulsification is effected by revolving the cathode at the surface of separation of the two liquids (*Brit. Pat.* 15,750, of 1915). Similar methods can be applied to electrolytic oxidations, as, for example, the formation of camphor from isoborneol.

The Formation of Saccharin.

Under certain conditions, *o*-toluene sulphonamide will yield saccharin on oxidation. According to the results of Fichter and Löwe (*Helv. Chim. Acta*, 1922), it is advisable to work in a medium containing sodium carbonate or ammonia. For the most favourable results, they recommend 2N sodium-carbonate solution at 60° C. as electrolyte, and platinum gauze and lead as anodic and cathodic materials respectively. A diaphragm cell is unnecessary, but efficient stirring is essential for good results. The success of the

process is not dependent on the intermediate formation of sodium percarbonate. 4N ammonia, containing ammonium sulphate, may also be used; the percentage yield and current efficiency in this case being 44 and 9, while with the sodium-carbonate solution they were 75 and 43 respectively. Caustic soda and dilute sulphuric acid are unsuitable media, sodium sulphate constituting the sole product in the former case.

Fichter has also examined the anodic oxidation of alkylated anilines in sulphuric-acid solution (*Helv. Chim. Acta*, 1922). Dimethylaniline, at a lead peroxide anode, yields, among other products, formaldehyde, tetramethyl benzidine, and the compound of these two. With a platinum anode different products result. On the other hand, tetraethyl benzidine is the sole product of the oxidation of diethylaniline at a lead peroxide electrode.

Electrolytic Preparation of Azo Dyes.

If a mixture of aromatic amine, sodium-nitrite solution, and a "coupling agent" is subjected to anodic electrolysis, an azo dyestuff is formed (Löb, 1904). A slight excess of nitrite is advisable, and the presence of the "coupling agent" is essential, as otherwise, the diazo compound first formed undergoes decomposition. In order to maintain the strength of the anode nitrite solution, the use of sodium nitrite in the catholyte is recommended. Thus, Congo Red may be prepared by treating a mixture of benzidine (10), naphthionic acid (3.3), and sodium nitrite (9.3 parts). Other examples are Ponceau 2G from aniline, β-naphthol disulphonic acid (R acid) and nitrite, and Dianisidine Blue from dianisidine, β-naphthol and nitrite. By the electrolytic reduction of an acid solution of diamidotriphenyl methane, *p*-rosaniline has been prepared.

Electrolytic methods have also been applied to coagulate rubber latex. On passing a current through the latter, rubber is deposited on the cathode. Strangely enough, the process is not arrested by the non-conducting deposit on the positive electrode, while a reversal of the current causes the rubber layer to be detached. According to Clignet (*Le Caoutchouc et La Gutta Percha*, 1915), on the large scale, graphite-filled porous vessels form the electrodes, and a small low-tension dynamo (1H.P.) suffices to supply the current. In order to remove inorganic impurities from sugar solutions, these are electrolysed in the middle chamber of a three-compartment cell. The ions move to their respective electrodes, which are washed in running water (*U.S. Pat.* 1,256,758, of 1918).

The Mechanism of Electrolytic Oxidation.

Two hypotheses have been advanced. According to one, the process is one of pure chemical oxidation by the oxygen formed in the first instance, while the other formulates the formation of oxidation products by the discharge of the anions of intermediate hydroxy-compounds. Fichter, who supports the former explanation, also assumes the intermediate formation of peroxides, many of which have been isolated. It has been pointed out, however, that on decomposition, these do not yield the required cleavage products. There is also a close similarity between electrochemical and biochemical oxidation processes, a parallelism which is attributed to the intense activity of oxygen liberated at a platinum anode.

CHEMICAL MANUFACTURE IN RUSSIA.

REMARKABLE EXPANSION IN DYESTUFFS PRODUCTION.

A SOMEWHAT detailed account of the present position of the dyestuffs and intermediate products industry in Russia is given in a recent issue of the *Financier*. The particulars are stated to be obtained from the "Green Book of Russia's Trade Returns."

Extent of the Anil Zevod.

The Anil Zevod, or Aniline Dye Trust, embraces all the aniline dye works of Soviet Russia. The trust includes nine different organisations in Moscow, and also the factory at Dorogomilov, which used to belong to the Russian Chemical Society. All the works, save one, are at present working. Two only of the 10 produced dyes before 1914, and these they made out of intermediates imported from Germany. They were making explosives during the war and in the early days of the revolution, and it was only after that event that they turned to dye making.

As the supply of imported intermediates gradually diminished, the Russian factories turned their attention to the making of their own intermediates. The new products already on the market include benzidine, alpha-naphthylamine, ortho- and para-toluidine, para-nitraniline, metaphenylenediamine, H. acid, saccharin, acetic anhydride, crystal violet, antifebrin and silver salvarsan. The difficulties in the way have been enormous, and great credit is due, says the report, to the professional staff, engineers and chemists, as well as to the men of science, who have greatly contributed to the successful result. All, or nearly all, the chemical laboratories had to be rebuilt under difficult conditions, and with an extreme shortage of necessary material. The Kinishem works are now, after a long delay, again producing sulphuric acid; the Olgin works oleum and chlor-sulphonic acid, as well as bisulphate.

Raw Material Supplies.

The work of individual factories changes from time to time to conform with the general plans of the trust, and new works are being built and others put in condition. The Don coal basin is now beginning to supply coke benzol, and will satisfy the demand of the combine for benzol, naphthalene, and so on. Of phenol there is still a fair supply, and it can also be produced by the trust. Zinc dust was formerly received from abroad, and will probably have to be obtained again in a similar manner.

The number of workmen engaged during 1922 in the works of the combine was 740, as against 605 in the previous year, but, with the increased supply of raw material, the number engaged has increased. Prices obtained enable the trust not merely to pay its way, but also to increase the reserve of material

Financial Position of the Trust.

In view of the huge demand for dyes the disposal of the products is assured, and no fear of a crisis need be entertained. On the very lowest calculation the market demand is about 156 tons a month. Notwithstanding high duties, about 31 tons were imported legally over a period of six months, and a great deal was smuggled. The financial position of the combine is satisfactory. According to the balance-sheet, the profits for eight months equalled 51,196 gold roubles—about £5,300. sterling. This does not take into consideration the larger supplies of raw material and finished dyes on hand, as well as the much greater value of the assets and buildings, apparatus, machinery, and so on. The whole cost of rebuilding and remodelling, as well as new works constructed, has been charged to the expense account. The combine has naturally felt the shortage of funds for the huge programme in hand, and the absence of credit under the present system in Russia has severely handicapped the trust at various stages.

Needless to state, the work of the Aniline Trust is only in its elementary stages, and facilities for rapid developments are lacking. But still the facts are, that Russia has developed an independent dye industry, using Russian raw materials and by-products. The dye industry will have to be protected from foreign competition, particularly German, at least for some considerable time, to prevent dumping.

Unfavourable factors for the development of the industry are also the following Excise duties of the Government:—(1) High excise duty on salt; (2) high excise duty on alcohol. The further successful development of this important industry will greatly depend on the attitude of the higher Government authorities towards it.

British Views on the Report.

"Perhaps the most interesting of many interesting details in this report," said a British dyestuffs authority to a representative of the *Financier*, "is the figure of dyestuffs consumption in Russia to-day. Tsarist Russia, excluding Poland, used 8,000 tons of dyestuffs a year; Bolshevik Russia needs less than 2,000 tons in the same period. Before the war Russia had a high rate of duty on finished colours and a very low rate on intermediate products. One result was that the Germans promptly ran up a couple of factories, where they turned intermediates, imported at this low rate, into finished dyestuffs.

To-day great development work is apparently to be done in the way of manufacture by this Bolshevik combine of factories that have facilities for making dyes. British dyes are already going to Russia through second, third, and fourth parties in Germany. They are shipped to Dantzig and Hamburg, where there are Germans who arrange for their transport into Russia.

ORGANIC VULCANISATION ACCELERATORS.

THE NEW ACTIVITIES OF THE B.D.C.

THE policy adopted by the Institution of the Rubber Industry, of discussing technical problems with those connected with allied industries, is proving its value. This was clearly shown in the very interesting lecture delivered at a meeting of the London Section, on Monday of this week, by Major V. Lefebure (of the British Dyestuffs Corporation) on "Rubber Accelerators."

Between 2,000 and 3,000 tons of synthetic organic chemicals are now used annually for accelerating rubber vulcanisation, and it was surprising, commented the lecturer, that this development had attained such great dimensions with so little standardisation, central consideration, and with such great differences of opinion as exist between rubber manufacturers as to the value or otherwise of the use of organic accelerators. In Great Britain, the widespread practice of offering and using, as accelerators, compounds of unstated and often unknown composition and purity, had retarded progress.

Undesirability of "Fancy" Trade Names.

America is by far the biggest rubber-consuming country in the world, and Major Lefebure suggested the following as a rough approximation of the raw rubber consumption in the countries named for 1923:—U.S.A. and Canada, 300,000 tons; Great Britain, 30,000 tons; France, 20,000 tons; Germany and Austria, 20,000 tons. Dealing with accelerators as chemicals, he said that for the organic accelerator, it must be of constant chemical composition. Though rubber manufacturers had complained of and even ridiculed the long chemical names carried by organic accelerators, the frank disclosure of the nature of the chemical was the only guarantee of any value to the rubber manufacturer, and such disclosure could not be made without the use of the chemical names. Therefore, he deprecated offering accelerators under curious trade names. For example, about six months ago samples of diphenylguanidine were collected from all possible sources and examined, and were found to vary greatly as regards method of sale and quality of the product. The products, most of which were sold under trade names, varied in actual diphenylguanidine content from 97 to 86 per cent., but in this case the British-made product was at the top of the list.

Comparative Activity of the Better-known Accelerators.

Comparing various accelerators from the point of view of speed, Major Lefebure referred to work recently carried out by the British Dyestuffs Corporation. A standard mix (rubber 100, sulphur 10, accelerator ½ per cent.) was "cured" at 40lb. for 60 minutes, comparing in the same operation *p*-nitrosodimethylaniline, aldehyde-ammonia, thiocarbanilide, diphenylguanidine, triphenylguanidine, hexamethylenetramine and tetramethyl-thiuramdisulphide. The test was repeated for a hard rubber mix (rubber 100, sulphur 40) which was "cured" for three hours under the same conditions. In this way it was found that under the above conditions of cure the following quantities of accelerators were roughly equivalent in activity:—

Accelerator.	Parts.
p-Nitrosodimethylaniline	1
Diphenylguanidine	1½
Aldehyde-ammonia	1½
Triphenylguanidine	4½
Hexamethylenetetramine	4½
Thiocarbanilide	8—10
Tetramethyl-thiuramdisulphide	less than ½

Effects of Other Compounding Ingredients on Accelerators.

Passing to the behaviour of accelerators in the presence of zinc oxide—a matter of great practical importance,—Major Lefebure gave his own experiences which showed that the presence of zinc oxide did have an important influence on the behaviour of organic accelerators. Magnesium carbonate also seemed to exert a generalised, mild activating influence on most accelerators. High percentages of litharge seemed to reduce the speed of organic accelerators, but this did not matter much as it was inconsistent, in the majority of cases, to employ high percentages of litharge in the presence of such accelerators. Lead sulphide, on the other hand, did not appear to retard the activity of accelerators. White substitute seemed to be a violent enemy of most accelerators. A comparative test between *p*-nitrosodimethylaniline, diphenylguanidine and aldehyde-ammonia using the experimental mix:—rubber 100, sulphur 10, white sub. 10, showed that *p*-nitrosodimethylaniline remained quite an active accelerator under these conditions, but diphenylguanidine and aldehyde-ammonia gave very poor results. The comparative immunity of *p*-nitrosodimethylaniline in the presence of white sub. was due probably to its comparatively low basicity. Indeed, the much greater range of compatibility of *p*-nitrosodimethylaniline with other components of the rubber mix was due to the fact that its action was associated with the nitroso group, and did not depend entirely upon basicity.

Nitroso Dimethylaniline, the Best All-round Product.

Owing to the great interest of *p*-nitrosodimethylaniline as an all-round accelerator, the lecturer referred to its harmful effects. Although some firms were using *p*-nitrosodimethylaniline and hexamethylenetetramine continuously without any rash trouble, yet attempts had from time to time been made to obtain combinations giving all the advantages of the *p*-nitrosodimethylaniline accelerator without the incidental disadvantages. The most recent appeared very promising, and consisted in making molecular compounds with β-naphthol and other analogous products. These compounds possessed a greater activity than their actual *p*-nitrosodimethylaniline-content would signify, and appeared to be almost entirely free from skin-irritant action.

All the work published, coupled with the tests carried out by the British Dyestuffs Corporation, enabled a list to be made of comparative activities of the different commercial accelerators, as follows:—

p-Nitrosodimethylaniline.
Diphenylguanidine.
Aldehyde-ammonia.
p-Phenylenediamine.
Hexamethylenetetramine.
Triphenylguanidine.
Zinc sulphate-ammonia compounds.
Formaldehyde-aniline.
Thiocarbanilide.

This list omitted the so-called "super-accelerators," the dithiocarbamates and thiuram-disulphides, as they were a special type.

Stability of Accelerators in Transit and Use.

Regarding stability as chemicals in transit and in the drug room, Major Lefebure's experience was that practically all the products mentioned as standard commercial accelerators could be regarded as stable. There was one marked exception—namely, the zinc-sulphate-ammonia compounds which had recently come on to the market. Other products which might show slight traces of decomposition if held long in chemical stock were the aldehyde-amine compounds, of which a well-known example was aldehyde ammonia; also the thiocarbamate type—the so-called super-accelerators. In fairness, however, it was necessary to discriminate between the reliable well-made brands, in which every care had been taken to obtain a stable and pure product, and other highly impure, less carefully manufactured articles. For example, samples of foreign super-accelerators which he had examined, and which were being offered in this country, showed a marked decomposition, with evolution of dimethylamine or diethylamine. The guanidines had shown remarkable stability in bulk use. Stability on the mills was a more searching test, as temperatures there sometimes reached well over 80°, and his experience was that the accelerators which had shown the greatest stability—in fact, complete stability—under the most stringent milling conditions, were the guanidines and *p*-nitrosodimethylaniline. It was wiser in general to use a small percentage of a relatively active organic accelerator than a large percentage of a relatively slow one. Many cases of premature vulcanisation in the mixing rolls or "scorching" had occurred when thiocarbanilide and hexamethylenetetramine had been used. This was partly due to the fact that relatively high percentages were required to give appreciable acceleration. Probably the best product of all from this point of view was triphenylguanidine, which was an extremely safe and foolproof product. *p*-Nitrosodimethylaniline, and aldehyde ammonia were also very safe from the point of view of accelerating action on the rolls.

The bulk experience of a large number of rubber manufacturers over a long period of time, had proved that the proper use of accelerators not only did not harm ageing, but had led to improved ageing of a number of important lines of rubber goods. Theoretical considerations also confirmed this conclusion.

The "Super-Accelerators."

With regard to super-accelerators, the earliest products to be suggested and tested were the thiocarbamates, combinations obtained from amines and carbon bisulphide. These compounds had certain disadvantages. In general, they were fairly deliquescent, and, if allowed to take up water through carelessness in handling, they tended to decompose on warming. They had relatively low melting-points, and were difficult to present as dry, finely-divided, undecomposed powders. For this reason the oxidation products, the thiuram disulphides, and also the zinc salts of the thiocarbamates, were of considerable practical interest. Their behaviour in rubber was practically the same as that of the parent compounds, the thiocarbamates, but they possessed the additional advantage of a superior physical state, being capable of preparation as dry powders, insoluble in water. The cost of production of these super-accelerators was largely determined by the cost of the amine components of the reaction, and so far the secondary aliphatic amines involved had not proved cheap chemicals. An outstanding feature of the super-accelerators was that in the presence of zinc oxide they gave an optimum physical condition, not only in a very short time, and not only with very high tensile strengths, but also with very low percentages of combined sulphur—*i.e.*, with very low vulcanisation coefficients.

General Survey of Present Position.

In conclusion, Major Lefebure pointed out that, although much has to be done before we can be satisfied that we thoroughly understand the behaviour of accelerators in rubber mixes, yet the rubber manufacturer to-day has at his command a sufficient range of active, reliable products for the chief types of mixes and processes of the industry. On the Continent, bulk experience had proved the value of the aldehyde-amine type, notably aldehyde-ammonia. In England, the value of the Peachey product, *p*-nitrosodimethylaniline, had been proved to the hilt. Other features of British bulk practice were the successful use of aldehyde-ammonia, of the piperidine-piperidyl-dithiocarbamate product in its reduced form, as proposed by Dr. Schidrowitz, and the increasing interest in and use of the guanidines, especially diphenylguanidine. In America the outstanding feature was the successful and increasing bulk use of diphenylguanidine, whilst there was also the wide use of *p*-nitrosodimethylaniline, particularly in hard rubber work, and the much wider attention paid there than elsewhere to the more complex aldehyde-amine compounds. This might be due to the fact that the American chemical industry was a very important source of supply of formaldehyde and acetaldehyde. In 1913-14, Mr. S. J. Peachey had made his well known discoveries in the field of acceleration, and gave us advantages as good as, if not better than, those possessed by Germany or America at that time; yet, with one or two notable exceptions, we failed to hold these advantages, and for nearly 10 years had been well behind in the race to manufacture and use these products.

Dr. S. Pickles, opening the discussion which followed the paper, said that certain accelerators were comparatively inert in the absence of zinc oxide, and others were comparatively active, and it was a question of whether we were dealing with a zinc oxide mixture or not which made all the difference in considerations of activity. Then, if it were concluded that zinc oxide was necessary for a certain accelerator, the percentage made a considerable difference. He was also undecided with regard to the firming-up of the rubber molecule by means of accelerators, and while some accelerators produced, almost from the start, a stiffening-up effect, even in the unvulcanised condition, yet others seemed to cause depolymerisation.

Dr. H. P. Stevens said the lecturer had not referred to the stability of accelerators at vulcanising temperatures. He could name accelerators used in conjunction with certain other substances by which the field of temperature in which they were active was very limited. If we had an accelerator which, ordinarily, might vulcanise very rapidly at 40lb., we might add something to it and find that we got very little acceleration at 40lb., but quite good acceleration at 10lb.

Dr. P. Schidrowitz said that with some of the ultra-accelerators we could overcure to the extent of 100 or 200 per cent., and yet the product would age better than an unaccelerated mixing which was overcured only, say, 5 to 10 per cent.

Is the British Rubber Manufacturer Deserving of Censure?

Mr. H. Rogers defended the manufacturers, who knew more about accelerators than some would have us believe. The American manufacturers had better opportunities of trying-out accelerators than the British manufacturers, and also had a larger chemical industry handling the materials in a larger way. He imagined that the quantity of accelerators used in this country to-day compared favourably even with the American figure.

Dr. Schidrowitz emphasised the importance of the possibility of vulcanising at low temperatures, under the boiling-point of water, and he thought that in time we should arrive at vulcanising tyres, not, perhaps, in the cold, but certainly not in pressure vessels.

Major Lefebure, referring to his concluding remarks in the paper, said the position with regard to accelerators was exactly parallel to that with regard to mustard gas during the war. A few people in this country who had worked on mustard gas had the impression that they had saved the Empire by their work; those who did the work certainly deserved great credit, but this country was deplorably behind others. To-day, probably not 30 per cent. of the accelerators were used that would be used if we were parallel with America or the big firms in France.

THE CHEMISTRY OF RUBBER.

XANTHATES AS VULCANISATION ACCELERATORS.

THE members of the Birmingham and Midland Section of the Society of Chemical Industry had under consideration at the second meeting of the session, at the University of Birmingham, on Tuesday, November 27, questions relating to the chemistry of rubber, and in particular to the acceleration of vulcanisation by xanthates, and physical characteristics used in the testing of the quality of rubber. There were two contributions, both being by Dr. D. F Twiss (chief chemist at the Dunlop Rubber Co.), together with Mr. F. Thomas, B.Sc., and Mr. F. B. Jones, B.Sc., respectively. The first paper was: "The Acceleration of Vulcanisation by Xanthates and the Influence of Metallic Oxides as Promoters," by D. F. Twiss and F. Thomas.

Optimum Effects Obtained at Low Temperatures.

No record, stated the authors, has yet been made in the chemical literature of the characteristic features of vulcanisation with the aid of metallic xanthates. The activity of the zinc alkylxanthates is greatly influenced by the presence of a suitable metallic oxide, such as zinc oxide. At ordinary vulcanising temperatures, such as 148° C., vulcanisation in the presence of a zinc alkylxanthate gives no clear indication of anything exceptional. Below 130° C. however, vulcanisation is greatly expedited, the improvement being most noticeable in the presence of zinc oxide, as little as 1 per cent. sufficing for a striking improvement in the physical properties of the product.

A mixture of rubber (90), and sulphur (10), vulcanised at 148° C. required 110 minutes for the attainment of an elongation (at 0.5kgs/sp.mm.) of 650 per cent. or a tensile strength of approx. 1.7kgs. per sq.mm. Progressive vulcanisation in this case is attended by the normal rapid decrease in extensibility and the development of a marked maximum in the tensile strength. With the additional presence of 5 per cent. of zinc ethylxanthate and 1 per cent. of zinc oxide in a mixture of the same rubber and sulphur (95 : 5) at 98° C., a tensile strength exceeding 2kgs/sq.mm. and an elongation of 486 per cent. at a load of 0.5kgs/sq.mm. are attained in less than 20 minutes, and remain substantially unaltered even after vulcanising for 150 mins.

Metallic Oxides as "Promoters."

The zinc salts of the other alkylxanthic acids—*i.e.*, zinc normal and iso-propyl xanthates, zinc *n*-butylxanthate, and zinc iso-amylxanthate possess similar power. Zinc methylxanthate is less active than its immediate homologues, probably on account of its lower degree of stability.

Consideration of numerous results leads to the view that the alkylxanthate enters into two types of reaction. In one of these a rapid cyclic set of changes occurs with activation of sulphur. In the other the xanthate undergoes irreversible decomposition with consequent rapid reduction in the quantity of xanthate available for the former reaction.

The cadmium alkylxanthates possess similar power to the zinc compounds. Cadmium oxide is almost as effective as zinc oxide in promoting the activity of alkylxanthates and other organic accelerators of vulcanisation, such as hexamethylenetetramine and thiocarbanilide. Magnesium and mercuric oxides are practically valueless as "promoters."

THE TRADE AND INDUSTRY OF THE DUTCH EAST INDIES.

ECONOMIC SITUATION MUCH IMPROVED.

IN a report on the Netherlands East Indies up to June, 1923, published by H.M. Stationery Office (3s. net), Mr. H. A. N. Bluett, British Commercial Agent at Batavia, says that the commercial recovery of the country is remarkable. During the current year there has been a most marked increase in trade.

Cinchona Bark, Quinine, and Copra.

The total exports of cinchona bark from Java in 1922 were 6,617 tons against 4,636 tons in 1921. Holland bought 5,008 tons, Great Britain 245 tons, and British India 913 tons. Under the altered rules of the Kina Bureau combine, manufacturers must take over from the growers the equivalent in bark of the quantity of quinine sold by them, with a minimum of 300,000kg. of sulphate of quinine per year; of the minimum quantity, 84,300kg. of sulphate of quinine in bark was allotted for delivery to the Bandoeng quinine factory, the remainder being shared out among affiliated manufacturers in Holland. As the quantity taken up by the manufacturers was below the normal production of the associated estates, the latter were allowed to store their excess stock at the estates for so long as it was not required by the Amsterdam manufacturers or the Bandoeng factory. It is estimated that by the end of last year over 3,000 tons were so stored, or approximately six months' export; from this it would appear that there is now a danger of overproduction, and the rumour that many estates affiliated to the combine are dissatisfied with the present arrangement may be well founded.

Although the combine of manufacturers has reduced the exorbitant price charged for quinine, there can be no doubt that—under normal conditions—consumption will not equal the producing capacity of either estates growing the raw material or the factories making the finished article, therefore either a reduction in the wholesale price of quinine or an all round curtailment of production seems inevitable. The estates owned by Japanese interest that are not tied to any combine appear to be promising, and their output will in a few years' time be of some importance.

The export of quinine from the Bandoeng factory showed a heavy decrease in 1922, only 124,589kg. being exported against 281,578kg. in 1921 and 310,351kg. in 1920, Italy (30,067kg.) and India (30,954kg.) being the principal importers. A marked improvement is noticeable for the current year, 47,019kg. having been exported during the first 3 months against 25,424kg. for the same period last year.

No export commodity is so dependent on the purchasing power of Central European countries as copra. Price and price only governs the amount of copra harvested. But the price offering for copra during the past year did not allow of enough being paid to the natives to encourage them to harvest the nuts; and exports show an all round decrease. The total exports from Java were 53,233 metric tons as compared with 93,010 tons in 1921, and from the seven principal ports of the outer islands 169,845 metric tons as compared with 217,558 tons in 1921. For the current year the exports show a small increase on the corresponding period of 1922. For other oil-bearing products—*e.g.*, peanuts, kapok seeds, cotton seeds, kemiri nuts, sesamun seeds and tengkawang or illipe nuts, there was a fair demand.

Iodine is found as sodium iodide in a dissolved state in mineral springs which have been located in the residencies of Sourabaya, Semarang and Cheribon, and has been produced from this source since 1854. It is exported from this country as copper iodide, potassium iodide and pure iodine. Exports in 1922 were 25,431kg. of iodine, of which 7,891kg. were shipped to Holland, 14,400kg. to England, 2,540kg. to Germany and 600kg. to China. In addition 260kg. of potassium iodide and 46,286kg. of copper iodide were exported, Great Britain taking 44,922kg. of the last named product.

Manganese ore is produced in two mines in Java and shipped from the port of Tjilatjap. The shipment amounted to 5,825 tons in 1920, 895 tons in 1921 and 2,551 tons in 1922. Exports went entirely to Holland for orders.

Review of the Import Trade.

For importers the period under review was not generally favourable. The import statistics for Java show that the decrease on 1921 is considerable in both volume and value, and that almost all lines forming the staple import trade of the country were adversely affected. The better export trade of the latter months of 1922 and the early months of this year is already reflected in the import statistics for the first quarter of the current year. It is not safe, however, to expect that the present revival will continue indefinitely, and in face of the present chaotic conditions in Central European countries it is impossible to forecast the trade possibilities of Netherlands India. It was particularly noticeable that importers mostly refrained from importing goods bearing trade marks not previously known in this market. On the other hand, importers were desirous to obtain the sole representation for well known manufactures whose registered trade marks are known throughout the world. There is now a particularly good demand for chemicals, cement, tin plates, galvanised sheeting, matches and soap.

The fact that the Netherlands East Indies is a considerable consumer of chemicals and chemical manures is now fully realised by British manufacturers, and exports to this country from the United Kingdom have been well maintained. For several of the principal lines consumed there is an increased import which has largely favoured Great Britain. Many home manufacturers previously not represented in this market have during the past two years established trade relations with leading importing firms, so that if our competitive prices are maintained there is now every indication that in future the United Kingdom will be the principal supplier of heavy chemicals. In addition to heavy chemicals there is a good demand for refined chemicals, medicines, patent medicinal foods and photographic chemicals, also chemicals required for the manufacture of aerated waters, syrups and cordials.

The import of dyestuffs, which are much needed for the batik industry, remains steady although with the exception of synthetic indigo the imports for 1922 show a decrease on 1921. It should be noted, however, that stocks at the end of December, 1922, were much lower than at the beginning of that year, and as the present demand for the batik industry is good, it is expected that imports for the current year will show an increase on 1922. Germany has re-established her position as the principal supplier of artificial dyestuffs, and most of the imports shown in the official statistics as direct shipments from Holland are of German origin.

The import of paints shows an all round increase; there is a fair demand and the competition which was expected from a local factory established in Sourabaya has proved negligible. Although Great Britain still enjoys only a small share of this trade she improved her position during 1922. The principal supplying countries are Germany and Holland.

The following table shows the quantity figures of the imports of certain chemical products into Java and Madura.

—		1921.	1922.	Jan. to March.	
				1922.	1923.
Coal tar	Litres	1,823,208	1,259,565	283,063	693,868
Sulphate of ammonia	Kg.	57,389,000	70,740,000	24,980,000	37,559,000
Sulphuric acid	,,	1,010,938	339,452	251,020	55,253
Alum	,,	451,954	661,102	130,786	247,982
Calcium carbide	,,	539,393	1,027,345	147,480	245,702
Carbonate of soda	,,	1,198,428	1,230,163	530,547	362,387
Caustic soda	,,	689,447	2,403,419	237,460	856,537
Copper sulphate	,,	229,833	333,489	64,155	92,910
Iron sulphate	,,	244,274	274,688	168,825	47,580
Alizarine	,,	301,117	245,825	44,035	84,459
Indigo, synthetic	,,	474,035	524,725	171,781	81,836
Other artificial dyes	,,	184,634	156,468	33,707	66,411
Red lead	,,	344,566	456,319	127,440	108,995
Zinc oxide	,,	322,755	570,890	74,019	91,159
Turpentine	Litres	10,517	33,799	9,062	2,960
Soaps—					
Toilet	Fl.	1,863,605	1,141,984	382,377	294,413
Washing	,,	1,573,050	1,730,338	528,062	334,148

Chemical Trade of Chile.—The monthly circular of the British Chamber of Commerce in the Republic of Chile (Incorporated) contains statistics on the value of the principal exports from and imports into Chile during the first six months of 1923. Among the exports are sodium nitrate, valued at 109,000,000 gold pesos (one gold peso equals 1s. 6d.); copper, 48,000,000 pesos; borate of lime, 7,000,000 pesos; iodine, 4,000,000 pesos; and copper ore, 4,000,000 pesos. Among the imports are mentioned edible oils, 2,000,000 pesos; dynamite, 1,670,000 pesos; coke, 1,280,000 pesos; and cement, 1,050,000 pesos.

CONCENTRATED HYDROGEN PEROXIDE.

ADVANTAGES AS A BLEACHING AGENT.

By J. R. Boger, B.Sc., F.I.C.

THE advantages of the hydrogen-peroxide bleach have been the subject of much correspondence and discussion, and it is now generally accepted that hydrogen peroxide is the best bleaching agent available for many classes of materials. Recent reductions in price have made it possible to bleach wool with hydrogen peroxide at a cost comparable with the cost of sulphur stoving. Hydrogen peroxide in the bleaching of straw and silk has been an accepted fact for many years, and its application to cotton and linen goods is on the increase. Outside the textile industry, hydrogen peroxide is used in large quantities for bleaching materials, such as glue, bone, ivory, wax, and fur, and very considerable amounts are also used for medical and surgical purposes.

Preparation of the Concentrated Product.

Concentrated hydrogen peroxide testing 30 per cent. H_2O_2 or 100 volume strength is still regarded by many people as a chemical curiosity, but as a matter of fact it is now playing a very important part in industry. It is prepared by the electrolysis of a solution of sulphuric acid the reactions which take place being indicated by the following equations:

$$2H_2SO_4 = H_2S_2O_8 + H_2.$$
$$H_2S_2O_8 + H_2O = H_2SO_5 + H_2SO_4.$$
$$H_2SO_5 + H_2O = H_2O_2 + H_2SO_4.$$

The sulphuric acid is first converted into persulphuric acid which then reacts with water to form monopersulphuric acid (Caro's acid). The latter is hydrolysed giving hydrogen peroxide, which is recovered in the concentrated state by distillation under vacuum. The material thus produced possesses a high degree of purity. This point is of the utmost importance, for it is well known that the stability of hydrogen peroxide is largely a question of purity, and in consequence the concentrated product is far more stable than the lower strength and more familiar material. Instances are known to the writer of carboys which have been in stock for more than two years, the contents of which have been found to contain practically the same percentage of concentrated peroxide as when they were first bottled. This point is of great importance to the user since in the production of uniform results it is essential that the bleaching agent shall be of regular composition.

Concentrated hydrogen peroxide contains 30 per cent. by weight of real H_2O_2, which means that 100lb. of concentrated peroxide contains 30lb. of real H_2O_2. The more familiar 12 volumes material contains only 3.6 per cent. real H_2O_2. This means that the purchaser has to pay carriage on $8\frac{1}{2}$ times the amount to obtain the same quantity of real H_2O_2, and it must not be overlooked that whether the goods are sold ex works or carriage paid, it is the consumer who pays the carriage in the end.

Disadvantages of Sodium Peroxide.

Sodium peroxide possesses many of the advantages of concentrated hydrogen peroxide, but it also possesses many disadvantages which are not encountered with the latter. Sodium peroxide decomposes when exposed to the atmosphere, and may be explosive in contact with certain classes of organic matter. In the preparation of a bleaching bath, sodium peroxide is dissolved in a dilute solution of sulphuric acid and great care has to be taken that the whole of the sodium peroxide is dissolved, for if undissolved particles are allowed to come into contact with the goods, holes or yellow stains will be produced. Again, some grades of sodium peroxide leave a residue which remains on the surface of the bath and has to be removed by skimming.

Concentrated Peroxide in Continuous Bleaching Processes.

Concentrated hydrogen peroxide is particularly valuable in batching and continuous bleaching processes where the goods are entered into the bleaching bath in the damp state, and after being impregnated with the bleaching liquor are removed and wrung out, leaving the bath with approximately the same amount of water as when they entered. The amount of liquid in the bath in such processes remains approximately constant, and it is merely necessary to add the small amount of concentrated hydrogen peroxide equivalent to the peroxide removed by the goods to maintain the bath at a uniform strength. This is a very difficult matter if the weak peroxide is used as the amount of liquid in the bath has a tendency to increase considerably.

In the ordinary steeping process where the goods are allowed to remain in soak for a number of hours and the bath is only partially exhausted, when the bleach is complete concentrated hydrogen peroxide can be used with great advantage in restoring the bath to its original strength since the amount of material to be added is so small that its volume may be neglected in making the calculation, and further it raises the strength of the bath without any appreciable increase in the total volume.

In view of the advantages of concentrated hydrogen peroxide, it is surely a proposition worthy of the serious consideration of all connected with the bleaching trade.

THE CHINESE DYESTUFFS MARKET.*

RESUMPTION OF BRITISH INDIGO TRADE.

THE countries principally concerned in the imports of dyestuffs into China are Germany, Switzerland, the U.S.A., Japan and Great Britain. Since their alliance with the Badische Anilin und Soda Fabrik, the French Compagnie Nationale has practically dropped out of the indigo trade in China and imports from France have been negligible.

As indicated by imports into Shanghai, which form an important proportion of the total imports into China, increases over the previous years' (1921) figures are shown by Germany, France, and Great Britain, whereas imports from Switzerland, the U.S.A., and Japan were lower than those of the corresponding period of the previous year. The German position in the aniline dye trade remains exceedingly strong, due largely to the powerful advantage among "up country" dyers derived from their old-established "chops." Amongst the more enlightened Chinese consumers in and around the treaty ports, the situation is different in that it is possible for the manufacturer's representative to discuss and demonstrate his firm's products to the individual consumer. The leading British manufacturers offer to their customers a technical service similar to that maintained for many years past by the German firms and have been enabled by its aid to make progress, particularly amongst those consumers to whom "chop" is not a prime consideration.

Indigo imports into China during the period July, 1922/June, 1923, were considerably greater than those of the corresponding period of the previous year, these increases being shared by Germany, Switzerland, and America. The withdrawal of the French manufacturers from the China market is reflected in the fall in imports from France almost to vanishing point. Imports of indigo from Great Britain were negligible since prices up to the close of 1922 were unremunerative and British manufacturers were still holding considerable stocks which it was considered wise to liquidate. These stocks having now been completely disposed of, the importation of synthetic indigo from Great Britain has been resumed and will presumably by continued.

Effects of the Ruhr Occupation.

The occupation of the Ruhr by the French in January last was followed almost immediately by brisk speculation in dyes, based on a belief amongst dealers that war between France and Germany was imminent. Large stocks of dyes, particularly those of German manufacture, were eagerly bought up by dealers, who immediately advanced their prices up to, and in some cases exceeding, 100 per cent. This gamble in dyes, however, suddenly fell away and has not since been resumed. Market prices have also receded to levels not much above those prevailing before this short boom. The dyestuff business, in common with almost all branches of foreign trade, suffers from the general lawlessness is prevailing in China.

Chemical Workers' Strike.—The employees of Thomas Tyrer and Co., Ltd., Stirling Chemical Works, Stratford, London, E., came out on strike on November 19, in consequence, it was alleged, of the dismissal of a man who was discharged with a week's pay on account of the lessened demand for certain work. The strike was unofficial, and the employees' Union, after some negotiation, admitted that the directors of the company had acted within their legal rights. Work was resumed two days after the strike had begun.

* From D.O.T. Report on China (to July, 1923), by H. J. Brett, Commercial Secretary to H.M. Legation, Shanghai.

NOTES ON THE ITALIAN CHEMICAL INDUSTRY.

(From Our Own Correspondent.)

Genoa, November 30.

General News. — A Congress recently held at Trieste discussed the present conditions of the Italian export trade, and the possibility of and means to be adopted for extending it. The Government has sent an industrial commission to the Ruhr to examine closely the position of Italian interests in that region, and to discover possible means of defending these better than at present. The principal Italian interests to be safeguarded are those of the iron industry and of the industries using synthetic colours.

A new Government decree makes it illegal for all gas-works producing more than one million cubic metres of illuminating gas per annum to sell the gas unless it has been first scrubbed free from its light oils to an extent not higher than 15 grammes per cubic metre of gas. This obligation to extract the light oils is also enforced upon coke-oven establishments, the quantity to be extracted in the latter case being a matter to be arranged with each individual works.

Nitrogenous Fertilisers.—In pre-war years about 55,000 tons of nitrate of soda were annually imported into Italy. During the war this figure rose to 100,000 tons, but, of course, included nitrate needed for the manufacture of explosives. After the Armistice, as a consequence of the great confusion in all financial and agricultural activities, and of the existence of large stocks of nitrogen products in the country itself, the importations of Chile nitrate declined; but as soon as liberty was given to agricultural enterprise, and financial conditions became fairly stabilised, the consumption of nitrate of soda rose again, in spite of its price being higher than that of other nitrogenous products and of the fluctuations of the exchange creating obstacles to the trade. From import statistics compiled at the various Italian ports, it is seen that in the season 1920-1921 23,000 tons of nitrate of soda were consumed, in 1921-1922 31,000 tons, and in 1922-1923 51,000 tons. For the fertiliser season 1923-24, every sign points to the nitrate consumption being at least as great as before the war. At present there are in Italy about 12,000 tons of nitrate of soda available for delivery, and from now to June, 1924, there should arrive another 40,000 tons. The production of synthetic ammonia by the Casale process is giving very good results at the Terni works.

Overseas Chemical Trade. — Imports of chemicals, drugs, resins, dyewares, and pigments reached 903,000,000 lire during the first nine months of this year, as against 905,730,255 lire during the same months of 1922. During the period, imports of oils and fats declined from 243,500,000 lire in 1922 to 159,300,000 lire in 1923; and the imports of inorganic chemicals from 136,300,000 lire in 1922 to 90,500,000 lire; whereas exports of oils and fats increased to 210,900,000 lire in 1923 from 67,400,000 lire in 1922, and exports of inorganic chemicals to 47,500,000 lire from 27,100,000 lire. During the first three months of this year Italy exported to Argentina tartaric acid valued at 2,477,850 lire, natural essential oils at 632,560 lire, magnesia at 688,210 lire, olive oil at 439,865 lire, pharmaceutical products at 613,863 lire, and sulphur at 980,700 lire.

Company News.—The report of the Vercelli fertiliser works, Prodotti Chimici Superfosfati, for the last financial year showed a net profit of 276,145.53 lire on a capital of three million lire. A new firm, A. Nebuloni e C. has been established at Milan with a capital of 150,000 lire for the production of hydrofluoric acid, fluorides, and fluosilicates. The Società Anonima Tartari ed Affini of Catania (Sicily) is to increase its capital from 300,000 to 600,000 lire. At S. Maria Maggiore, near Domodossola, there has been established the new firm of Società Ceramica Vigezzina, with a capital of 150,000 lire, for the exploitation of deposits of feldspar and other raw materials for the production of porcelain.

The Fabbrica di Prodotti Sintetici Società Dott. E. Baslini and C., of Milan, is doing considerable business with synthetic acetaldehyde; calcium carbide; paral, a substitute for methylated spirit for power purposes, derived from acetaldehyde, etc. The Società Siciliana di Prodotti e Concimi Chimici, of Palermo, is increasing its capital from 6,000,000 to 10,000,000 lire by the issue of 40,000 shares of 100 lire. The Società Anonima Lorenzo Cammarata per il Commercio e la Distillazione del Catrame has been formed at Naples with a capital of 10,000 lire, with the objects of both distilling and trading in coal tar. The 17th year of the Società Anonima Bolognese per l'Industria dei Concimi e Prodotti Chimici, già Giuseppe Masotti Qm. Luigi, of Bologna, closed with a net profit of 404,988.66 lire on a capital of 2,000,000 lire, a dividend of 7.50 lire per share of 50 lire being declared. It has now been decided to increase the capital from two to three million lire.

The Chemical Market.—The Italian chemical market remains active, and fairly extensive contracts have been placed for caustic soda, sulphate of soda, and nitric acid. There is a rather inexplicable decline in the demand for super phosphate, although prices in Italy, allowing for exchange complications, are much below those quoted abroad. What may be termed comparative stagnation also characterises the demand for sulphate of ammonia, the price of which is slowly and steadily falling. In spite of this, the nitrate-of-soda market is by no means dull. As regards copper sulphate, present prices do not encourage business. Certain activity prevails in the basic-slag market, and imports from France have recovered. The prices of shellac remain firm, and the spot demand for the product is great. Stocks of leaf quality are low, and the holders are not inclined to sell at present prices.

THE DECAY OF BUILDING STONE.

CHEMICAL PRESERVATIVES AND THEIR VALUE.

MR. B. DYER, Chairman of the London Section of the Society of Chemical Industry, presided at the monthly meeting on December 3 when two papers were read as follows:—"The Use and Preservation of Building Stone," by J. Allen Howe; and "The Chemical Aspects of Building Stone Decay," by Dr. J. J. Fox and T. W. Harrison.

Mr. Howe, who is of the Geological Survey of Great Britain, dealt with the purely geological aspect of the subject. He touched upon the controversy as to whether the decay of natural building stone is caused by nitrifying organisms, and said that in towns like London, at any rate, these organisms have very little chance of doing damage in view of the sulphur in the atmosphere.

Sulphur Dioxide the Main Agent of Decay.

Dr. J. J. Fox gave some information gathered in work at the Government Laboratory, and said that so far as London is concerned, there is ample evidence that bacterial action does not come into play. It has been ascertained that the most serious decaying agent in large towns is sulphurous acid, and bacterial action is not of primary importance. Experiments proved that the most potent agent is water, because it carries sulphur compounds down from the atmosphere on to the stone. The problem of preservatives is not an easy problem, said Dr. Fox, nor can we expect to get one preservative which can be applied to all kinds of stone under all conditions. The time had come, however, when the whole problem of stone preservatives should be tried on a large scale. The 1861 Commissioners recommended that this should be done, and at that time there existed practically all the preservatives we now have. The reason why the Commissioners recommendation was not acted upon, however, was that the cost—£150.—was too high!

Inorganic Colloids as Stone Preservatives.

The most promising direction seemed to be in the use of inorganic bodies, because organic materials were liable to oxidise and cause trouble. The most likely materials were inorganic colloids, but even these were liable to dry up and leave the original pores. Another point in connection with preservatives was the formation of a hard surface to the stone. Was that desirable? Some people urged that these kinds of preservatives should be applied again and again until there was a perfectly hard surface to the stone, which, of course, would be of an entirely different composition from the general body of the stone. Personally, he doubted the advisability of this method of preservation.

In the discussion, Mr. Noel Heaton said there had been practically no progress made in preservatives for stone work for the last 50 years. The failure of the different preservatives had been demonstrated time after time and yet we had people continually coming forward and offering products under preparatory names, which it was claimed would solve the problem; nevertheless, they were the same old things over again.

ITEMS OF INTEREST.

Low-temperature Carbonisation. — Arrangements have been made by Low Temperature Carbonisation, Limited, to provide fresh capital through the Trade Facilities Act for the extension of works

Northampton Polytechnic Institute.—The annual prize distribution and students' conversazione will be held on Friday, December 7 (to-day), when Sir W. Martin Conway will distribute the prizes and certificates. The conversazione for members and students will be continued on Saturday.

The Colloid Mill in America.—Research and commercial development work on the Premier colloid mill, colloid processes and colloid products is to be undertaken by the Premier Mill Corporation of Geneva, New York. This company is the American branch of the British Premier Filter Press Co., Ltd.

Agwi Petroleum Finances.—A meeting of the Agwi Petroleum Corporation is called for the 28th inst. to consider a resolution for increasing the capital to £1,500,000. by the creation of 500,000 new shares. It is also proposed to create £300,000. 5 per cent. debentures, repayable at 135, at the option of the company, at any time within six months or in five years.

Australian Chemistry Professorship.—The Senate of the University of Sydney invites applications for the position of Professor of Organic Chemistry (Pure and Applied) in the University. The salary attached to the appointment is £1,100. per annum. Fuller particulars of the appointment may be obtained from the Agent-General for New South Wales, Australia House, Strand, London, W.C. 2.

The Theory of Colloids.—In the course of an interesting lecture on "Recent Advances in Colloid Chemistry," delivered before the Hull Chemical and Engineering Society on November 27, Mr. A. V. Slater, of the research laboratories of Reckitt and Sons, Ltd., stated that, in his view, the theory of colloids could be explained satisfactorily neither by the purely chemical nor by the physical adsorption concept, but that a correlation of the two by the light of recent research on surfaces and interfaces was necessary.

Obituary.—We regret to announce the death, on Saturday, of Mr. Sydney Knowles Muspratt, aged 74. Mr. Muspratt was a nephew of Dr. E. K. Muspratt, and a first cousin of Sir Max Muspratt, Bt. Mr. S. K. Muspratt was an alderman of Flint Town Council, and was mayor in 1896-7. In 1908 he served the office of High Sheriff of Flintshire, which had been held by his father and by his brother, the late Mr. James Liebig Muspratt.—It is with deep regret that we learn as we go to press of the sudden death of Mr. John Wilkie, B.Sc., F.I.C., the chairman of the Nottingham Section of the Society of Chemical Industry.

The British Empire Exhibition.—We have received an advance copy of a new folder on the subject of the 1924 Exhibition, which gives the latest available information of the many attractions the great Exhibition is to contain. Especially interesting is the reference to the British Government Pavilion, the description of which is the first that has been authorised for publication. In this Pavilion, the Ministry of Health, the Ministry of Agriculture, the Mines Department, the Imperial Mineral Resources Bureau, the Royal Botanical Gardens, and the Geological and Ordnance Survey will all be attractively represented.

Personal.—We are advised of the retirement of Mr. Alex. Fraser, who since 1869 has been actively connected with the heavy chemical industry, first as a process worker, and subsequently as a foreman. Mr. Fraser started work at a chemical works in the Widnes district. He then was foreman at Norris's, of Sowerby Bridge, and afterwards acted in a similar capacity at Dan Dawson and Sons, of Milnsbridge; Read, Holliday and Sons, Ltd., of Huddersfield; and J. Brown and Co., Ltd., of Dewsbury. For the last ten years Mr. Fraser has been with the West Norfolk Farmers' Chemical Manure Company, Ltd., of King's Lynn. Always shrewd, and with an intuitive knowledge of the requirements of the heavy-chemical trade in the matter of the erection of plant, and its subsequent operation, he has been peculiarly successful, and has done excellent work for the many firms with whom he has been associated during the last fifty years. It need hardly be said that Mr. Fraser, who is seventy-four years of age, carries with him the good wishes and esteem of many friends in his well-merited retirement.

British Coal Output.—During the week ending November 24 the coal output from the mines of Great Britain was 5,726,000 tons, compared with 5,574,100 during the previous week and 5,471,800 in the corresponding week of last year.

Sugar Beet in Lincolnshire.—The Holland (Lincolnshire) Farmers' Union, which has 1,000 members, has decided that it cannot recommend farmers in South Lincolnshire to grow sugar beet next year unless the factories offer a more reasonable contract than the one operating this year.

Atmospheric Corrosion.—The first experimental report to the Atmospheric Corrosion Committee of the British Non-Ferrous Metals Research Association will be discussed at a meeting of the Faraday Society, on the 17th inst. at 8 o'clock, in the rooms of the Chemical Society, Burlington House.

Explosion on British Steamer.—With regard to the explosion on the s.s. Otterburn, referred to in these columns last week, we are now informed by Mr. W. J. U. Woolcock, of the Association of British Chemical Manufacturers, that there was no chlorate of potash in the cargo, but that there was a parcel of potassium chloride.

The Imperial Institute.—On the retirement of Professor Wyndham R. Dunstan, Mr. H. M. Lidderdale, Secretary to the Executive Council, has been appointed Acting Director of the Imperial Institute from December 1, pending the reorganisation of the Institute. All communications on the business of the Institute should be addressed to the Acting Director, Imperial Institute, South Kensington, S.W. 7.

Danish Industry and Trade.—We have received from the Central Institute for Audit and Trade Organisation in Commerce, Industry, and Agriculture, Ltd., of "Copenhagen, B. Glydenlovesgadi," copy of a pamphlet (in English) descriptive of the activities of the Audit. The information contained should be of considerable practical interest to British firms concerned with Danish industry and trade. Copies will be forwarded to readers on request to the Copenhagen address given above.

New High Commissioner for India.—On Friday of last week, Mr. J. W. Bhore made over charge of the Secretaryship to the High Commissioner for India to Sir Edward Cook, late Financial Secretary to the Government of India, as an acting appointment. The High Commissioner will be responsible to the Government of India for the placing of contracts for a large part of the expenditure of £70,000,000., which will have to be spent by the Indian Governments and railways on public works developments and renewals within the next few years.

University News.—The Council of Leeds University has appointed Mr. Wilfred H. Hoffert to the post of research chemist to the Joint Research Committee of the National Benzol Association and the University, in succession to Professor E. C. Williams, who resigned his appointment on his election to the Ramsay Memorial chair of Chemical Engineering in the University of London.—At Manchester, Professor Bragg has been elected Dean of the Faculty of Science; Mr. R. Forsyth has been appointed demonstrator in Technological Chemistry in the Faculty of Technology. —Professor Arthur Smithells, F.R.S., who formerly occupied the chair of Chemistry at Leeds University, has had the title of Emeritus Professor conferred upon him by the Council.

The Royal Society.—At the 261st anniversary meeting of the Royal Society, at Burlington House, on Friday afternoon last, reference was made to Sir Alfred Yarrow's gift of £100,000., to mark his sense of the value of research to the community, and it was announced that Professor Fowler and Mr. G. I. Taylor had been appointed to the Yarrow Professorships. The President (Sir Charles Sherrington) said that Professor Alfred Fowler was known the world over as a spectroscopist whose researches had been of the greatest value to astronomy, physics, and chemistry. Mathematics, engineering, and geophysics had formed the field of research of Professor Taylor. The following officers and members of Council were elected:—President, Sir Charles Sherrington; Treasurer, Sir David Prain; Secretaries, Mr. W. B. Hardy and Mr. J. H. Jeans; Foreign Secretary, Sir Arthur Schuster. Other members of Council:—Sir Frederick Andrewes, Professor C. G. Barkla, Sir William Bragg, Professor W. E. Dalby, Professor A. S. Eddington, Professor T. R. Elliott, Professor E. S. Goodrich, Sir Sidney Harmer, Sir Thomas Holland, Sir Frederick Keeble, Professor T. R. Merton, Professor H. F. Newall, Professor D. Noel Pator, Dr. A. Scott, Mr. F. E. Smith, and Professor J. F. Thorpe.

U.S. WOOD PRODUCTS OUTPUT.—Figures just published by the U.S. Department of Commerce, show that the total American production of lime acetate during the first nine months of the present year was 122,869,828lb., and that the production of methanol (methyl alcohol) during the same period was 6,499,172 gallons.

EXTENSIONS OF PATENTS.—In the *Illustrated Official Journal* (*Patents*) of November 28, it is announced that the Société d'Exploitation de Procédés Evaporatoires (Système Prache and Bouillon) have applied for extensions in the terms of British Patent No. 10,413, of 1909 ("Improvements in or relating to Injector Apparatus for Compressing Steam or other Elastic Fluid"), and British Patent 9,276, of 1909 ("Improvements relating to Apparatus for Concentrating Liquids"). It is also announced that the Chemical Engineering and Wilton's Patent Furnace Company, Limited, have applied for an extension in the term of British Patent 26,910, of 1907 ("Improvements in or relating to the Distillation of Tar.")

POTASH RECOVERY AT SWEDISH CEMENT WORKS.—According to *Swedish Export*, the Swedish Board of Trade has recommended that the Slite Cement Works on the island of Gotland be granted a Government loan for extending its plant for production of potash on the Jungner method. The Board says that, in view of the large Swedish importation of German Stassfurt salts for fertiliser purposes, amounting to 10,000,000 kroner, it is of importance to ascertain how far the Swedish raw material can be utilised to compensate for this import. The conditions at Slite for recovery of potash from the clay according to the Jungner method seem to be very favourable, and the Board therefore thinks it probable that the results will prove encouraging.—*Engineering.*

TAR MARKET IN FINLAND.—Sales of tar in Finland during November have been sluggish. In consequence of the uncertain political situation, foreign buyers are not eager to purchase, and both Poland and Czecho-Slovakia have now appeared on the scene as competitors, whilst a tar industry is developing within the importing countries themselves, where there is always a considerable demand for this article. Fluctuations in the rate of exchange have kept France out of the market, and Holland, Germany and Great Britain have purchased only small quantities of late. From the beginning of the year up to the end of September exports of tar did not amount to more than 670 tons, whilst last year at the same time the quantities totalled 1,944 tons, and in 1913 were 1,812 tons.

PURIFICATION OF ALUMINIUM-SULPHATE SOLUTIONS.—The success of experimental work on the purification of copper-sulphate solutions and zinc-sulphate solutions, made by the Department of the Interior at the Pacific experiment station of the U.S. Bureau of Mines, suggested that possibly aluminium-sulphate solutions could be purified of iron compounds and thus provide a much needed cheap process of producing iron-free alum and other aluminium salts, which are now twice as costly as the less pure salts and yet are used in large tonnages by the baking powder makers and the paper mills, and for water purification. Three different modifications of a laboratory method for hydrolytic removal of iron from aluminium-sulphate solutions were worked out. Further experimentation is being conducted by the Bureau of Mines with a view to developing this method into a practical process for preparing pure alumina direct from clays for use in the aluminium industry.

THE STRENGTH OF CONCRETE.—The question of how to proportion the ingredients in designing concrete mixtures is an important one. Bulletin No. 137, just issued by the Engineering Experiment Station of the University of Illinois, enunciates relations between the compressive strength of the concrete and the amount of the cement and voids contained therein. It develops methods for studying the concrete-making properties of fine and coarse aggregates. Means are suggested for estimating the effect upon the strength and density of concrete that accompanies an increase in the amount of mixing water beyond that which would give minimum volume to the concrete. Analytical relations are developed and the technique for the proposed tests are described. The results of tests of mortars and concretes made up with a variety of fine aggregates are recorded and the accuracy and applicability of the methods discussed. Copies of the Bulletin may be obtained without charge by applying to the Engineering Experiment Station, Urbana, Illinois.

COMING EVENTS.

Society of Chemical Industry (Manchester Section).—Joint meeting with the Institution of the Rubber Industry, **Friday, December 7,** at **7 p.m.,** at the Textile Institute, 16, St. Mary's Parsonage. Papers: "Methods to be Adopted in Comparing the Activity of Various Accelerators," by S. Martin; "The Analysis of Rubber Vulcanisation Accelerators," by Dr. T. Callan and N. Strafford.—(**South Wales Section**): Meeting, **Friday, December 7,** at **7.30 p.m.,** at the Technical College, Cathays Park, Cardiff. Paper: "Coke Ovens," by T. G. Watts, to be followed later by a visit to the Maritime Coke Works, Pontypridd.

Institute of Chemistry. — Annual dinner, **Monday, December 10,** at **7.30 p.m.,** at the Hotel Victoria, Northumberland Avenue.—(**Manchester Section**): Meeting, **Monday, December 10,** at **7 p.m.,** at the Textile Institute, St. Mary's Parsonage, Deansgate.

Institute of Metals (Scottish Section).—Meeting, **Monday, December 10,** at **7.30 p.m.,** at 39, Elmbank Crescent, Glasgow. Paper: "Cold Working of Metals and Its Influence on the Properties and Uses," by A. T. Adam.—(**N.-E. Coast Section**): Meeting, **Tuesday, December 11,** at **7.30 p.m.,** at Armstrong College, Newcastle-on-Tyne. Paper: "Admiralty Gunmetal," by S. G. Homfray and F. Adam.—(**Birmingham Section**): Meeting, **Tuesday, December 11,** at **7 p.m.,** at the Chamber of Commerce, New Street. Paper: "Extrusion Problems" by Major R. M. Sheppard.—(**London Section**): Meeting, **Thursday, December 13,** at **8 p.m.,** at 85-88, The Minories, Tower Hill, E. 1. Paper: "Some Foundry Problems," by A. H. Mundey.—(**Sheffield Section**): Meeting, **Friday, December 14,** at **7.30 p.m.,** at the University, St. Georges' Square. Paper: "The Metallurgical Microscope," by J. H. G. Monypenny.—(**Swansea Section**): Meeting, **Friday, December 14,** at **7.15 p.m.,** at University College, Singleton Park. Paper: "The Brinell Hardness Test," by A. L. Norbury.

Hull Chemical and Engineering Society.—Meeting, **Tuesday, December 11,** at **7.45 p.m.,** at the Photographic Society, Grey Street. Paper: "Recent Advances in the Study of Corrosion," by Dr. J. Newton Friend.

Society of Chemical Industry (Edinburgh Section).—Meeting, **Tuesday, December 11,** with the Institute of Chemistry. Paper: "H.M. Factory, Gretna," by Allin Cottrell.—(**Newcastle Section**): Meeting, **Wednesday, December 12,** at **7.30 p.m.,** at Armstrong College, Newcastle-on-Tyne. Paper: "The Sterilisation of Preserved Foods," Miss C. M. Dugdale.—(**Chemical Engineering Group**): Joint meeting with the Liverpool Section on **Wednesday, December 12,** at **6 p.m.,** at 14, Elliott Street, Liverpool. Paper: "Extraction of Oils from Seeds Nuts, and Kernels," by J. T. Brewis. Visit to the African Oil Mills during the afternoon.

Institute of Chemistry (South Wales Section).—Visit on **Wednesday, December 12,** to the Chemical Department of University College, Swansea.—(**Leeds Section**): Meeting, **Thursday, December 13,** at **7 p.m.** Paper: "Practice Under Modern Patent Law," by Griffith Brewer.

Society of Dyers and Colourists (West Riding Section).—Meeting, **Thursday, December 13.** Paper: "The Dyeing of Artificial Silks," by W. E Sanderson.—(**Manchester Junior Branch**): Meeting, **Friday, December 14.** Paper: "Artificial Silk from the Chemist's View-point," by J. W. Shuttleworth.

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, December 14,** at **7 p.m.,** at 36, George Street.

West of Scotland Iron and Steel Institute.—Meeting, **Friday, December 14,** at Glasgow. Paper: "The Sulphur Content of the Acid Charge," by J. H. Whiteley.

Society of Chemical Industry (Birmingham Section).—Joint dinner with the Institute of Chemistry on **Saturday, December 15,** at **7.15 p.m.,** at the Queen's Hotel.—(**Glasgow Section**): Ramsay Chemical Dinner on **Thursday, December 20,** at the Ca'doro Restaurant.

Institution of the Rubber Industry. — Meeting, **Monday, December 17,** at **8 p.m.,** at the Engineers' Club, Coventry Street, Piccadilly, W. Paper: "The Position of the Rubber Tyre Industry," by Col. Sealy Clarke.

Chemical Society.—Meeting, **Thursday, December 20,** at **8 p.m.,** at Burlington House, Piccadilly, W. 1.

CORRESPONDENCE.

*** *We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE INSTITUTE OF CHEMISTRY.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—It may interest your readers, and especially the Fellows and Associates of the Institute of Chemistry and the members of the British Association of Chemists, as well as employers of chemists, to know that it is common knowledge in Liverpool, if not in other sections, that the Council of the Institute of Chemistry is admitting a candidate to a "sort" of examination for the Fellowship of the Institute, apparently contrary to the Charter. We should like to know why this candidate is given special treatment, and we would also like to be convinced that the examination is a fair one. While I was a Member of Council I had dozens of letters complaining that candidates had asked the Council of the Institute to let them sit for the examination, but they were told they had not complied with the preliminaries and would have to do so before they could be admitted. This treatment was most unfair because in the past it had been done. Personally, I do not mind the present candidate being admitted to the examination if the Charter permits, and providing the Council will give the rejected candidates during these last six years the same privilege if they will consent to accept, but I know many who will not do so now.—Yours, etc.,

C. Watson Gray,
Ex-Member of Council of the Institute of Chemistry.

Liverpool,
December 1, 1923.

CHEMISTS AND THE ELECTION.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Once again the British Association of Chemists has taken the opportunity of placing before the candidates for election a questionnaire covering matters affecting vitally the welfare of the chemists of the country. Replies have, so far, been received from over 20 per cent. of the candidates, and among the large number of replies (over 90 per cent.) in support of our programme are to be found the following:—*Conservative*: Rt. Hon. L. C. S. Amery, Rt. Hon. Sir Douglas Hogg, Sir F. Sykes, Sir P. Sassoon, and and C. S. Garland. *Liberal*: E. Brotherton Ratcliffe, Cdr. Kenworthy, Rt. Hon. J. M. Hogge, and F. Briant, L.C.C. *Labour*: Rt. Hon. A. Henderson, W. Thorne, G. Lansbury, H. G. Wells, C. W. Bowerman, and E. G. Hemmerde.

Considering the strenuous conditions under which candidates live at election times, and especially the more prominent ones, we consider the response to our questionnaire extremely satisfactory.—Yours, etc.,

I. Boodson,
Hon. General Secretary,
British Association of Chemists.

London, W. 1,
December 4, 1923.

CHEMICAL ENGINEERING AND HYDROCHLORIC-ACID TREATMENT.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir. — It is obvious that the writer of the letter signed "Guthrie and Co.," in your issue of November 30, was not present at the meeting of the Chemical Engineering Group at which this subject arose. Although the handling of hot hydrochloric-acid solutions (such as occur in the hydrochloric-acid treatment of leucite) presents no terrors to the chemical engineer, this is not true of the chemical manufacturer.

The question of pumping such solutions is only a small part of the difficulties which occur in some factories. The loss of hydrochloric acid as vapour is usually increased by the means taken to avoid the nuisance of its presence in the factory itself. The treatment of leucite by hydrochloric or nitric acid in practically sealed plant presents no serious difficulty, but involves a departure from the methods we find in works "not very far" from my "lecture room."—Yours, etc.,

J. W. Hinchley.

South Kensington, London, S.W. 7.
December 4, 1923.

STOCK AND SHARE LIST.

LONDON QUOTATIONS DURING NOVEMBER.

Div. or Int.	Paid	Name of Company.	Sh're Val.	Nov. 2—28. Highest	Lowest
1/–	7/7/23	Allen Liversidge	£1	24/–	22/6
7%†	1/12/23	Aluminium Corp., Pref. Stk. (7% Cum.)	100	69½	65
1/–	16/4/23	Ass. Port. Cement	1	26/10½	23/6
–/7½	1/10/23	Benzol and By-products, 6% Cum. Ptg. Pref.	1	16/9	15/3
3/–	23/6/23	Bleachers' Assn.	1	48/–	45/6
5/–	2/7/23	Boake, Roberts, 5% Cum. Pf.	10	*6⅜	6
1/–	15/11/23	Borax Consolidated Def.	1	39/6	36/6
1/–	3/9/23	Bradford Dyers' Assn.	1	59/6	54/9
–/6	1/10/23	British Aluminium	1	18/10½	17/–
—	—	British Celanese 7½% Cum. Ptg. Pref.	1	11/10½	8/4½
–/9	31/5/23	British Cotton and Wool Dyers	5/–	8/6	7/6
1/–	16/12/20	British Cyanides	1	24/	19/4½
—	—	British Dyestuffs, Def.	1	3/6	2/3
—	—	British Glues and Chemicals	1	4/7½	4/–
1/–	3/9/23	British Oil and Cake	1	28/3	25/3
1/9	12/7/23	British Oxygen	1	45/–	42/6
1/–	1/11/23	British Portland Cement	1	30/–	27/6
–/8⅜	13/12/23	Brunner, Mond	1	38/3	36/–
–/9⅜	1/11/23	Bryant and May	1	47/10½	45/6
2/6	1/10/23	Bush (W. J.) and Co., 5% Cum. Pref.	5	°70/–	58/–
2/6	29/9/23	Calico Printers' Assn.	1	28/–	26/6½
–/6	–/12/23	Cassel Cyanide**	5/–	16/–	15/0
4½%	1/8/23	Castner-Kellner, 4½% 1st Mt. Db. Sk. Rd.	100	*85	82½
2/–	22/3/22	Cerebos	1	29/6	29/6
1/6	11/1/22	Champion and Slee	1	10/–	10/–
–/9⅜	2/7/23	Cory (Horace) and Co.	1	16/9	15/3
1/3	3/8/23	Courtalds	1	63/6	59/3
–/7½	2/7/23	Crosfield (J.), Cum. 6% Pref.	1	20/4½	20/3
5/6	8/1/23	Egypt. Salt and Soda (Bearer)	1	24/3	22/4½
–/7½	18/8/23	English Velvet Dyers	1	*31/6	26/6
1/–	10/7/20	Evans, Sons, Lescher and Webb	1	*8/9	5/–
1/3	3/7/23	Field (J. C. and J.)	10/–	14/6	13/6
–/7½	2/7/23	Gossage (Wm.), 6½% Cum. Pf.	1	19/6	18/10½
2/6	1/8/23	Knight (J.), 25% Cum. Pref. Ord.	1	60/–	57/6
1/6	18/10/20	Lawes' Chem. Manure	1	*4/6	2/6¾
–/8⅜	2/7/23	Lever Bros., 7% Cum. Pref.	1	21/10½	21/1½
—	—	Magadi Soda	1	1/9	1/4½
1/6	3/8/23	Mond Nickel	1	39/4½	35/–
–/9⅜	2/7/23	New Transvaal Chem. A Pf. (8% Cum.)	1	23/4½	23/–
1/4½	2/7/23	Nobel Industries	1	21/9	20/3
5%	2/7/23	Pears (A. and F.), 5% Deb. Stk. Irred.	100	94	94
1/2⅜	8/9/23	Pinchin, Johnson	1	40/3	38/–
–/6⅝	23/10/23	Sadler & Co. (14/7/– paid up)	1	*15/3	15/3
2/–	14/4/23	Salt Union	1	21/6	20/6
–/10½	1/12/23	"Sanitas," 9% Cum. Pref.	1	25/–	23/–
–/7½	2/7/23	Stevenson and Howell, 6¼% Cum. Pref.	1	17/10½	16/16
–/9⅜	1/9/23	United Alkali	1	31/3	30/7½
–/5	1/9/23	United Indigo and Chem.	3/4	*6/7½	4/3
1/–	28/3/23	United Premier Oil and Cake	1	11/1½	10/–
1/2⅜	1/12/23	Wall Paper Manfrs.	1	24/4½	23/1½
1/6	20/7/23	Welsbach Light	1	15/–	13/–
2/6	2/7/23	Wheen (R.), 5% Cum. Pref.	5	55/–	45/–
2/–	27/6/23	White, Tomkins and Courage	1	24/1½	23/3
3/4½	20/6/23	Yorkshire Dyeware and Chem.	15/	*29/9	21/3
52/– p.c. †	1/9/23	Gas Light and Coke (4% Stand.)	100	96	92
5%	3/9/23	South Metropolitan Gas, Ord. Stk.	100	99	96¾
1/3	30/11/23	Aguas Blancas Nitrate	5/–	34/–	30/3
1/6	6/12/23	London Nitrate	1	54/9	53/6
1/–	3/11/23	Salar del Carmen Nitrate	1	64/6	62/6
7/6	26/4/23	Mason and Barry (Bearer)	1	47/–	44/4½
10/–	1/11/23	Rio Tinto (Bearer)	5	32⅜	30⅜
5/–	10/5/23	Tharsis Sulphur (Reg.)	2	75/7½	70/7½

All ordinary shares except where otherwise specified.
* January 2 to October 31, 1923. † Actual.
** Quoted at Glasgow.

German Use of Wrong Measures.—The London Chamber of Commerce is informed that the complaints of short measure which have recently been made by oversea buyers, more especially in South American countries and Japan, have been found to be due to the use of German tape-measures, accurately marked with metre measurements on one side and with the old German yard or "elle" of 37 inches on the other. The London Chamber of Commerce has already taken steps to warn its correspondents abroad, as well as the Board of Trade and the Department of Overseas Trade, of the injury which will result to British commercial prestige, unless foreign buyers use measures of British standard and manufacture.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Frater (Geo. A.) and Co., Ltd., Gateshead, paint manufacturers.—Registered November 14, £6,000. mortgage, to South Shields Commercial Permanent Building Society.

Kennedy's Glass Works, Ltd., Boscombe.—Registered October 22, two mortgages, to National Provincial and Union Bank of England, Ltd., securing all moneys due or to become due to the Bank.

Morris (P.) and Co., Ltd., Liverpool, paint manufacturers, etc.—Registered November 20, £5,008. mortgage, to Leeds Provincial Building Society.

Petroleum Products, Ltd., Liverpool.—Registered November 16, second debenture securing all moneys advanced by or owing to the holders, Bickersteth Baker and Co., Tower Building, Liverpool.

Shardlow Chemical Company, Ltd., Beeston.—Registered November 17, £7,250. debenture, to F. W. Chambers, High Street, Long Eaton, paper merchant, and another.

Walker (J. B.) and Co., Ltd., Hull, oil refiners.—Registered November 20, £1,000. debentures, part of £8,000.

SATISFACTIONS.

Rolls and Co., Ltd., London, N., paint manufacturers.—Satisfaction registered November 19, £150., balance of amounts registered October 13, 1902, and February 11, 1903.

Somerset Oxide and Ochre Company, Ltd., Bristol.—Satisfaction registered November 15, all moneys, etc., registered June 20, 1921.

Synthetic Products Company, Ltd., London, E.C.—Satisfaction registered November 16, £7,500., etc., registered April 23, 1915; £6,000. (not ex.), registered January 15, 1916; £2,500., registered October 2, 1917; £3,050., registered September 21, 1918; £5,000. (not ex.), registered December 24, 1918; £1,000. (not ex.), registered August 4, 1920; and £500., registered December 18, 1922.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

United Chemical Manure Company, Ltd., London, E.C.—Resolved October 30, confirmed November 15. H. H. Keddell, liquidator.

DISSOLUTIONS OF PARTNERSHIP.

(*Note.—When two dates are given in the following announcements, the first is the date of the dissolution. The date in parentheses is that of the official advertisement.*)

Allied Chemical Company (Ernest Chas. Tyler and Alf. Thos. Holloway), 66, Bownend Road, Fishponds, Bristol. October 12. Debts by A. T. Holloway, who continues under same style at 77, Thingwall Park, Fishponds, Bristol. (November 20.)

Hayton and Co. (Matthew Hayton, Wilfred Hayton, and Geo. Stanley Hayton), 99, Gilesgate, Durham, wholesale druggists. May 7, 1923. Debts by W. Hayton and G. S. Hayton, who continue. (November 20.)

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Booth, T. A., Idle; wholesale manufacturing druggist; £89. 14s. October 3.

Britonia Polish Company, Ltd., 7, Isabella Street, Preston; manufacturers; £19. 16s. 6d. September 25.

Cheshire Feeding Meals and Fertilisers, Ltd. (registered office, Prince Chambers, 16, John Dalton Street, Manchester); manufacturers; £17. 3s. 1d. October 23.

Hall, Harry H., Sladen Dye Works, Littleborough; dyer; £15. 13s. 10d. October 22.

Jones (Evan) Son and Co., Ltd., registered office, The Red House, Cowell Street, Llanelly; manufacturing chemists; £22. 1s. 4d. October 24.

Kendall, Chas., and Co., Gildersome, cod liver oil manufacturers; £39. 5s. 6d. October 10.

Niblett Brothers, No. 16 Wharf, Hertford Road, Kingsland; solder manufacturers; £13. 2s. 6d. October 22.

Ridley, J. F., Scholars Green; chemical manufacturer; £28. 8s. 11d. October 23.

Shuttleworth, J. W. W., 21, Lloyd Street, Manchester; artificial silk manufacturer; £10. 17s. 3d. October 25.

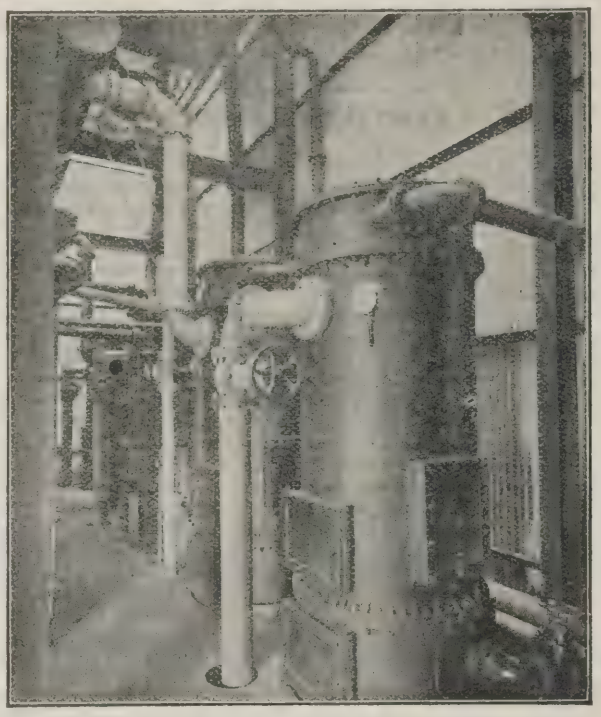
Wenning Paint Works, Bentham; £13. 11s. 2d. October 27.

Silver Badge Polish Company, 49, Abbotts Road, Southall; polish manufacturers; £18. 3s. 4d. October 23.

FERTILISER NEWS.

Nitrate of Soda.—Shipments during November, amounting to about 163,000 tons, were lower than they might have been had not the labourers' strike at Iquique adversely affected loading at that port. Efforts have been made to cope with the situation by enlisting the aid of any labour available, but progress under such conditions is very slow. On the basis of last year's figures, exports to Europe and Egypt are fairly well maintained at 102,000 tons, against 106,000 tons for November of last year. The extent to which the European market is depreciated by the absence of Germany as a buyer is shown by comparison with the 1913 figure, amounting to 221,000 tons. America, and other countries, accounted for some 61,000 tons, against 93,000 tons a year ago. In the f.o.b. market further business has been done by the Producers' Association, which reports about 50,000 tons sold during the later half of November. Total sales for shipment during the current fertiliser year, therefore, reach between 1,430,000 and 1,440,000 tons—a considerable improvement compared with the position at the same date in 1922, when 1,100,000 tons were reported as disposed of. It is stated that most of the business has been transacted on American account, giving rise to confident expectations that the lack of interest in the Chilean product on "the other side" is diminishing. Stocks in the United States are low at the present time, the visible supply at the end of November being 98,000 tons, against 177,000 tons last year. According to American advices, however, the market is very quiet, and buyers are endeavouring to shade prices wherever possible. The weakening of the English exchange, a fact which affects the price in America to a slight extent, is disturbing the market somewhat. Stocks in Europe and Egypt are rising, imports at 63,500 tons exceeding deliveries inland from ports by 25,000 tons, increasing the visible supply, which includes nearly 180,000 tons now afloat, to about 468,000 tons. Some perturbation is caused by the announcement of the latest tax-raising measure of the Chilean Government. Under the provisions of a Bill which has been passed by the Senate, and sent to the other Chamber, it is proposed to tax the profits of foreign companies operating in Chile. This tax, which amounts to 3 per cent, is likely to impose a heavy burden on the nitrate industry.

Sulphate of Ammonia.—The report presented at the annual meeting of the Sulphate of Ammonia Federation, held recently in London, contains statistics of a very interesting nature. Production of ammonia in all forms calculated in terms of 25 per cent. sulphate in 1922 totalled 361,675 tons in the United Kingdom and 466,070 tons in the United States, compared with 260,850 tons and 320,090 tons respectively in 1921 and 409,875 tons and 445,950 tons in 1920. Provisional estimates for 1923 indicate that the total reached in 1920 will be slightly exceeded. In the United Kingdom during the fertiliser year ending May 31, 1923, there was a steady recovery in output, chiefly at coke-oven plants, and the total production of sulphate of ammonia is estimated at about 340,000 tons, compared with 229,390 tons for the previous twelve months. Consumption in the United Kingdom during the period is stated to be about 140,000 tons, an increase of some 4,000 tons. The Board of Trade returns covering the same months give the exports as 187,600 tons. The increase in the domestic consumption is considered to be more favourable than the actual figures would warrant, as it is accompanied by a corresponding increase in the consumption of nitrate of soda, while Norwegian nitrate of lime to the extent of 10,000 tons was imported during the year. The amount of sulphate used in the United Kingdom has been steadily diminishing since the peak year 1918-19, when 269,000 tons were absorbed, followed by 233,500 tons in 1919-20, 166,920 tons in 1920-21, and 136,000 tons in 1921-22, so that the turn of the tide is certainly a matter for gratification. Compared with the pre-war figure of 40,000 tons, the present position is certainly satisfactory.



ROSE, DOWNS & THOMPSON, Ltd.

Old Foundry, HULL.

28, Victoria St., Westminster, LONDON, S.W.1.

Tel. Address :—ARROSER, VIC., LONDON.
Telephone :—No. 2496, Victoria.

SPECIALITY :—

Chemical Oil Extraction Plant.

INFLAMMABLE and NON-INFLAMMABLE SOLVENTS.

AMMONIA & TAR PRODUCTS

Carbonate of Ammonia

ENQUIRIES SOLICITED.

BROTHERTON

WORKS:
BIRMINGHAM
GLASGOW
LEEDS
LIVERPOOL

& COMPANY LIMITED

LEEDS

WORKS:
PORT RAINBOW
SUNDERLAND
WAKEFIELD
WORKINGTON

REPORTS OF COMPANIES.

Huelva Copper and Sulphur Mines, Ltd.

It is reported that a somewhat decreased tonnage of ore was extracted during the year to June 30 last, the amount being 45,870 tons, as against 47,492 tons in the previous year, and 50,189 tons in 1920-21. In addition, 3,749 tons of higher grade ore were purchased from other mines and contributed to the output of copper, which was 1,853 metric tons, an increase over those of the two previous years. The total receipts for the year amounted to £161,845.; after deducting Spanish and London expenses and loss on exchange, the net profit was £11,463., comparing with £6,001. in 1921-22 and £20,601. in 1920-21. The directors have applied £3,094. in increasing the provision for depreciation to £40,000., and now recommend a dividend of 8d. per share (3⅓ per cent.), as a year ago. The balance forward is £1,024. against £1,978. brought in.

North Broken Hill, Ltd.

During the year ended June 30 the profit, after allowing for mine expenditure, taxation, etc., and reserve for depreciation, was £284,780., to which is added £30,000. brought forward. During the year three dividends of 2s. per share (or 30 per cent.) have been paid (against 10 per cent.); £13,333. has been placed to debenture sinking fund reserve, while £52,000. has been appropriated for plant expenditure, leaving a balance of £69,447. The assets at June 30 last show a surplus over liabilities of £532,454. (exclusive of shares and debentures in other companies).

DIVIDENDS.

Cassel Cyanide Company, Ltd.—The net profit for the year to September 30 last, together with the balance from last year, amounted to £67,388. The interim dividend of 3d. per share absorbed £17,625., and the directors have recommended a final dividend of 6d. per share, less tax, requiring £35,250., leaving £14,513., to be carried forward.

British Oxygen Company, Ltd.—Directors have declared an interim dividend on account of year ending March 31, 1924, of 9d. per share, equivalent to 3¾ per cent. actual, free of tax.

Scottish Oils Company, Ltd.—No interim dividend will be paid on the 7 per cent. non-cumulative participating preference shares.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

Interest has been aroused by the announcement that the coke makers in West Cumberland are considering the installation of a new type of washer for the purpose of producing a coke as hard and as low in phosphorus as East Coast coke. It is recognised that if the coke makers can make good their claim that the low-phosphorus iron smelters will be enabled to dispense with the East Coast coke, it will not take them more than two years to recoup themselves for their outlay. The cost of the local coke to smelters of ordinary iron at present is between 25s. and 26s. per ton. The cost of the new coke, it is stated, would be at least 9s. per ton less than that of the East Coast coke. If, as is believed, the coke makers embark on this project they not only improve their own collieries and coking plants, but they put the smelters in the way of competing on much more favourable terms with the smelters of hematite pig-iron in Scotland and on the East Coast. There is little that is new to say concerning the movement in trade at the moment. The improvement in the pig-iron trade is maintained, and as the local consumption of metal is growing, it is evident that an additional furnace or two will within a few weeks have to be put into blast. The coal trade is very busy, and the whole of the make of coke is going into consumption. Residuals are in slow demand. East Coast coke supplies this week are 9,900 tons.

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," December 8, 1888.)

The Spanish Mineral Trade.—The exportation of iron ore from Spain continues to be very active, and would be even more important if it were not partly checked by the want of steamers. It amounted, however, to upwards of 3,000,000 tons from January 1 to October 20 last, this figure being only a little below the returns for the corresponding period of 1887. The decision of the Spanish Government to lay an export duty on iron ore, towards defraying the cost of the Bilbao harbour works, has caused considerable dissatisfaction in commercial circles in Spain and other countries, still the prices are firmly maintained at 8s. to 8s. 4d. for Campanil, and 7s. to 7s. 6d. for red ore.

CHEMICAL TRADE OF THE NETHERLANDS.

OCTOBER IMPORTS AND EXPORTS.

The following statistics, which have been furnished by the Bureau voor Buitenlandsche Bedrijfsberichten, of The Hague, show the amount and value of Holland's trade in chemicals during the month of October, 1923.

Imports of Chemical Products.

		Kilogrammes.	Florins.
Calcium acetate	Total	221,000	19,000
	Belgium	70,000	15,000
Lead acetate	Total	5,000	3,000
Acetone	Total	3,000	3,000
Methyl alcohol	Total	31,000	16,000
Ethyl ether	Total	3,000	1,000
Chloroform	Total	1,000	1,000
Soda ash	Total	3,457,000	247,000
	Germany	1,000	—
	Belgium	23,000	1,000
	B.E. Africa	103,000	8,000
	France	1,386,000	99,000
	Gt. Britain	1,945,000	138,000
Soda crystals	Total	52,000	2,000
Caustic soda	Total	622,000	115,000
	Germany	22,000	4,000
	Gt. Britain	329,000	61,000
	France	11,000	2,000
	U.S.A.	248,000	45,000
Bleaching powder	Total	416,000	39,000
	Germany	63,000	5,000
	Belgium	239,000	21,000
	Gt. Britain	113,000	13,000
Calcium carbide	Total	613,000	68,000
	Germany	254,000	26,000
	Sweden	158,000	19,000
	Switzerland	169,000	20,000
Magnesia	Total	623,000	37,000
	Greece	620,000	37,000
Alum	Total	18,000	2,000
Boric acid	Total	83,000	24,000
	Gt. Britain	21,000	6,000
Sulphate of iron	Total	27,000	1,000
Copper sulphate	Total	1,000	—
Sodium sulphate	Total	357,000	16,000
	Germany	221,000	8,000
	Belgium	120,000	6,000
Sulphuric acid	Total	9,795,000	169,000
	Germany	1,000	—
	Belgium	9,782,000	168,000
Nitric acid	Total	93,000	13,000
Hydrochloric acid	Total	50,000	14,000
Liquid carbonic acid	Total	16,000	7,000
Salammoniac	Total	20,000	5,000

Exports of Chemical Products.

Lead acetate	Total	20,000	8,000
Soda ash	Total	34,000	3,000
Soda crystals	Total	4,000	—
Caustic soda	Total	104,000	19,000
Calcium carbide	Total	83,000	8,000
Magnesia	Total	1,216,000	94,000
	Germany	82,000	6,000
	Belgium	36,000	3,000
	Gt. Britain	358,000	28,000
	France	161,000	13,000
	U.S.A.	266,000	20,000
	Norway	31,000	2,000
	Sweden	60,000	4,000
	Ireland	85,000	7,000
	Spain	10,000	1,000
	Switzerland	45,000	4,000
	Finland	30,000	2,000
Boric acid	Total	1,000	1,000
Iron sulphate	Total	2,000	—
Copper sulphate	Total	2,000	—
Sulphuric acid	Total	987,000	37,000
	Germany	186,000	5,000
	Dutch E. Indies	73,000	4,000
	Egypt	44,000	1,000
	Argentina	47,000	2,000
	Mexico	447,000	16,000
Nitric acid	Total	6,000	1,000
Hydrochloric acid	Total	40,000	12,000
Liquid carbonic acid	Total	10,000	11,000
Salammoniac	Total	7,000	2,000

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

British India.

The Director-General, India Store Department, Branch No. 10, Belvedere Road, Lambeth, S.E. 1, requires tenders for the supply of 4,956lb. of potassium iodide crystals B.P., due on December 18, 1923.

Egypt.

A merchant and commission agent in Cairo desires to be placed in touch with British manufacturers of linseed oil substitutes. (Ref. No. 594.)

Lithuania.

A firm of merchants and agents in Kovno desire to secure the representation for Lithuania of British manufacturers of caustic soda, talc, and fats for soap factories; brewing machinery, filters, etc., for breweries; coal tar, impregnating materials for railway sleepers, etc. (Ref. No. 593.)

South Africa.

A firm of agents in Cape Town desire to handle an agency for disinfectants, preferably for a firm who would carry stocks in South Africa, on a consignment basis, and pay for propaganda. (Ref. No. 574.)

Spain.

A Spanish commission agent of Vigo desires to secure the representation of a British firm exporting copper sulphate. (Ref. No. 589.)

Sweden.

A firm of commission agents in Stockholm desire to secure the representation for Sweden of British manufacturers of heavy chemicals, soya oil, and other vegetable oils, etc. (Ref. No. 591.)

A firm of commission agents in Gothenburg desire to secure the representation for Sweden of a British firm manufacturing and exporting linseed oil, boiled and raw. (Ref. No. 592.)

Switzerland.

A Swiss firm at Basle desire to enter into relations with United Kingdom exporters of mineral lubricating oils, gas oils, benzene, petrol, animal oils, vegetable oils, and rosin, with a view to acting as agent or to purchase on their own account. (Ref. No. 593.)

United States of America.

A firm of agents in Reading, Pa., wish to communicate with British producers and exporters of whiting and china-clay, with a view to obtaining agencies, on a commission basis, for the States of Pennsylvania, New Jersey, and New York. (Ref. No. 596.)

NEW COMPANIES.

Anglo-Spanish Oilfields, Ltd.—Private company. Capital £2,000. Office: 18, Sackville Street, Piccadilly, W.

British Mineral Oil Products, Ltd. — Private company. Capital £10,000. Solicitors: Slaughter and May, 18, Austin Friars, E.C.

Cleeneeze, Ltd.—Private company. Capital 2,000., in £1. shares (1,000 7 per cent. cumulative preference). Manufacturers of and dealers in powders, compounds, pastes, blocks, tablets, and creams, etc. Solicitor: C. A. Thompson, 61-2, Chancery Lane, W.C.

Danish Soap Industry, Ltd.—Private company. Capital £5,000. Soap manufacturers, perfumers, etc. Office: 49A, Old Bailey, E.C.

Phosaline (1923), Ltd.—Private company. Capital £200. Wholesale, retail, and manufacturing chemists, etc Office: Provident Chambers, 51, Wardwick, Derby.

Razip Manufacturing Company, Ltd. — Private company. Capital £1,000. Manufacturers of and dealers in Razip paint, enamel, etc. Office: 38, Deansgate, Manchester.

Silver Drug Supply Company, Ltd.—Private company. Capital £1,000. Manufacturers of and dealers in drugs and pharmaceutical chemicals, etc. Secretary: H. Warburton, 1, Lords Avenue, Weaste, Manchester.

Unit Pasteuriser and Chiller, Ltd.—Private company. Capital £2,000. Office: Sentinel House, Southampton Row, W.C.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 19 to 24 (inclusive).

Synthesis of Rubber Compounds. Benson, M. 29,469.
Products from Rubber. Benson, M. 29 6.5.
Removing Odoriferous Substances from Oils and Fats. Bollmann, H. 29 210.
Pure Carbazol. Chemische Fabrik in Billwärder vorm. Hell and Sthamer Akt.-Ges.; and Weil, L. 29 312.
Pure Anthracene and Carbazol. Chemische Fabrik in Billwärder vorm. Hell and Sthamer Akt.-Ges.; and Weil, L. 29,313 and 29 314.
Generation of Gases Cruse, H. 29,121.
Gas Analysis Apparatus. Daynes, H. A. 29 597.
Dehydration of Air Containing Volatile Substances. Delpech, J. 29 628.
Treatment of Diatomaceous Earth. Golby, F. W. (*Celite Co.*) 29 492.
Holders for Chemical Apparatus Hossack, A. 29,526
Insecticides. Howles, F.; and McDougall, I. 29,512.
Sodium. Hulin, P. L. 29,289.
Water Gas. Humphreys and Glasgow, Ltd.; and Shelfox, J. C. 29,503.
Distillation. Lamplough and Co., Ltd., F.; and Lamplough, F. 29 401.
Separating Liquids. Lemale, P. C. 29 376.
Operating Evaporating Apparatus. Metallbank- und Metallurgische Ges. Akt.-Ges.; and Gensencke, W. 29,481.
Bituminous Emulsions. Montgomerie, J. A. 29 568.
Reactivating Adsorption Media with Simultaneous Recovery of the Adsorbed Products. Naamlooze Vennootschap Montaan Metaalhandel. 29 591.
Styrol. Nuyatuck Chemical Co. 29,286.
Paints. Schindelmeiser, J. 29,290.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C. 2.

1922.

Compounds of Silver Iodide and Protein Substances. Marks, E. C. R. (*Parke, Davis, and Co.*). 23 443. **206,954**
Scrubbers for Use in Gas-producer Plants. Ruston and Hornsby, Ltd.; Livens, F. H.; and Grieve, F. J. 26 783. **206,982**
Dyestuffs. Thomas, J.; and Scottish Dyes, Ltd. 28,596. **207,000**

1923.

Utilisation of Vegetable Materials Containing Pentosans. La Forge, F. B.; Tooke, C. W.; Mains, G. H.; and Clarke, W. F. 9,661. **207,116**
New Barbituric Acid Compounds. Chemische Fabrik Auf Actien vorm. E. Schering. 14 079. **198,379**
Manufacturing from Cyanamide Fertilisers Containing Soluble Organic Nitrogen. Soc. d'Etudes Chimiques pour l'Industrie. 22,076. **203,683**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Treating Ammonium-chloride Lyes in Iron Vessels. Henkel et Cie; and Weber, Dr. W. 6,597. **207,142**
Naphthalene Derivatives and Dyestuffs Therefrom. Soc. of Chemical Industry in Basle. 25 043. **207,162**
Electrolytic Processes. Siemens and Halske Akt.-Ges. 28 463. **207,174**
Sulphur from Gas-containing Hydrogen Sulphide. Farbenfabriken vorm. F. Bayer and Co. 29 008. **207,196**
Electrolytic Tanks. Carrera, L. A. 29,097. **207,199**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Chromium Compounds. A. Mond, London. (Chemische Fabrik Griesheim-Elektron, Frankfort-on-Main, Germany.) British Patent **204,886**, of 1922.

Chrome iron ore is converted into ferrochromium in the known manner, the ferrochromium is dissolved in hydrochloric acid and the chromium precipitated as hydrated oxide by calcium or barium carbonate. The precipitate is separated and used to produce alkali chromate or chromium salts. The filtrate, if barium carbonate was used, is evaporated and cooled to separate barium chloride and the mother liquor may be evaporated to obtain ferrous chloride. In the precipitation of the chromium hydrate it is preferred to use granular limestone or witherite and hot chloride solution.

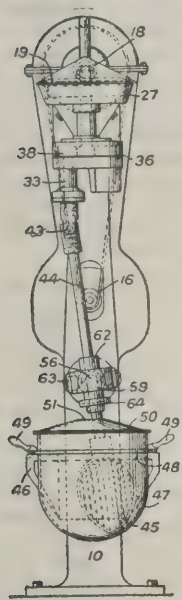
Vulcanising India-rubber. Dunlop Rubber Company, Ltd., London; D. F. Twiss, Sutton Coldfield, Warwickshire; and F. Thomas, Birmingham. British Patent **204,757**, of 1922.

Zinc or cadmium propyl xanthate or one of the alkyl series—namely, methyl, ethyl, butyl, amyl, is added to rubber mixings which are subsequently vulcanised at a temperature of 60-130° C. whereby over-vulcanisation is prevented however long the heating may be continued. According to an example, 51¼ parts of rubber, 5 parts of sulphur, 20 parts of zinc oxide, 1 part of magnesia, 18 parts of gas black, 3 parts of paraffin wax, and 1¾ parts of zinc propyl xanthate heated for 20 minutes at 98° C. gives a product having a coefficient of vulcanisation of about 3, which remains the same after a further 2½ hours' heating. *Reference has been directed by the Comptroller to Specification* 177,493.

Vulcanisation Accelerator. H. Skellon, Middleton, Lancashire; T. H. Roberts, Reigate, Surrey; and H. B. R. Clarke, Radlett, Hertfordshire. British Patent **204,902**, of 1922.

A vulcanising accelerator consists of the material formed by the reaction of zinc or cadmium sulphate and ammonia, with the addition, if not already present in the mixing, of zinc oxide. In an example, to a mixing consisting of 48 per cent. rubber, 49 per cent. fillers, and 3 per cent. sulphur is added 1-2 per cent. of the rubber of a mixture of equal proportions of penta amino zinc sulphate and zinc oxide, and the mixing is vulcanised in 20min. at 40lb. steam pressure. Specification 4955/14 is referred to.

Mixing-machines. F. Westerman, Chicago, U.S.A. British Patent **204,752**, of 1922



A stirrer 45 is mounted on a shaft 44 which describes a path of double-conical form and is simultaneously rotated, the shaft 44 sliding in a sleeve 62 which is mounted by pivots 63 in a ring 59 carried by a shaft 56 which revolves in bearings on the standard 10. The shaft 44 may have a universal joint 43 to connect it to a shaft 33 carrying a pinion 38 in mesh with a wheel 36 driven by bevel gear 18, 19 and belt 16 from an electromotor carried on the standard 10. Oil pans 27, 64 are provided. The container has a cover 50 provided with a small central opening 51 and a flange 48 which rests on a bracket 46 and is secured by clamps 49.

Acid Treatment of Coal Tar. W. E. W. Richards, and Siluminite Insulator Company, Ltd., London. British Patent **204,976**, of 1922.

Coal tar is heated to about 100° C., sulphuric acid is added and air is blown in; heating is then discontinued and the blowing maintained until the mixture has thickened when pitch separates at the bottom and oils at the top, these being separated. The oils are distilled at about 400° C., a pitch-like residue and a distillate suitable for use as fuel oil being obtained. Specification 3008/12 is referred to.

Distilling Alcoholic Liquids. H. F. Harris, Atlanta, Georgia, U.S.A. British Patent **204,775**, of 1922.

The separation of alcohol from fermented liquids by distillation is hastened by the addition to the liquid of sulphates of the alkali or alkaline earth metals, magnesium sulphate, a mixture of ferrous and ammonium sulphates, or of sodium phosphate, sodium thiosulphate or other salts. In using ammonium sulphate, 50-70 per cent. is added to the fermented mash and an acid is added, if necessary, to give the mixture an acid reaction. In using magnesium sulphate, 50-100 per cent. is added, and lime is added to the distillate to remove any magnesium sulphate which has been carried over.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Silica Gel. Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany. British Patent **205,081**. Convention date, October 4, 1922.

Silica gel prepared in the usual manner is freed from a large proportion of its water by subjecting to pressure, there being no consequent diminution in its absorptive properties. In an example, water glass solution is treated with dilute hydrochloric acid and the gelation of the resulting hydrosol is assisted by heat. The jelly is then subjected to a pressure of 350 atmospheres for one hour and the mother liquor is washed out. The mass is dried preferably *in vacuo*. The jelly may be washed prior to applying the pressure. The product may be either granular or pulveruient according to the conditions of treatment.

Aromatic Amines. Farbwerke vorm, Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. British Patent **204,722**. Convention date, September 29, 1922.

Diaminodiaryldialkylmethanes are produced by heating aniline, or a homologue thereof having an unoccupied para-position, with an aliphatic ketone. The aniline or its homologue is employed in the form of a salt and in aqueous solution. The products form starting materials for the preparation of dyes. According to the examples, a solution of aniline hydrochloride is heated with acetone in an autoclave and diaminodiphenyldimethylmethane isolated by making the solution alkaline, removing the excess of aniline by steam distillation, and crystallising the residue from boiling water; in a similar way diaminodi-*o*-tolyldimethylmethane is obtained from *o*-toluidine and acetone, and diaminodiphenylmethylethylmethane from aniline and methylethylketone.

PUBLICATIONS RECEIVED.

Physico-Chemical Principles.—A Course of Laboratory Experiments. By Miles S. Sherrill, Associate Professor of Theoretical Chemistry in the Massachusetts Institute of Technology. 1923. New York: The Macmillan Company.

A Course in General Chemistry. — By William C. Bray, Professor of Chemistry in the University of California; and Wendell M. Latimer, Assistant Professor of Chemistry at the University of California. 1923: New York: The Macmillan Company.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. WEDNESDAY.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—The position of the spot heavy chemical market is very steady, and a tendency to firmer conditions is in evidence. **Acetic Acid**, 80% technical, £47.; 80% pure, about £48. 10s. to £49.; 98% glacial, £60. in casks and about £73. in glass demijohns, ex wharf London; the spot position keeps very steady, and, with a fair demand

being experienced, supplies are now rather limited; the position on the Continent supports the market. **Acetone,** British Government specification, about £124. per ton, in drums; spot prices are fully maintained, with inquiry good for the little material available. **Alum,** lump, £10. to £10. 10s. per ton, in casks; the spot position is quite steady, but dealers are not finding much business. **Arsenic,** Cornish, white powdered, about £70. per ton, f.o.b.; owing to the shortage of supplies and the continued good inquiry for export, prices are moving up and stand firm. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; dealers offering imported material at about this figure, with demand quiet. **Bleaching Powder,** 35—37%, £10. 5s. to £10. 10s. per ton; prices on spot are rather firmer, although business is still slow. **Barium Chloride,** 98½—100%, £14. 15s. to £15. per ton; dealers are quoting round about these figures, with occasional business being booked. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P., crystals, about 1s. 4½d. per lb., less 5%; spot values are a little unsteady, with the market almost idle. **Cream of Tartar,** B.P., 99—100%, 86s. to 87s. 6d. per cwt., less 2½%; dealers' prices are firming up here on account of the Continental position; the market keeps steady. **Epsom Salts,** commercial quality, about £4. 15s. per ton, in bags; dealers' prices are round about this figure, with some parcels perhaps a shade cheaper. **Formaldehyde,** 40%, £64. to £65. per ton; spot prices are fully maintained at these prices, and a fair volume of business has been done; the market has a rising tendency. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; dealers' prices are level on the week; the demand has again been slow. **Lead Acetate,** brown, about £43.; white, about £44. per ton; spot supplies and Continental offerings are very limited; high prices are likely to rule for some time. **Litharge,** imported, about £37. 10s. per ton, on spot; dealers are doing a limited business at about this figure; the market is very steady. **Lithopone,** 30% Continental red seal, £23. 5s. to £24. per ton; this item is very firm, with material in short supply on spot, and offers from the Continent restricted and dear. **Ammonium Chloride,** grey galvanising, £31. per ton; this item keeps steady, with a fair demand for spot supplies, which are not large; fresh imports must be at high prices. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at these prices. **Oxalic Acid,** about 5¾d. per lb.; at this quoted price the position is none too steady, with business still far from satisfactory. **Carbonate of Potash,** 90—92%, about £25. 10s.; 96—98%, about £27. 10s. to £28. per ton; this market is very steady, and any movement in prices is almost certain to be to higher levels on account of the stoppage of supplies from Germany. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; prices are rather steadier here, and tend to advance; the demand is still quiet. **Caustic Potash,** 88—92% solid, £31. 10s. to £32. 10s. per ton; this market continues to harden on spot, and still higher prices are expected. **Permanganate of Potash,** commercial quality, about 9d. per lb.; there has not been much demand of late; prices are supported by the firmer conditions on the Continent. **Prussiate of Potash,** yellow, about 10¼d. per lb.; dealers continue to offer British material at this figure, but the demand is not at all good; foreign material cannot compete at present. **Sulphate of Potash,** 90%, £11. per ton; prices are quoted unchanged on the week. **Mercury,** about £9. 17s. 6d. per bottle of 75—76lb., net; the spot position is rather easier this week, with the demand slow; supplies are rather free. **Red Lead,** imported, about £37. 10s. per ton, on spot; dealers are finding limited business at about this figure; prices are steady, and tend to harden. **Salammoniac,** dog-tooth crystals, fully £50.; medium, £44. to £45.; fine white crystals, £28. to £29. per ton; spot stocks are limited, and some fair business has been done; prices are firm, and tend to advance; fresh imports will have to be dearer. **Saltcake,** ground and unground, about £4. 10s. per ton, delivered, for home trade; makers are said to be sold up to the end of the year. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; merchants are offering at about these prices, with still but small inquiry. British makers' prices for domestic consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in free bags; British makers quote at this price, for home trade only; dealers are competing at about level rates. **Bichromate of Soda,** home trade, 4½d. per lb.; British makers selling at this old figure; their prices for export are slightly dearer. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers' prices are maintained on a quiet market. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in bags; British makers' price for home consumers is unchanged at this figure; prices for export vary as to destination. **Hyposulphite of Soda,** pea crystals, about £15. to £15. 10s. per ton; commercial crystals, £10. to £10. 10s. per ton, in casks; dealers' prices are moving up on account of much firmer conditions on the Continent; British makers' prices are also reported as being at higher rates. **Nitrate of Soda,** 96%, about £13. 5s. per ton, f.o.r. or f.o.b.; quoted prices are level on the week, with the market quiet. **Nitrite of Soda,** 100%, about £28. 10s. per ton; there has been a big jump in prices, with the market very steady. **Prussiate of Soda,** about 5½d. per lb.; the demand for this product remains slow, with dealers offering British material at about this figure. **Sodium Sulphide,** 60—62% solid, £14. 15s.; solid, £15. 10s. per ton, in drums; dealers' prices are dearer this week; business slow. **Tin Crystals,** about 1s. 3½d. per lb.; prices are level on the week, with the market quiet. **Tartaric Acid,** B.P., crystals, about 1s. 1½d. per lb., less 5%; the spot market remains very quiet, and the tone is still weak. **White Lead,** imported, about £41. to £41. 10s. per ton; dealers are asking higher prices on account of the firmer conditions on the Continent. **Zinc Oxide,** B.P. £52.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers' quotations are at about these rates.

Pharmaceutical Chemicals.—Prices continue to advance in many items, and the position generally is very firm indeed, and spot supplies are running short. **Acetanilid,** about 3s. 3d. per lb.; the spot price has again advanced, and supplies are very short indeed; the position is accentuated by the refusal of the Board of Trade to grant licences for imports sufficient to meet urgent demands. **Acetyl-Salicylic Acid,** B.P., 3s. 10d. to 3s. 11d. per lb.; spot prices are very firm at these further advanced values; supplies are keenly sought after, and fresh imports must be dearer. **Benzoic Acid,** B.P., about 3s 9d. to 4s. per lb.; these figures are more or less nominal, owing to lack of supplies. **Diethyl-barbituric Acid,** B.P. (barbitone), about 18s. per lb.; this item still shows but little life, and dealers' prices are unchanged. **Salicylic Acid,** B.P., fully 2s. 6d. per lb.; the spot position is strong, and the market has a rising tendency. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; dealers are keeping their prices very steady at these values, with a fair volume of business about. **Amidopyrin,** about 15s. per lb.; business is still quiet, and prices quoted are unchanged. **Ammonium Bromide,** B.P., fully 10d. per lb.; a further big jump in the spot price is recorded, and, owing to scarcity of supplies, still higher prices are expected. **Benzonaphthol,** about 5s. per lb.; the market is quiet, with prices quoted unaltered. **Betanaphthol,** resublimed, about 2s. 6d. per lb.; spot material is quoted at this figure, with no great demand. **Benzaldehyde 03,** about 3s. per lb.; this market is very steady, and some fair business has been done. **Calcium Lactate,** about 2s. 6d. per lb.; this item has been rather quieter, but the spot value is maintained. **Chloral Hydrate,** duty paid, fully 4s. 3d. per lb.; a fair business has been done this week, and prices are very steady. **Creosote,** B.P., about 2s. 6d. per lb.; this market is quite steady, with business rather limited. **Creosote Carbonate,** about 8s. 3d. per lb.; there is still but little interest shown in this article. **Guaiacol Carbonate,** about 14s. per lb.; the price as quoted is very firm, and supplies are scarce; higher prices are expected

before long. **Hexamine**, fully 4s. 6d. per lb.; dealers are not selling below this figure, and some opinions favour further advances. **Hydroquinone**, 4s. to 4s. 3d. per lb.; this seems to be about the price levels now quoted; business is fair. **Methyl Salicylate**, 3s. to 3s. 2d. per lb.; a further good advance in spot prices is recorded, with the market exceedingly firm; supplies are not large. **Methyl Sulphonal**, about 25s. per lb.; most dealers holding spot supplies are quoting close up to this figure. **Paraformaldehyde**, about 3s. 9d. per lb.; this market keeps very steady, and a fair volume of business is being done. **Paraldehyde**, 1s. 7d. to 1s. 8d. per lb.; holders are firm at these prices for spot supplies, which are not very large. **Phenacetin**, about 8s. per lb.; business has been good here, and dealers' quotations are firm. **Phenazone**, fully 8s. 9d. to 9s. per lb.; last week's higher prices are maintained on a strong market; fresh imports will cost more. **Phenolphthalein**, 8s. 6d. to 8s. 9d. per lb.; dealers have again advanced their prices, and supplies on spot are difficult to locate. **Potassium Bromide**, B.P., crystals and granular, fully 9d. per lb.; a further big jump in spot values is recorded, with the market almost bare of big supplies; Continental rates are much higher. **Potassium Permanganate**, B.P., about 9¾d. to 10¼d. per lb.; dealers have advanced their prices, with the market firm. **Potassium Sulphoguaiacolate**, about 7s. per lb.; this market remains neglected, with quoted values unchanged. **Resorcin**, about 6s. 6d. per lb.; spot supplies are quoted at this rate on a firm market. **Salol**, 4s. 3d. to 4s. 6d. per lb.; the market is gradually firming up to the higher rate quoted. **Sodium Benzoate**, about 3s. 3d. to 3s. 6d. per lb., nominal; supplies on spot cannot be traced, and, although there is a big demand, the Board of Trade still refuse to grant licences to allow the import of acid. **Sodium Bromide**, B.P., crystals and granular, about 10d. per lb.; this market continues to advance, with supplies on spot now getting low, and fresh imports must be at still higher rates. **Sodium Diethylbarbiturate**, about 18s. per lb.; quoted price unchanged, with market dull. **Sodium Salicylate**, B.P., crystals, 3s. 1d. to 3s. 2d.; powder, about 3s. per lb.; dealers holding spot stocks notify further advances in their prices, with the market very firm. **Sulphonal**, about 20s. per lb.; there is not much doing here; supplies are very limited, and prices are firmly held. **Terpin Hydrate**, about 1s. 9d. per lb.; dealers continue to offer at this price, with business restricted. **Thymol**, 15s. 6d. to 16s. per lb.; this item is steady, but business is not brisk. **Vanillin**, 100%, 26s. 3d. to 26s. 6d. per lb.; spot supplies are offering at these rates.

Coal-tar Products, Etc.—Pitch continues to find little business, and the price is still moving to lower levels. Other products show little or no alteration in values, and the general tone is steady. Business has not been of any great importance. **Aniline Oil**, 9d. to 9¼d. per lb., naked at works; values continue steady, with business quiet. **Betanaphthol**, 1s. 1d. to 1s. 2d. per lb.; business remains slow, with prices unchanged. **Benzol**, crude, 65's, 8d. to 10d.; standard motor, 1s. 1d. to 1s. 4d.; pure, 1s. 6¼d. to 1s. 8d. per gallon, in tank wagons; British makers continue to quote at these rates. **Carbolic Acid**, crystals, 1s. to 1s. 0½d. per lb.; still but little inquiry here, and prices are not at all steady. **Cresylic Acid**, 97—99%, 2s. to 2s. 2d. per gallon; this market keeps quite steady, and a fair volume of business has been done. **Toluol**, 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; 90%, about 1s. 4d. per gallon; prices are fairly steady, with business limited. **Xylol**, pure, 2s. 3d. per gallon; prices are steady, but the market is dull. **Creosote Oil** is steady, with occasional inquiry being dealt with; quoted in the region of 9¼d. per gallon, f.o.b. **Naphtha**, crude, 8¼d. to 8¾d. per gallon; this item remains dull; prices are unaltered. **Solvent Naphtha**, 90/160, 1s. 2d. to 1s. 3d. per gallon; some little business has been done here, and prices are steady. **Heavy Solvent Naphtha**, 90/190, 1s. 2d. per gallon; this item has again been neglected, with values unsteady. **Naphthalene**, £19. 10s. per ton; the market is keeping up to its recent improved level, with business moderate. **Pyridine**, about 22s. per gallon; supplies are very limited, and prices hold very firm. **Hexamethylene**, 3s. 9d. to 4s. per gallon; spot offers are fully maintained at these rates, with not much material offering. **Pure Methyl Alcohol**, £90. per ton, in drums, ex wharf London; this item is now very firm, and the market has a rising tendency; supplies are restricted. **Pitch**, about 117s. 6d. per ton, f.o.b. East Coast; a further material reduction in prices is recorded; the market has again suffered from lack of interest, and the tone is far from good. **Wood Tar**, £4. 15s. to £6. per ton, according to quality; quoted prices are unchanged on the week.

ITALIAN CHEMICAL MARKET. November 30.

Quotations during November were as follows, prices being per 100kilos, at Milan, unless otherwise stated: **Caustic Soda**, 70—72%, Italian, 180 lire; American, 76—78%, 200 lire; English, 185 lire; French, 175 lire. **Carbonate of Soda**, 98—100%, Italian, 85 lire (Genoa); English, 86 lire (Genoa); American, 86 lire (Genoa); demand continues good. **Soda Crystals**, steady at 40 lire. **Alum**, crystals, steady at 85 lire. **Bicarbonate of Soda**, powder, kegs, 175 lire (Genoa); in fair demand. **Bichromate of Soda**, 445 lire (Genoa). **Bichromate of Potash**, crystals, 590 lire; in fair request. **Borax Crystals**, 99%, in kegs, 380 lire; in good call. **Carbonate of Ammonia**, lump, 430 lire; powder, 370 lire; not in much demand. **Chlorate of Potash**, crystals, in good call at 310 lire. **Acetone**, pure, 98—99%, steady at 1,300 lire. **Glacial Acetic Acid**, 99%, 1,200 lire. **Boric Acid**, crystals, in good call at 800 lire. **Lactic Acid**, 80%, 300 lire; not much doing. **Bisulphite of Soda**, crystals, 350 lire; in small demand. **Formaldehyde**, 40%, in good demand at 780 lire. **Phosphate of Soda**, steady at 160 lire. **Hyposulphite of Soda**, crystals, unchanged at 130 lire. **Metabisulphite of Potash**, 400 lire. **Nitrite of Soda**, 96—98%, in fair demand at 300 lire. **Permanganate of Potash**, crystals, in limited demand at 800 lire. **Sulphate of Alumina**, crystals, 18%, 110 lire. **Sulphate of Zinc**, in fair request at 180 lire. **Citric Acid**, crystals, in fair request at 1,900 lire. **Sulphate of Iron**, still slow at 50 lire. **Hydrofluoric Acid**, 50%, in fair call at 600 lire. **Oxalic Acid**, crystals, in good call at 660 lire. **Tartaric Acid**, crystals, in fair request at 1,350 lire. **Chloride of Ammonia**, lump, 98—100%, in little demand at 550 lire (Milan); powder, 95—96%, in fair request at 315 lire (Genoa). **Chloride of Calcium**, 75—80%, in little demand at 65 lire. **Bleaching Powder**, French, 110—115%, 90 lire; electrolytic, 100 lire. **Cream of Tartar**, 89—99%, powder, in good demand at 930 lire. **Yellow Prussiate of Potash**, crystals, in fair call at 2,000 lire. **Yellow Prussiate of Soda**, crystals, 1,400 lire. **Silicate of Soda**, crystals, 85 lire; Italian, 38—45%, 65 lire; English, 140° Tw., 100 lire. **Sulphate of Soda**, crystals, 45 lire; powder, 65 lire. **Sulphate of Magnesia**, crystals, in fair request at 48 lire. **Chloride of Magnesia**, solid, 70 lire. **Hydrochloric Acid**, 20—21° Bé., 17 lire. **Sulphuric Acid**, 50° Bé., 19 lire; 66° Bé., 43 lire. **Nitric Acid**, 36° Bé., 155 lire; 42° Bé., 190 lire. **Benzaldehyde**, 3,500 lire. **Tannic Acid**, 80%, 2,000 lire. **Aluminium Acetate**, quiet at 162 lire. **Lead Acetate**, brown, 560 lire; white, 575 lire. **Betanaphthol**, in better demand at 2,800 lire. **Barium Peroxide**, 1,000 lire. **Sodium Peroxide**, in fair request at 1,800 lire. **Red Prussiate of Potash**, little doing at 3,150 lire. **Caustic Potash**, 88—92%, 380 lire. **Tartar Emetic**, powder, 1,200 lire. **Mineral Superphosphate**, 27 lire. **Bone Superphosphate**, in good call at 52 lire. **Basic Slag**, 16—18%, in better demand at 35 lire. **Nitrate of Soda**, 15—16%, in fair demand at 136 lire. **Nitrate of Ammonia**, in fair request at 125 lire. **Nitrate of Lime**, 12—13%, in little request at 110 lire. **Sulphate of Ammonia**, 20—21° Bé., quotations fell from 165 to 160 lire through smaller demand and larger supplies. **Sulphate of Copper**, 98—99%, Italian, 228 lire; foreign, 230 lire. **Chloride of Potash**, quiet at 75 lire. **Sulphate of Potash**, little business at 85 lire. **Calcium Cyanamide**, 15—16%, in little call at 98 lire. **Sulphur**, refined, in blocks, 54.50 lire (Catania, Sicily), 70 lire (Milan). **Sulphur**, sublimed, 71.50 lire (Catania, Sicily), 87 lire (Genoa). **Crude Tartar**, 269 lire.

LONDON METAL MARKET. WEDNESDAY.

Copper: Standard brands, £62. to £62. 2s. 6d., cash; £62. 15s. to £62. 17s. 6d., three months; electrolytic, £67. 15s. to £68. 5s. **Tin**: Standard, £236. 15s. to £237., cash; £237. 15s. to £238., three months; Straits, £238. 5s.; English, £237. 10s. **Lead**, soft foreign, £31. 15s., prompt; English, £32. 15s.; chemical sheet, 37s. per cwt. for 2-ton lots, delivered. **Spelter**, prompt, £32. 10s.; hard, £27. 10s. **Antimony**, English regulus, 99%, £36.; special brands, £42. to £42. 10s. **Aluminium**, 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel**, £130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 15s. to £9. 17s. 6d. **Bismuth**, 10s. **Platinum**, £29. per oz.; scrap, £27. **Wolfram**, spot,

12s. per unit, c.i.f. U.K. or Continent. **Zinc Dust** has shown much increased activity; Beaver brand, 90—92%, £48.; American, 92—94%, £48.; Continental, 83—88%, £42. to £46. per ton, delivered.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand generally for heavy chemicals continues on the quiet side, owing to the unsettled conditions, and there does not seem much prospect of improvement before the New Year. The quotations for alkali products have not yet been fixed for forward contracts, and current quotations remain unaltered. **Bleaching Powder,** softwood casks, quiet at £11. 5s. on rails, with foreign supplies offering at lower rates. **Chlorates** have a hardening tendency at 3d. to 3¼d. for **Potash,** and 2¾d. to 3d. for **Soda. Bichromates** are unaltered. There is only small inquiry for **Glauber's Salt,** and prices are easy at £3. 10s., carriage paid. Roasted **Saltcake** maintained for home trade at £4. 10s., in bulk, carriage paid. Imported American **Sulphur,** steady at £5. 5s., ex store. **Copper Sulphate** shows no improvement, and quotations remain nominal at £25. to £25. 10s., f.o.b. Liverpool. **Phosphate** and commercial **Hyposulphite of Soda** are neglected at recent rates, and prices are weak. **Nitrite of Soda** is dearer at £28. 10s. Concentrated **Sodium Sulphide,** 60—62%, £14. to £14. 10s., carriage paid. White powdered **Arsenic** is again lower at £68., delivered, for best Cornish make. **Yellow Prussiates** weak; **Potash** at 9½d., **Soda** 5½d., per lb., with only small inquiry. **Carbonate** and **Caustic Potash** are scarce, and values have an upward tendency. **Acetic Acid** and **Acetate of Soda** remain unaltered. **Acetates of Lime** are firmly maintained, owing to short supplies; grey at £22., brown £14. 10s., carriage paid. Miscible **Wood Naphtha,** easy at 5s. 9d. per gallon. **Acetone,** quiet at £124. per ton. **Lead Salts** are scarce, and prices are firm; white and brown **Acetate** at £45. per ton delivered, and **Nitrate** £44., net, carriage paid. **Barium Chloride,** steady at £14. 10s. per ton. **Ammonia Salts** are in good request, and values are improving. Green **Copperas** is moving off fairly well, and stocks are low. **Oxalic Acid,** dull at 5½d. to 5¾d. per lb. **Permanganate of Potash,** commercial grade, unchanged at 8¼d. per lb., carriage paid.

SWANSEA MARKET REPORT. Wednesday.

Tinplate prices very firm, with premiums on the fixed quotation of £1. 3s. 6d. per standard box, f.o.b. **Galvanised Sheets,** quiet but steady on the basis of £19. 2s. 6d. per ton. **Copper** firmer, with prompt at £62. 7s. 6d. per ton, and three months £63. 2s. 6d. **Tin** very firm at £236. 17s. 6d. per ton cash, and £237. 12s. 6d. three months. **Lead** easier; prompt £29. 12s. 6d. per ton, and three months £29. 2s. 6d.; English, £32. 10s. **Spelter,** steady at £33. per ton prompt, and £33. 2s. 6d. three months. **Zinc Sheets** in good demand at £39. 7s. 6d. per ton. **Sulphate of Copper** dull at £25. 7s. 6d. per ton, less 5%, in casks, f.o.b. **Sulphate of Ammonia** steady, with better home demand at £14. 16s. per ton. **Nitrate of Soda,** rather slow at £13. 7s. 6d. per ton. **Bone Meal** in little demand, with prompt Indian £9. 2s. 6d. per ton. **Pitch** in quiet demand, and quotations much easier at £5. 17s. 6d. per ton. **Creosote** active, orders being placed for delivery over next half year at 8½d. to 9¾d. per gallon on rail. **Benzol** in strong demand at 1s. 3¼d. per gallon. **Tars** active, with refined at £1. 14s. 6d. per 40-gallon casks, with crude up to £4. 15s. 3d. **Arsenic** quiet, with firm prices at £67. 17s. 6d. per ton for white powdered. **Oxalic Acid** dull at 6¼d. per lb. on rails. **Sulphuric Acid** not so active, but quotations firm and unchanged. **Copperas** remains dull at £2. 2s. 6d. per ton for 4-ton lots, delivered London or equal. **Seed Oils** very firmly held, with raw **Linseed** at £2. 5s. 9d. per cwt., and boiled £2. 7s. 9d., net, in barrels. **Cottonseed Oil,** common edible £2. 5s. 6d. per cwt., and deodorised £2. 7s. 6d., net, in casks. **Rape Oil** very firm, with best refined at £2. 7s. 4d. per cwt., net, in barrels. **Cod Oil** scarce, with Newfoundland at £2. 5s. 6d. per cwt., and English £1. 13s. 9d. **Castor Oil** dearer, with best at £3. 3s. 6d., and seconds at £2. 17s. 6d. per cwt., net, in barrels. **Coconut Oil** steady, with Ceylon, prompt, at £2. 7s. 6d. per cwt., f.o.b. **Olive Oil** very steady, and fair business at £66. 7s. 6d. per ton, net. **Palm Oil** not so active, but firmly held at £38. 5s. 6d. prompt, and £38. 2s. 6d. forward, for Lagos; softs, £38. 2s. 6d.; mediums, £37. 17s. 6d. prompt, and £37. 12s. 6d. forward; and hards, £37. 17s. 6d. per ton. **Turpentine** easier at £3. 14s. 3d. per cwt. for prompt American. The tone of the **Coal** market was firm, with better buying: Best Admiralty smokeless £1. 8s. 6d., seconds £1. 7s.; ordinaries, £1. 5s.; Monmouthshire black vein, £1. 7s.; coking smalls, £1., all per ton, f.o.b. **Anthracite,** best large £2. 1s. 6d., seconds £1. 15s.; Paris and French nuts, £2. 11s. 6d., all per ton, f.o.b. **Coke** prices were very firm, with export qualities at £2. 7s. 6d. to £2. 16s. 6d. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, in trucks at ovens. **Patent Fuel** very steady from £1. 9s. to £1. 11s 9d. per ton, f.o.b.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Inquiries for chemicals of the heavier class for use in the United Kingdom continue to be made to an extent that represents a very fair amount of business being done. The general trade situation has improved through the cessation of the boiler-makers' stoppage, which had checked business in different industries in the North for weeks past. An increased demand for chemicals must result from the resumption of work by boiler-makers and by increases of work in industries that have been hindered by the stoppage. **Bleaching Powder** has again been in quietly steady demand for use in the U.K., and has been shipped more freely for export; for "spot" lots and for export, £11. 5s. per ton is asked; special quotations being given for contracts. **Chloride of Calcium** has been quiet for home-trade uses, and has had a moderate shipment for foreign ports; it is £5. 12s. 6d. per ton. **Caustic Soda** has had a very fair inquiry for use in the U.K., and has moved freely in the export branch; it is £19. 7s. 6d. per ton, carriage paid in Great Britain, varying according to destination for export lots; for contracts special prices are quoted, according to requirements. **Bicarbonate of Soda** has sold with some freedom for use in the U.K., but has been quieter in the export branch of the trade; the price for home-trade use is £10. 10s. per ton, in bags, carriage paid in Great Britain. **Soda Crystals** have had a fair sale for use in the U.K. and for export; they are £5. 5s. per ton, carriage paid to home-trade users. **Nitrate of Soda** has had a small sale, and is £13. 5s. to £13. 10s. per ton. **Borax** has had a steady inquiry from the home trade, but has been quiet in the export branch; commercial crystals are £25. per ton, and powdered is £26; higher grades are—crystals £29. per ton, powdered £30., and superfine £31. per ton, in 2cwt. bags, carriage paid to home-trade users. **Saltcake** has been in very fair demand for use in the U.K.; it is £4. 10s. to £5. per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has been in moderate demand, and is 4½d. to 4¾d. per lb. **Ammonia Alkali** has had a rather free sale for use in the U.K., and has had a fair shipment for export; it is £7. 10s. per ton for home-trade use, and £8. per ton for export, varying according to destination; special prices are quoted for contracts, according to requirements. **Hyposulphite of Soda** has been rather more in demand, it is £10. per ton, in 2cwt. bags, for commercial, and £15. per ton for photographic. **Sulphide of Soda** has been quiet, and is £14. 15s. to £15. 15s. per ton for solid, and £9. 2s. 6d. to £9. 17s. 6d. per ton for crystals. **Chlorate of Soda** has been but little in demand, and is 3d. per lb. **Phosphate of Soda** has had a very limited inquiry, and is £14. 10s. to £15. per ton. **Prussiate of Soda** has been but little in demand, and is 6d. per lb. **Yellow Prussiate of Potash** has had a moderate sale, and is 10½d. to 11d. per lb. **Red Prussiate** continues quiet, and is 2s. 9d. per lb. **Carbonate of Potash** has had a fair inquiry, and prices are somewhat higher through the German repudiation of the Reparations levy; they may be given as £25. 10s. to £28. 10s. per ton, according to test. **Nitrate of Potash** has been more in demand, and is £29. to £30. per ton. **Chlorate of Potash** has had a limited inquiry, and is 3½d. to 4d. per lb. **Caustic Potash** has been in fair request, and the price has advanced; it may be given as £32. to £34. per ton. **Permanganate of Potash** has been rather more in demand, and is 9d. to 9¼d. per lb. **Bichromate of Potash** has had a slightly freer inquiry, and is 5¼d. to 5½d. per lb. **Salammoniac** has again been in fair demand; first quality is £56. per ton, and second quality £53. per ton. **Sulphate of Ammonia** has had a quietly steady sale for use in the United Kingdom, and has moved rather freely in the export branch of the trade; the price has been fixed for December at £14. 16s. per ton for neutral of 25¾%, and £13. 13s. per ton for ordinary; the price of neutral for January will be £15. 2s. per ton, for February £15. 3s. per ton, and for March to May £15. 5s.

per ton, the price of ordinary being increased proportionately for home-trade uses. **Carbonate of Ammonia** has been more in demand, and is 4d. per lb. **Muriate of Ammonia** continues quiet, and is £32. per ton. **Magnesia** has been in good request. **Carbonate** is £2. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been but little called for; it is £11. per ton for home-trade use, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been in fair request, and is £8. to £11. per ton, according to quality. **Sulphur** has had a steady and very fair inquiry; flowers are £10. per ton; roll is £8. 10s. per ton; rock, £8. to £8. 10s. per ton; and American, £5. 10s. per ton. **Tartaric Acid** has been quiet, and is 1s. 1d. to 1s. 1½d. per lb. **Cream of Tartar** has been in rather good request; it is £4. 6s. to £4. 8s. per cwt. **Boric Acid** has been quiet; commercial is £48. per ton, and powdered £51.; B.P. grades are £54. to £60. per ton, carriage paid in Great Britain. **Citric Acid** continues quiet, and the price has been weak; it may be given as 1s. 5d. per lb. **Oxalic Acid** has been but little in demand, and is 6d. per lb. White **Acetate of Lead** has been rather more in demand; it is £44. to £44. 10s. per ton. **Sulphate of Copper** has been inactive for use in the U.K., but has had a fair shipment to foreign ports; it is £25. to £25. 10s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been but little in demand; the price is still high, though variable; it is from £64. to £69. per ton for white powdered.

WEST OF SCOTLAND CHEMICALS.

WEDNESDAY.

Business in chemical products in the home market continues to be fairly brisk, but the recent improvement in export inquiry has fallen off somewhat. Continental supplies are hardening in price, otherwise there is little to record in price alterations except in barium chloride, which has advanced. **Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, scarce and still dearer at £70. 10s. per ton on spot; an improving market. **Barium Chloride,** £15. 5s. per ton; at this stronger price the market remains steady; foreign imported material offered round £14. to £14. 5s. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, carriage paid in the U.K., makers' prices. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities competing strongly. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted below this figure. **Citric Acid,** 1s. 5d. per lb., less 5%; a little business about. **Copper Sulphate,** £26. 5s. per ton, less 5%; a rather neglected market. **Cream of Tartar,** £4. 1s. 6d. per cwt. for 99% at Glasgow, quotation steady, and inquiry small. **Lead Acetate,** white, £42. 15s. per ton on spot; brown, more export inquiry at £45. per ton; Continental material offering at slightly cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign supplies now arriving are quoted at much under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., deliverd; this figure has held steady for some little time now. **Potassium Chlorate,** crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** 1s. per lb.; at this price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £55. and £52. 10s. per ton respectively; crystals, £48. 10s. per ton; at these reduced quotations the market is rather inactive. **Saltpetre,** £1. 12s. 6d. per cwt., net; a better market, with price unaltered; fresh arrivals are cheaper. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady, with but little demand. **Sodium Bicarbonate,** £9. 15s. per ton, in 2cwt. bags; £11. 5s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid,** 1s. 0¾d. per lb., less 5%, at Glasgow; a quiet tendency still noticeable in this market.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending December 1.

ARSENIC—
Oporto, 44 cks.

BARIUM SULPHATE (BLANC FIXE)—
Bremen, 131 cks.

BARYTES—
Bremen, 628 pkgs.
Hamburg, 216 bgs., 68 cks.

CHEMICALS (*otherwise undescribed*)
Hamburg, 15 cs., 1,438 pkgs.

CREAM OF TARTAR—
Bordeaux, 48 cks.

DEXTRINE—
Baltimore, 462 bgs.
Newport News, 430 bgs.

DYESTUFFS (NATURAL)—
Annatto
Bordeaux, 1 ck.

IRON OXIDE—
Malaga, 84 brls.

MAGNESITE—
Kymassi, 985 t.
Madras, 600 bgs.

PARAFFIN WAX—
New Orleans, 599 brls.

ROSIN—
Bordeaux, 50 cks.

SALT—
Bremen, 1,700 bgs., and qnty.
Hamburg, 100 t. and 3,400 bgs.

SOAP—
Hamburg, 35 cs.
New Orleans, 1,400 brls.
Norfolk, Va., 625 brls.

TANNING MATERIALS—
Myrabolans
Calcutta, 3,160 pkts.

WHITE LEAD—
Antwerp, 11 kgs.
Hamburg, 54 cks.

ZINC OXIDE—
Antwerp, 33 pkgs.

GOOLE.

Week ending December 1.

CHEMICALS (*otherwise undescribed*)
Hamburg, 20 brls., 13 drms.

COLOURS (*otherwise undescribed*)
Antwerp, 77 pkgs.

DEXTRINE—
Hamburg, 150 bgs.

HYDROGEN PEROXIDE—
Bremen, 80 crbys.
Ghent, 80 crbys.

GRANGEMOUTH.

Week ending December 1.

PHOSPHATE (BONE)—
Rotterdam, 710 bgs.

TARTARIC ACID—
Rotterdam, 40 cks.

GRIMSBY.

Week ending December 1.

CALCIUM CARBIDE—
Bergen, 2,000 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 50 cs.

KAINIT—
Hamburg, 214 t.

POTASSIUM CYANIDE—
Hamburg, 3 cs.

HULL.

OFFICIAL AMENDMENTS.

From return for week ending October 15 deduct—

IRON OXIDE—
Malaga, 2 t. 12 c.

Week ending December 1.

CALCIUM CARBIDE—
Trondhjem, 25 t.

CAUSTIC POTASH—
Hamburg, 10 t.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 10 c.; Bremen, 4 t. 2 c.; Copenhagen, 8 galls.; Gothenburg, 5 t. 3 c.; Hamburg, 24 t. 12 c.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 60 lb.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Hamburg, 60 lb.
Rotterdam, 1,111 lb.

FERRO CHROME—
Gothenburg, 11 t.
Trondhjem, 115 t.

FERRO SILICON—
Trondhjem, 98 t.

GLUE—
Antwerp, 2 t. 10 c.

MANGANESE (METALLIC)—
Genoa, 5 c.

POTASSIUM CARBONATE—
Bremen, 1 t. 10 c.

PYRITES—
Pomaron, 100 t.

ROSIN—
Gefle, 19 t.; Gothenburg, 1 t.; Hamburg, 18 t.

SALTPETRE—
Rotterdam, 1 t. 2 c.

SOAP—
Dunkirk, 3 c.
Genoa, 6 t. 10 c.

SULPHUR—
Catania, 51 t.

SULPHUR (FLOWERS)—
Catania, 10 t.

TANNING MATERIALS—
Sumac
Palermo, 67 t. 1 c.
Valencia, 30 t.

TAR (*otherwise undescribed*)—
Archangel, 412 t. 1 c.

TAR OIL (*otherwise undescribed*)—
Hango, 1,200 galls.
Helsingfors, 5 t. 12 c.

LEITH.

Week ending December 1.

BARYTES—
Bremen, 121 cks.
Hamburg, 35 cks.

BASIC SLAG—
Antwerp and Ghent, 1,000 bgs.

CHEMICALS (*otherwise undescribed*)
Rotterdam, 21 cks.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 1 ck.

GLUE—
Amsterdam, 120 bgs.
Antwerp and Ghent, 10 bgs.

LACTIC ACID—
Rotterdam, 25 cks.

LITHOPONE—
Memel and Danzig, 52 brls.
Rotterdam, 4 cks.

RED LEAD—
Amsterdam, 20 cks.

SALT—
Bremen, 150 bgs.
Hamburg, 200 bgs.

SOAP—
Copenhagen, 15 cs.

LIVERPOOL.

Week ending December 1.

ACETONE—
Germany, 33 drms.

ALUMINIUM SULPHATE—
France, 100 bgs.

ARGOLS—
France, 268 bgs.
Spain, 10 bgs.

BARYTES—
Belgium, 19 cks.
Germany, 55 cks.
Spain, 40 brls.

BAUXITE—
France, 350 t.

BEESWAX—
Panama, 8 bxs.
W.C. Africa, 1 bg.

BISMUTH (METALLIC)—
Peru, 11 t.

BORON CARBIDE—
U.S., 2 cs.

CARBORUNDUM—
France, 2 t. 10 c.

CARBON BISULPHIDE
Germany, 40 drms.
Italy, 125 drms.

CAUSTIC POTASH—
Czecho-Slovakia, 69 drms.
Germany, 125 drms.

CHEMICALS (*otherwise undescribed*)
U.S., 1 ck.

COAL TAR PRODUCTS—
Carbolic Acid
Belgium, 24 drms.

CREAM OF TARTAR—
France, 90 kgs., 19 cks.
Ger-many, 20 kgs.
Spain, 16 brls.

DYESTUFFS (NATURAL)—
Cutch
India, 100 bxs.
Straits, 1,000 bgs., 100 bxs.
Fustic
U.S., 5 cks.
Hematine
U.S., 45 cks.
Logwood
U.S., 10 cks.

FERRO-SILICON—
Norway, 3 cs.

FERTILISER (BONE)
Belgium, 500 bgs.

GLUE—
Belgium, 100 bgs.
Germany, 1 sk.

GLYCERINE—
Holland, 81 drms.

IRON OXIDE—
France, 32 cks.
S. Africa, 103 bgs.

KIESELGUHR—
Algeria, 217 bgs.; Belgium, 217 bgs.; U.S., 852 bgs.; W.C. Africa, 500 bgs.

LACTOSE—
Germany, 10 cs.

LEAD ASHES—
Chile, 4 t. 13 c.

LITHOPONE
Holland, 52 cks.

MAGNESITE (CALCINED)—
Greece, 104 bgs.

MAGNESIUM CHLORIDE—
Germany, 18 drms.

MANGANESE ORE—
India, 3,350 t.

MOLYBDENITE—
Australia, 1 t. 14 c.

OCHRE—
France, 55 cks.

PARAFFIN SCALE—
U.S., 1,240 brls.

PARAFFIN WAX—
Burma, 1,360 bgs.; U.S., 153 bgs.

PITCH (STEARINE)—
France, 12 cks.

PITCH (*otherwise undescribed*)—
U.S., 121 brls.

POTASSIUM CARBONATE
Germany, 56 cks.

POTASSIUM CHLORATE—
Spain, 100 brls.

RED LEAD—
Italy, 33 brls.

ROSIN—
Spain, 200 cks., 250 brls.; U.S., 2,350 brls., 1 cs.

SALTPETRE—
Holland, 19 cks., 50 kgs.

SOAP—
France, £347.; Holland, £93.; Italy, £180.; Spain, £171.; U.S., £385.

SODIUM ACETATE—
Austria, 51 cks.

SODIUM CHLORATE—
Germany, 100 cks.

SODIUM NITRATE—
Chile, 5,646 bgs.

STEARINE—
Argentine, 57 cks.85 tcs.,

TALLOW—
Argentine, 283 cks., 50 tcs.

TANNING MATERIALS—
Chestnut
France, 361 cks.; Italy, 198 cks.; 11 cs.; U.S., 418 bgs.
Gall Nut
China, 100 cs.
Gambier
Straits, 277 cs.
Myrabolans
India, 7,940 pkts., 2,000 bgs.
Oak
Jugo-Slavia, 550 cks.
Quebracho
Argentine, 24,468 bgs.
Italy, 100 bgs., 50 brls.
Sumac
Sicily, 700 bgs.
Spain, 253 bgs.
Valonia
Smyrna, 1,455 bgs.
Wattle
S. Africa, 1,594 bgs., 870 bls.

TARTARIC ACID—
France, 24 cks.

TITANIUM PIGMENT—
Norway, 77 brls.

TURPENTINE—
U.S., 50 cks., 409 brls.

WAX (*otherwise undescribed*)—
U.S., 124 bxs.

WHITE LEAD—
Germany, 1 brl., 22 cks.; Holland 11 cks., 50 drms.; Italy, 38 cks.

ZINC ASHES—
Spain, 11 t.
U.S., 30 t.

ZINC DUST—
U.S., 25 t.

ZINC OXIDE—
Belgium, 60 cks.

LONDON.

Week ending December 1.

ALBUMEN—
Argentine Republic, £998. Swift
China, £25,200. Baxter, Hoare
,, £2,510. W. M. Smith
,, £1,400. Weber, Smith & Hoare
,, £1,200. Fellows, Morton & Clayton
,, £1,890. McDougall & Bouthron
Portugal, £43. Lewis & Peat

ALUMINIUM—
France, 10 t. C. S. Lovell

ANTIMONY REGULUS—
China, 50 t. Cookson

ARGOLS—
France, 102 pkgs.
Greece, 52
Italy, 22

ARSENIC—
Peru, 246 t. Dixon
Victoria, 5 9 c. Bullard, King

BARYTES—
Belgium, 610 bgs. Felton & Crepin
Germany, 61 ,,
,, 150 Jenson & Nicholson
,, 190 Pallister, Luck

BEESWAX—
Anglo-Egypt. Sudan, 75 pkgs. Baxter, Hoare
Brit. India, 13 cs. Galbraith & Grant
Morocco, 3 bgs. W. H. Muller

BONE BLACK—
U.S.A., 130 brls. E. W. Taylor

BORATE OF LIME—
Chile, 345 t. 10 c. Borax Consol.

BROMINE—
Germany, £232. R. Moore

CALCIUM CARBIDE—
Jugo-Slavia, 222 t. J. R. Grant
,, 39 t. 7 c. D. Mills
,, 255

CALCIUM CHLORIDE—
Germany, 24 t. 12 c. W. Connell

CAMPHOR—
China, 20 drms. R. Warner
Japan, 10 cs.
,, 50 R. Warner
,, 60 W. M. Smith

CARBON BLACK—
Belgium, 15 cks. O. Murray

CARNAUBA WAX—
Brazil, 241 bgs. Weber, Smith & Hoare
France, 33

CASEIN—
France, £749. Brit. Xylonite
,, £96. W. Hamsher
,, £430. W. Bryan
Germany, £631. Lewis Hawkins
N.Z., £3,500.

CAUSTIC POTASH—
Germany, 607 pkgs. J. M. Steel

CHEMICALS (*otherwise undescribed*)
Belgium, £98. H. Barrett
France, £25. G. W. Wheatley
Italy, £226. Anderson & Dean
Germany, £24. J. Bailey
Japan, £850.

CHEMICALS (*otherwise undescribed*)
Germany, £234. Petri
,, £26. Reitmayer, Calburn & Kindersley
,, £15. Brown & Forth
,, £22. Beck & Pollitzer
,, £338.
Sweden, £42.
U.S.A., £25.
,, £1,395.
,, £80. Pitt & Scott
£3,049.

CHEMICALS (*otherwise undes.*)—*
CHLOROPHYLL—
Germany, £155.

CITRATE OF LIME—
Italy, £1,600.

COAL TAR PRODUCTS—
Anthracene
France, £2,500. Sender
Naphthalene
Belgium, £19. Allison
Unspecified
Germany, £264. A. Potter

CREAM OF TARTAR—
Algeria. 100 pkgs. E. W. Taylor
France, 100
,, 100 R. Warner
Italy, 100

DEXTRINE—
U.S.A., 2 c.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Germany, 1 pkg.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Germany, 18 pkgs. Greeff
,, £252. A. Potter
,, 5 kgs. Stott & Hotopf
,, £31.
Switzerl'd, £648.
,, 5 pkgs.

DYESTUFFS (NATURAL)—
Annatto
Denmark, 13 pkgs.
,, 6 Pay
Indigo
Brit. India, 10 chts.
Logwood
U.S.A., 30 pkgs.

FERTILISERS (*otherwise undes.*)—
Holland, 5 t. W. H. Muller
Irish F. State, 6

FUSEL OIL—
Holland, 30 cks. Honeywill

GELATINE—
Belgium, £4,230. Duche
Germany, £45. W. A. J. Tilleray
,, £333. Crowe
,, £51.
,, £416. C. Zimmerman
Switzerl'd £976. Europ & Gen. Exp.

GLUE—
Belgium, £808. P. Ingenlath
,, £175. Duche
,, £34.
France, £500. Duche
,, £170. A. J. Malicet
,, £98. P. Ingenlath
,, £29. Crowe
,, £30. Glue & Gel.
,, £6. Symons
,, £716.
,, £300. Farmiloe
Germany, £422. G. E. King
Holland, £331. H. W. Winter
,, £220. W. H. Muller
Italy, £150.
Sweden, £50.

IODINE—
Chile, £55,960.

ISINGLASS—
Brazil, 13 pkgs.
Brit. India, 57 cs. Major & Field
,, 22
French Indo-China, 6 W. M. Smith
Germany, 15 Van Oppen
Straits Setts. 20
Japan, 15 bls.

* Entered under the Safeguarding of Industries Act.

KIESELGUHR—
Algeria, 20 t. J. A. McLaren
,, 25
,, 49 14 c. Taylor Miller
,, 17 10 J. W. Cook
France, 30 13 Shaw, Lovell

LITHOPONE—
Germany, 40 cks. W. Harrison
,, 100

MAGNESITE—
Holland, £210.

MINERAL COLOURS (*otherwise undescribed*)—
Italy, 10 brls. Taylor & Cox
,, 12 N. J. Fenner & H. B. Alder
Spain, 38
,, 120 R. Aguye

MONTAN WAX—
Germany, 10 bgs. Oscar Harris

OCHRE—
France, 9 cks. Taylor & Cox
Spain, 160 brls. R. Aguye

OZOKERITE—
Austria, 129 bgs. T. H. Mins
Germany, 511 Holroyds Oil & Cer.

PARAFFIN WAX—
U.S.A., 72 t. 2 c. T. Chiesman

PHOSPHATE ROCK—
Tunis, 1,100 t. Sheppy Glue & Chem.

PITCH (*otherwise undescribed*)—
Belgium, 4 brls. H. H. Poole

PLUMBAGO—
Brit. India, 20 bgs. W. M. Smith
Germany, 14 W. Hall
Japan, 744 cks.
U.S.A., 61 pkgs.

POTASH ALUM—
Italy, 17 pkgs. Harrison, Clark

POTASSIUM CARBONATE—
Germany, 5 pkgs. Petri
Russia, 473 Litchfield & Saundy

POTASSIUM CHLORATE—
France, 20 pkgs. O. Murray

POTASSIUM PRUSSIATE—
Holland, 4 pkgs.

POTASSIUM SULPHATE—
Germany, 200 pkgs. Hollingshurst

PRUSSIAN BLUE—
Belgium, 11 cks. H. H. Poole
Holland, 22
Saar, 15 Stephens
,, 11 H. Keller

ROSIN—
Finland, 56 brls. Stromwall
France, 100 cks. Lowden Connell
,, 15 Rosin & Turp. Imp.
Portugal, 135 cks. Langley Smith
U.S.A., 350 brls. ,,
,, 676 Rosin & Turp. Imp.
,, 300 Lowden Connell

SALAMMONIAC—
Germany, 17 pkgs. R. Moore

SALT—
Germany, 15 t. Swift
,, 30 G. J. Kanaar
,, 15
,, 50 Morris

SALTPETRE—
Brit. India, £950. G. & H. Green
Germany, £56. Burton, Baker

SHELLAC—
Brit. India, 21 t. 6 c. J. W. Cook
,, 1 16 H. Battin
,, 21 19 Litchfield & Saundy

SHELLAC—
Brit. India, 15 c. Weber, Smith & Hoare
France, 12 t. 13 c. J. W. Cook

SOAP—
Belgium, £4.
Denmark, £93.
France, £33. Weber, Smith & Hoare
,, £79. S. Kalisky
,, £15.
,, £40. P. Le Brun
,, £17. Weigel, Leygonic
,, £85. D. & W. Gibbs
Germany, £31. Amer. Exp.
,, £29. C. W. Hartrodt
,, £63. T. Meadows
,, £12. A. Potter
,, £208.
Holland, £173. Litchfield & Saundy
,, £6.
Spain, £4. Morison, Pollexfen & Blair
U.S.A., £125.
,, £649. Knight & Morris
Victoria, £300. J. W. Cook

SODA CRYSTALS—
Belgium, 10 t.
,, 5 P. Winn

SODIUM BICHROMATE—
Russia, 204 t.

SODIUM PERBORATE—
Germany, 4 t. 19 c. Borax Consol.

SODIUM PHOSPHATE—
Germany, 4 t. 18 c. Scheuer

SODIUM PHOSPHATE—*
———— £5,209.

STEARINE—
N.S.W., 10 pps.

SULPHUR—
Italy, £87. E. W. Brash

TALLOW—
N.Z., 56 t. 6 c.
,, 7 17 Goad, Rigg
,, 24 2 Phillips & Graves
Victoria, 6

TANNING MATERIALS—
Gambier
France, 8 pkgs. Gough, Kidston
Java, 170
Straits, 103 Dalton & Young
Sumac
Denmark, 9 pkgs. Pay
Unspecified
Spain, 164 pkgs.
Turkey, 58 Phillips, Conquest & Damala

TAR (*otherwise undescribed*)—
France, 55 brls. J. Calder
Germany, 10 White Sea & Baltic
Sweden, 250 Mordaunt
Poland, 123 White Sea & Baltic

TAR OIL—
Sweden, 20 brls. Stromwall

TARTARIC ACID—
Holland, 60 pkgs. J. Knill
,, 40 W. C. Bacon

TURPENTINE—
France, 150 brls.
,, 74 drms. Rosin & Turp. Imp.
,, 50 brls. Fairclough, Dodd & Jones
Germany, 1
Portugal, 100 cs. Banco Nacional Ultramarino
Russia, 100 brls. White Sea & Baltic
U.S.A., 750 Goodlake & Nutter
,, 200 Lowden, Connell
,, 100

ULTRAMARINE—
Belgium, 5 cks. E. Elliott
Holland, 5 Stancourt & Muir
,, 5 O. Murray

WHITE LEAD—
Germany, 16 cks. H. Smart
Holland, 80 cks. Chance & 10 drms. Hunt
,, 36 cks. Dexters

ZINC OXIDE—
Belgium, 100 cks. M. Ashby
,, 8 brls.
Holland, 150 cks. F. T. H. Nye
,, 60 M. Ashby
U.S.A., 13 De Frey

MANCHESTER.

Week ending December 1.

ACETIC ACID—
Hamburg, 27 cks., 285 crbys.; Montreal, 682 brls., 128 cs.; Rotterdam, 1 ck.

ALUMINIUM SULPHATE—
Rouen, 100 bgs.

AMMONIUM NITRATE—
Hamburg, 43 cks.

BARIUM SULPHATE (BLANC FINE)—
Hamburg, 65 cks.

CARBON BLACK—
Antwerp, 19 cks.
New York, 100 cs.

CAUSTIC POTASH—
Antwerp, 18 drms.
Hamburg, 116 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 128 cks., 100 drms.

COAL TAR PRODUCTS—
Pyridine
Antwerp, 80 drms.

CREAM OF TARTAR—
Hamburg, 4 cks.

DEXTRINE—
Amsterdam, 100 bgs.; Baltimore, 1,816 bgs.; Hamburg, 300 bgs.; Norfolk and Newport News, 1,730 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 6 cks., 55 brls.
Unspecified
Antwerp, 352 cks.; Hamburg, 116 cs., 55 cks.; Rotterdam, 28 cks., 68 brls.

DYESTUFFS (NATURAL)—
Logwood
New York, 4 brls., 165 cks.

FERTILISERS (*otherwise undes.*)—
Antwerp, 250 bgs.

FORMALDEHYDE—
Antwerp, 25 drms.; Hamburg, 148 cks.; Rotterdam, 42 cks.

GLUCOSE—
Hamburg, 400 bgs., 50 cks.

GLUE—
Amsterdam, 30 bgs.
Antwerp, 90 pkgs., 20 bgs.

KIESELGUHR—
Cartagena, 100 bgs.

LEAD ACETATE—
Hamburg, 17 crts.

LITHOPONE—
Antwerp, 20 cks.
Rotterdam, 228 cks.

MAGNESITE—
Amsterdam, 110 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 275 brls., 1,020 drms., 105 cks.

MAGNESIUM SULPHATE—
Hamburg, 300 bgs.

MINERAL COLOURS (*otherwise undescribed*)—
Amsterdam, 26 cks.

OCHRE—
Bordeaux, 33 cks.

PARAFFIN WAX—
New York, 100 bgs.; Norfolk and Newport News, 300 brls.

PHOSPHATE (*otherwise undes.*)—
Antwerp, 5 bgs.

PHOSPHORUS—
Montreal, 94 drms.

PITCH (*otherwise undescribed*)—
New York, 59 drms.

POTASH (*otherwise undescribed*)—
Hamburg, 11 cks.

POTASSIUM PERMANGANATE—
Hamburg, 60 drms.

POTASSIUM PRUSSIATE—
Copenhagen, 15 cks.

PYRITES—
Seville, qnty.

ROSIN—
Mobile, 200 brls.
Pensacola, 800 brls.

SALT—
Hamburg, 150 bgs.

SOAP—
Rouen, 6 cs.

SODIUM (METALLIC)—
Bergen, 158 cs.

SODIUM ACETATE—
Amsterdam, 40 cks.
Antwerp, 40 kgs.

SODIUM BICHROMATE—
Baltimore, 133 cks.

SODIUM NITRATE—
Hamburg, 50 cks.

SODIUM PHOSPHATE—
Hamburg, 34 cks.

SODIUM PRUSSIATE—
New York, 69 brls.

STEARINE—
Antwerp, 342 bgs.
Hamburg, 136 bgs.

TANNING MATERIALS—
Unspecified
Bordeaux, 25 cks.; New York, 70 brls.; Rotterdam, 10 brls.

TARTARIC ACID—
Amsterdam, 20 kgs.
Rotterdam, 40 kgs.

THIOCARBANILID—
New York, 8 cs.

TIN OXIDE—
Hamburg, 15 cks.

ULTRAMARINE—
Hamburg, 3 cks.

WHITE LEAD—
Amsterdam, 35 cs., 38 cks.
Hamburg, 38 brls.

ZINC DUST—
Antwerp, 21 cks.

ZINC OXIDE—
Antwerp, 68 cks.
Rotterdam, 10 cks.

NEWCASTLE-ON-TYNE

Week ending December 1.

ALUMINIUM—
Bergen, 127 slbs.

BARIUM SULPHATE—
Antwerp, 200 bgs.

CALCIUM CARBIDE—
Christiania, 1,770 drms.

COLOURS (*otherwise undescribed*)—
Bremen, 3 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 2 crts.

GLUCOSE—
Ghent, 30 cks.

GLUE—
Antwerp, 20 bls.

LITHOPONE—
Rotterdam, 4 cks.

PHOSPHATE OF LIME—
Bougie, 3,000 t.

ROSIN—
New Orleans, 950 brls.

STEARINE—
Antwerp, 65 bgs.

SUPERPHOSPHATES—
Antwerp, 300 t.

WAX (*otherwise undescribed*)—
New Orleans, 1,282 brls.

ZINC OXIDE—
Antwerp, 12 brls.

N. & S. SHIELDS.

Week ending December 1.

NIL.

* Entered under the Safeguarding of Industries Act.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending December 1.

AMMONIUM CARBONATE—
Bergen, 10 c.

AMMONIUM SULPHATE—
Demerara, 600 t.

BOILER COMPOSITION—
Gothenburg, £93.
Kobe, 2 t. 3 c.

CHEMICALS (*otherwise undescribed*)
Alexandria, 12 pkgs.; Antofagasta, 160 pkgs.; Antwerp, 7 pkgs.; Auckland, 315 pkgs.; Basrah, 25 pkgs.; Bilbao, 100 pkgs.; Calcutta, 10 pkgs.; Cape Town, 35 pkgs.; Demerara, 215 pkgs.; Dunedin, 197 pkgs.; East London, 20 pkgs.; Genoa, 66 pkgs.; Hamburg, 109 pkgs.; Kingston (Ja.), 275 pkgs.; Iquique, 26 pkgs.; Lisbon, 29 pkgs.; Kobe, 201 pkgs.; Lyttleton, 26 pkgs.; Madras, 260 drms.; Montreal, 771 pkgs.; Mossel Bay, 1 pkg.; New York, 2,433 pkgs.; Portland Ore, 50 drms.; Rangoon 3 pkgs.; Rouen, 900 pkgs.; Tampico, 321 pkgs.; Vera Cruz, 500 pkgs.; Wellington, N.Z., 50 pkgs.

COAL TAR PRODUCTS—
Creosote
Madras, £18.
San Antonio, 68 t.
Pitch
Algiers, 199 t.
Havre, 311 t.
Tar
Alexandria, 4 t. 3 c.; Algoa Bay, 10 t. 4 c.; Antwerp, 102 t.; Calcutta, £3.; Cape Town, 163 t. 4 c.; Colombo, 8 t.; Demerara, £36.; Kingston (Ja.), 6 t. 10 c.; New York, 1 t. 10 c.; Pt. Said, 19 t. 16 c.; Rangoon, 17 t. 7 c.
Unspecified
Alexandria, 68 t. 3 c.; Calcutta, £27.; Cape Town, 85 t. 3 c.; Demerara, £6.; Iquique, £1,849.; New York, 44 t.; Oporto, £206.; Rouen, 4 t.

DISINFECTANTS (*otherwise undes.*)
Pt. Said, 2 c.

FERRO CHROME—
Hamburg, 50 t.

MAGNESIA—
Genoa, 10 c.

PARAFFIN WAX—
Antofagasta, 16 t.; Bilbao, 16 t.; Demerara, 3 t.; Lisbon, 5 t.; Pt. Said, 10 t.

POTASSIUM BICHROMATE—
Alexandria, 10 t. 6 c.; Antofagasta, 1 t. 3 c.; Athens, 6 t. 12 c.; Bombay, 1 t. 8 c.; Calcutta, 1 t.; Genoa, 1 t. 19 c.; Gothenburg, 1 t. 1 c.; Hamburg, 10 t. 5 c.; Iquique, 1 t. 18 c.; Talcahuano, 2 t. 19 c.; Valparaiso, 7 t. 2 c.

ROSIN OIL—
Hamburg, 1 t. 16 c.

SHEEP DIP—
Bahia, 9 t. 3 c.; Buenos Ayres, £788.; Demerara, £24.; East London, 17 t. 8 c.; Hamburg, 2 t. 15 c.

SOAP—
Algoa Bay, 2 t. 2 c.; Auckland, 6 c.; Calcutta, 13 c.; Cape Town, 2 t. 2 c.; Demerara, 1 t. 7 c.; Gothenburg, 1 t. 3 c.; Malta, 1 c.; Montreal, 1 t.

SODIUM BICHROMATE—
Algoa Bay, 1 t. 19 c.; Auckland, 1 t.; Calcutta, 1 t.; Dunedin, 19 c.; Genoa, 1 t. 18 c.; Hamburg, 3 t. 3 c.; Iquique, 1 t. 19 c.; Rouen, 9 t. 13 c.; Valparaiso, 36 t.

SPERMACETTI WAX—
Hamburg, £115.
New York, 1 t. 2 c.

TALLOW—
Colombo, 3 t. 9 c.; Demerara, £24.; Hamburg, 20 t.

TANNING MATERIALS—
Unspecified
Cape Town, 4 t. 14 c.
Dunedin, N.Z., 2 t. 6 c.

TAR (ARCHANGEL)—
Calcutta, £18.

TAR (STOCKHOLM)—
Colombo, 1 t.

TAR (*otherwise undescribed*)—
Demerara, £25.

WAX (*otherwise undescribed*)—
Genoa, 2 t. 12 c.; Hamburg, 13 c.; Leghorn, 10 t.; New York, 1 t. 7 c.

GRANGEMOUTH.

Week ending December 1.

COAL TAR PRODUCTS—
Creosote
Rotterdam, 10 cks.

PARAFFIN WAX—
Riga, 112 bgs.

HULL.

Week ending November 27.

CHEMICALS (*otherwise undescribed*)
Abo, 190 drms.; Amsterdam, 20 cs.; Antwerp, 50 drms., 1 brl., 175 drms.; Alexandria, 100 drms.; Beauty Point, 20 kgs.; Christiansand, 1 cs.; Copenhagen, 7 cs., 1 ck., 36 drms.; Christiania, 5 cs., 17 cks., 11 pkgs.; Dunkirk, 9 cks., 50 brls.; Genoa, 4 cks., 9 brls.; Gothenburg, 1 cs., 2 cks., 12 pkgs.; Hobart, 5 bgs., 7 brls.; Hamburg, 8 cs., 40 drms.; Leghorn, 100 cks.; Melbourne, 10 kgs., 1 brls.; Naples, 511 bgs.; Rotterdam, 2 brls., 48 drms.; Sydney, 3 cs.

COAL TAR PRODUCTS—
Naphthalene
Rotterdam, 377 bgs.
Pitch
Dunkirk, 300 t.
Tar
Hamburg, 158 drms.

FULLER'S EARTH—
Hamburg, 223 brls.

GLUE—
Copenhagen, 1 bg.
Rotterdam, 5 bgs.

PITCH (*otherwise undescribed*)—
Copenhagen, 5 brls.

SALT—
Malmo, 15 cs.

SOAP—
Alexandria, 13 kgs.; Copenhagen, 4 cs., 2 cks.; Christiania, 2,027 cs.; Gothenburg, 250 cs.

TURPENTINE—
Antofagasta, 100 cs.
Christobal, 10 cs.

LEITH.

Week ending December 1.

COAL TAR PRODUCTS—
Creosote Oil
Gothenburg, 2 drms.

MAGNESIUM CARBONATE—
Bordeaux, 400 bgs.

PARAFFIN WAX—
Ghent, 32 bgs.
Hamburg, 374 bgs.

PITCH (*otherwise undescribed*)—
Gothenburg, 10 cks.

SHEEP DIP—
Reykjavik, 43 cs.

SOAP—
Reykjavik, 36 cs.

SODA—
Thorshavn, 6 bgs.

SPENT OXIDE—
Hamburg, 74 t.

LIVERPOOL.

Week ending November 29.

ACETIC ACID—
Manaos, 1 c. 2 qrs., £12.

ALUM—
Galatz, 3 t., £55.

ALUMINIUM SULPHATE—
Bergen, 5 t., £34.
Calcutta, 15 t., £129.

AMMONIUM CARBONATE—
Bordeaux, 10 c., £15.; Buenos Ayres, 2 t. 9 c., £82.; Calcutta, 7 t., £255.; Cartagena, 1 t., £33.; Constantinople, 19 c., £25.; Dalny, 1 t. 19 c., £71.; Galatz, 3 t. 19 c., £107.; Genoa, 14 t. 18 c., £122.; Hamburg, 8 t. 7 c., £196.; New York, 4 t. 3 c., £166.; Para, 4 c., £12.; Piraeus, 10 c., £19.; Rio de Janeiro, 1 t. 19 c., £53.

AMMONIUM CHLORIDE—
Alexandria, 4 t. 16 c., £204.; Adelaide, 1 t. 1 c., £33.; Bombay, 6 t., £239.; Barcelona, 3 t. 19 c., £116.; Calcutta, 10 t. 10 c., £424.; Constantinople, 2 t. 19 c., £123.; Galatz, 5 t., £151.; Kobe, 79 t. 18 c., £2,344.; Montreal, 1 t. 13 c., £51.; Rouen, 5 t. 2 c., £155.; Shanghai, 2 c., £3.; Yokkaichi, 5 t., £148.; Yokohama, 59 t. 15 c., £1,752.

AMMONIUM NITRATE—
Antwerp, 150 t., £4,875.

AMMONIUM SULPHATE—
Catania, 52 t., £733.; Cheribon, 1,000 t. 1 c., £15,843.; Hong Kong, 90 t., £1,552.; Las Palmas, 43 t., £602.; La Pallice, 16 t., £216.; Malaga, 346 t. 7 c., £4,763.; Naples, 25 t., £338.; Nantes, 16 t., £216.; Samarang, 700 t. 12 c., £10,512.; Sourabaya, 30 t. 4 c., £4,755.

ANTIFOULING PAINT—
Lisbon, 10 c., £27.
Vigo, 6 c., £33.

ANTIMONY LACTATE—
Abo, 6 c., £19.

ARSENIC—
Seville, 1 t. 1 c., £89.

ARSENIOUS ACID—
Melbourne, 2 t., £196.

BITUMEN—
Buenos Ayres, 13 t. 10 c., £146.

BLEACHING POWDER—
Auckland, 5 t., £60.; Bombay, 1 t., £12.; Callao, 1 t. 4 c., £70.; Delagoa Bay, 18 t., £216.; Fremantle, 1 t. 1 c., £13.; Melbourne, 1 t., £15.; Pernambuco, 3 t., £35.; Philadelphia, 3 t. 9 c., £90.; Rotterdam, 10 t. 3 c., £91.; Sydney, 1 t. 2 c., £15.; Singapore, 1 t. 12 c., £50.; Shanghai, 5 t. 1 c., £60.

BOILER COMPOSITION—
Calcutta, 4 c. 3 qrs., £14.; Pasages, 2 t. 14 c., £110.; Rio de Janeiro, 19 c., £27.

BORAX—
Asuncion, 10 c., £12. 15s.; Barcelona, 13 t. 15 c., £357.; Cartagena, Col., 16 c., £82.; Landskrona, 10 c., £12.; Manaos, 1 c., £1. 5s.; Piraeus, 1 t., £26.; St. John's, N.F., 6 c., £25.; Santiago, Cuba, 3 t., £76.

BORAX GLASS—
Barranquilla, 10 c., £36.

BORIC ACID—
Bangkok, 1 qr., £1.; Barcelona, 10 c., £30.; Madras, 2 qrs., £6.

CALCIUM CHLORIDE—
Adelaide, 5 t., £30.; Brisbane, 5 t. 4 c., £31.; Bombay, 20 t. 1 c., £105.; Beira, 2 t. 13 c., £17.

CALCIUM CHLORIDE—
Colombo, 10 t. 3 c. £48.; Durban, 15 t. 18 c., £96.; Melbourne, 10 t., £60.; Penang, 10 t. 11 c., £60.; Sydney, 25 t. 8 c., £151.; Singapore, 6 t. 1 c., £71.; Sourabaya, 8 t. 18 c., £110.

CHEMICALS (*otherwise undescribed*)
Antwerp, 15 t., £705.; Adelaide, 2 t. 10 c., £65.; Barcelona, 3 t., £78.; Constantinople, 10 c., £13.; Christiania, 1 t., £26.; Dunedin, 1 t., £11.; Fremantle, 1 t., £10.; Invercargill, 1 t. 2 c., £34.; Leghorn, 25 t., £625.; Melbourne, 3 t. 2 c., £543.; New York, 23 t. 19 c., £293.; Sydney, 8 t. 1 c., £173.; Shanghai, 9 t. 6 c., £250.; Santander, 1 t. 9 c., £39.; Tientsin, 6 t., £150.; Teneriffe, 5 t. 2 c., £13.

CHLORINE—
Durban, 6 c., £10.

CITRIC ACID—
Barcelona, 10 c., £72.

COAL TAR PRODUCTS—
Carbolic Acid
Calcutta, 4 c., £30.; Genoa, 1 t. 18 c., £259.; Hamburg, 19 c., £125.; Kobe, 5 t., £577.; Melbourne, 2 c., £17.
Creosote
Melbourne, 4 c. 2 qrs., £10.
New York, 10 t. 11 c., £350.
Napthhalene
Aden, 4 t., £32.; Mombasa, 5 t., £40.; Shanghai, 5 t., £40.
Pitch
Alexandria, 15 t. 11 c., £113.
Tar
Accra, 1 t. 8 c., £14.; Delagoa Bay, 79 t. 14 c., £890.; Iddo, 14 c., £15.; Tanga, 1 t. 5 c., £17.
Unspecified
Genoa, 4 t. 5 c., £779.

COBALT OXIDE—
Santos, 5 c., £236.

COPPER ACETATE—
Sydney, 5 c., £25.

COPPER OXIDE—
Antwerp, 4 t., £304.; Seville, 4 c., £17.; Trieste, 2 t., £141.

COPPER SULPHATE—
Fremantle, 12 t., £288.; Melbourne, 10 t., £260.; Monte Video, 9 t. 17 c., £238.; Tanga, 15 c., £19.

CREAM OF TARTAR—
Adelaide, 10 c., £43.; Auckland 1 t., £88.; Bluff, 10 c., £44.; Brisbane, 2 t., £172.; Fremantle, 4 t. 10 c., £387.; Greymouth, 10 c., £44.; Invercargill, 1 t., £86.; Lyttleton, 1 t., £88.; Melbourne, 1 t. 10 c., £129.; Sydney, 4 t., £344.

DISINFECTANTS (*otherwise undes.*)
Accra, 1 c. 1 qr., £17.; Buenos Ayres, 1 c., £25.; Cartagena, Col., 8 c., £20.; Calcutta, 7 t. 2 c., £205.; Dakar, 5 c., £26.; Lome, 1 c. 1 qr., £12.; Montreal, 10 t. 16 c., £524.; Madras, 1 t. 1 c., £58.; Manaos, 10 c., £34.; Mombasa, 2 t. 7 c., £87.; Napier, 3 c., £12.; New York, 7 t. 5 c., £249.; Oamaru, 1 c. 1 qr., £10.; Pto. Deseado, 2 t. 4 c., £187.; Pto. Cabello, 2 t. 15 c., £207.; St. John's, N.F., 13 c. 2 qrs., £132.; Savannah-la-Mar, 14 c., £39.; Wellington, 4 c., £25.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 15 t., £1,960.
Santos, 10 c., £440.
Methylene Blue
Calcutta, 2 c., £64.
Unspecified
Brisbane, 11 c., £149.; Boston, 1 t. 2 c., £318.; Barcelona, 3 c. 3 qrs., £73.; Calcutta, 5 c., £112.; Dunedin, 1 t., £308.; Durban, 2 c., £60.; Hong Kong, 5 c., £75.; Lyttleton, 2 c. £28.; Madras, 2 c. £24.; Montreal, 3 t. 11 c,. £584.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Piraeus, 4 c. 3 qrs., £172.; Pt. Swettenham, 3 c., £29.; Rio de Janeiro, 4 c. 2 qrs., £221.; Santos, 1 c. 2 qrs., £65.; Trinidad, 1 c., £12.; Tuticorin, 4 c., £60.; Wellington, 10 c., £96.

DYESTUFFS (NATURAL)—
Orchil
New York, 1 t. 5 c., £61.

ESSENTIAL OILS (SYNTHETIC)—
Iddo, 16 c., £140.; Kobe, 1 t. 8 c., £686.; Quebec, 3 c., £283.; Wellington, 2 qrs., £20.

FERTILISERS (*otherwise undes.*)—
Charleston, 197 t. 12 c., £401.

GLYCERINE—
Bangkok, 6 c. 1 qr., £32.; Copenhagen, 5 t. 15 c., £438.; Calcutta, 2 t. 2 c. 2 qrs., £151.; Cape Town, 1 t., £91.; Durban, 1 t. 10 c., £138.; Helsingfors, 1 t. 1 c., £73.; Hong Kong, 1 t., £90.; Kobe, 54 t. 1 c., £4,890.; Lisbon, 2 t. 9 c., £211.; Monte Video, 1 t. 9 c., £140.; Norrkoping, 5 c., £13.; Piraeus, 10 c., £40.; Stockholm, 4 t. 18 c., £336.; Yokohama, 15 t. 14 c., £1,142.

LACTIC ACID—
Algoa Bay, 3 t. 11 c., £142.
Sydney, 14 c., £29.

LEAD NITRATE—
Montreal, 5 t., £220.

MAGNESITE (CALCINED)—
Amsterdam, 8 t. 10 c., £65.

MAGNESIUM SULPHATE—
Abonema, 1 c., £1, 5s.; Accra, 4 c. 2 qrs., £6.; Bangkok, 1 c., £1. Barbados, 1 t. 2 c., £9.; Grand Bassam, 1 c., £1. 5s.; Madras, 2 qrs., £2.; Pt. Harcourt, 4 c., £5.; Sekondi, 3 c., £9.; Sierra Leone, 11 c., £14.; Saltpond, 3 c., £3.; St. John's, N.F., 4 t. 1 c., £34.; Winnebah, 1 c., £1. 5s.; Wellington, 4 t., £24.

MANGANESE BORATE—
Sydney, 6 c., £23.

MANGANESE OXIDE—
Seville, 2 t. 14 c., £102.

NICKEL OXIDE—
Santos, 5 c., £39.

NICKEL SULPHATE—
Sydney, 10 c., £21.
Shanghai, 10 c., £21.

NITRIC ACID—
Durban, 4 c., £17.

PHOSPHORUS SESQUISULPHIDE
Alicante, 10 c., £101.
Valencia, 3 t. 8 c., £707.

POTASSIUM AND SODIUM CITRATE—
Montreal, 7 c., £82.

POTASSIUM BICHROMATE—
Alexandria, 34 t. 4 c., £1,675.; Antwerp, 1 t. 4 c., £56.; Abo, 5 t. 8 c., £239.; Dantzig, 15 c., £37.; Trieste, 3 t. 6 c., £167.

POTASSIUM CITRATE—
Bombay, 2 c. 1 qr., £29.

POTASSIUM CYANIDE—
Buenos Ayres, 5 c., £29.

POTASSIUM IODIDE—
Addah, 14 lb., £16.; Grand Bassam, 10 lb., £10.; Pt. Harcourt, 28 lb., £35.

POTASSIUM PRUSSIATE—
Kobe, 11 t., £1,106.
New York, 11 c., £104.

SHEEP DIP—
Buenos Ayres, 64 t. 2 c., £2,696.; Braila, 1 t. 10 c., £122.; Buenaventura, 15 c., £59.; Barranquilla, 2 t. 11 c., £145.; Bahia Blanca, 21 t. 1 c., £1,100.; Callao, 1 t. 8 c., £94.; Cape Town, 2 t. 19 c., £60.; Commodoro Rivadavia, 9 t. 3 c., £350.; Dunedin, 7 t. 3 c., £525.; Lyttleton, 15 t. 18 c., £1,164.; Mombasa, 9 c., £17.; Pelotas, 3 t. 16 c., £250.; Pt. Alegre, 4 t. 8 c., £280.; Pto. Deseado, 29 t. 8 c., £1,436.; Rio Gallegos, 7 t., £262.; San Julian, 4 t. 9 c., £175.; Wellington, 14 t. 15 c., £1,032.

TANNING MATERIALS
Oak
Bergen, 4 t. 10 c., £63.
Wattle
Copenhagen, 2 t. 7 c., £39.
Wyborg, 1 t. 3 c., £19.
Unspecified
Antwerp, 4 t. 12 c., £34.; Auckland, 2 t. 17 c., £50.; Algoa Bay, 2 t. 8 c., £40.; Austria, 9 t. 12 c., £210.; Durban, 1 t. 12 c., £32.; Helsingfors, 1 t. 3 c., £20.; Shanghai, 10 t., £248.

TAR (WOOD)—
Alexandria, 1 t. 5 c., £10.

TARTARIC ACID—
Adelaide, 10 c., £63.
Melbourne, 10 c., £63.
Sydney, 3 t., £364.
St. John's, N.F., 2 c., £13.

TIN OXIDE—
Melbourne, 15 c., £194.; Santos, 14 c., £176.; Sydney, 1 t. 7 c., £337.

TURPENTINE—
Wellington, 12 c., £50.

VANADIC ACID—
Dunkirk, 1 t. 4 c., £1,024.

WOOD PRESERVATIVE—
Hong Kong, 9 c., £16.
Wellington, 16 c., £38.

ZINC CHLORIDE—
Bombay, 14 t. 19 c., £348.

ZINC OXIDE—
Bolivia, 1 t. 10 c., £72.
Batoum, 37 t. 1 c., £1,665.
Rouen, 1 t. 10 c., £70.
Vera Cruz, 4 c., £11.

Week ending November 30.

BASIC SLAG—
St. John's, N.F., 10 t.

BISMUTH ORE—
Bremen, 5 t.

CAUSTIC POTASH—
Amsterdam, 34 drms.

CAUSTIC SODA—
Aarhus, 10 pkgs.; Adelaide, 60 drms.; Alexandria, 95 drms.; Antwerp, 4 drms.; Auckland, 47 drms.; Barranquilla, 37 drms.; Bergen, 20 drms.; Bourgas, 300 drms.; Bombay, 40 drms.; Buenos Ayres, 801 drms.; Callao, 18 drms.; Calcutta, 100 drms.; Christiania, 40 pkgs.; Cuidad Bolivar, 50 drms.; Copenhagen, 29 drms.; Corinto, 20 drms.; Durban, 9 drms.; Hamburg, 935 drms.; Funchal, 34 drms.; Invercargill, 10 drms.; Jaffa, 27 drms.; Lyttleton, 30 drms.; Madras, 120 drms.; Mazatlan, 40 drms.; Moji, 41 drms.; Monte Video, 100 drms.; Oporto, 62 drms.; Piraeus, 50 drms.; Pt. Alegre, 1,225 drms.; Rio de Janeiro, 1,700 drms.; Rotterdam, 238 drms.; Salonica, 68 drms.; Sekondi, 100 drms.; Singapore, 173 drms.; Shanghai, 118 drms.; Sierra Leone, 40 drms.; Sourabaya, 400 drms.; Sydney, 101 drms.; Timaru, 20 cs.; Trondhjem, 65 drms.; Varna, 600 drms.; Wellington, 168 drms.; Zanzibar, 20 drms.

FERRO MANGANESE—
Durban, 9 t.; Los Angeles, 150 t.; Quebec, 22 t.; Santos, 25 t.; Stockholm, 10 t.

GLUE, SIZE, AND GELATINE—
Algoa Bay, 20 pkgs.; Bombay, 20 cs.; Buenos Ayres, 23 bgs.; Melbourne, 20 pkgs.; Montreal, 120 bgs., 15 cks.; New York, 160 bgs.; Penang, 1 pkg.; Shanghai, 20 bgs., 10 cks.; Victoria, B.C., 10 bgs.

MAGNESIA—
Vera Cruz, 10 pkgs.

OXYGEN—
Lagos, 10 cylds.

PARAFFIN WAX—
Pto. Cabello, 160 bgs.

PLUMBAGO—
Vancouver, 2 t.

SALT—
Aalesund, 8 t.; Abonema, 40 t.; Accra, 7 t.; Antwerp, 500 t.; Bergen, 136 t.; Brisbane, 6 t.; Calcutta, 4,344 t.; Cape Palmas, 4 t.; Cape Town, 2 t.; Duala, 67 t.; Dunedin, 20 t.; Durban, 2 t.; Grand Bassam, 80 t.; Gibraltar, 9 t.; Halifax, N.S., 110 t.; Iddo, 360 t.; Kingston (Ja.), 20 t.; Lagos, 80 t.; Malta, 24 cs.; Montreal, 571 t.; New York, 25 t.; Pto. Barrios, 121 t.; Pt. Harcourt, 71 t.; Saltpond, 22 t.; Pt. Lovo, 27 t.; Rio de Janeiro, 88 t.; Sassandra, 20 t.; Rouen, 10 t.; Sapele, 72 t.; Seville, 2 t.; Sierra Leone, 355 t.; St. John's, N.F., 6 t.; Skein, 45 t.; St. Kitts, 8 t.; Sydney, 20 t.; Suva, 50 t.; Trondhjem, 34 pkgs.; Winnebah, 12 t.

SOAP—
Accra, 1,450 pkgs.; Alexandria, 19 pkgs.; Amboina, 620 pkgs.; Amoerang, 200 pkgs.; Ampanom, 200 pkgs.; Assinee, 12 pkgs.; Banda Neira, 25 bxs.; Bandjermassin, 1,350 bxs.; Banjoewangie, 25 bxs.; Bangkok, 172 pkgs.; Barbados, 132 bxs.; Barranquilla, 6 bxs.; Benoa, 5 pkgs.; Batavia, 2,261 pkgs.; Benkolen, 150 pkgs.; Bermuda, 18 pkgs.; Black River, 17 pkgs.; Blinjoe, 195 bxs.; Boeleleng, 10 pkgs.; Boela, 70 bxs.; Bombay, 4,452 bxs.; Boston, 3 cs.; Bourgas, 565 cs.; Buenos Ayres, 742 pkgs.; Burutu, 8 cs.; Ceuta, 481 pkgs.; Cape Coast, 29 pkgs.; Calcutta, 648 bxs.; Colombo, 72 pkgs.; Comodoro Rivadavia, 25 pkgs.; Copenhagen, 261 pkgs.; Curacao, 102 pkgs.; Czecho-Slovakia, 13 pkgs.; Djambi, 345 pkgs.; Dobo, 50 pkgs.; Dongala, 50 pkgs.; Durban, 75 pkgs.; Gibraltar, 100 pkgs.; Gorontalo, 556 pkgs.; Guadeloupe, 250 pkgs.; Harbour Grace, 25 pkgs.; Hong Kong, 87 pkgs.; Iddo, 150 pkgs.; Iquitos, 924 pkgs.; Karachi, 590 pkgs.; Kingston (Ja.), 1,055 bxs.; Kota Baroe, 530 pkgs.; Kobe, 13 bxs.; Kuala Lumpur, 1,800 pkgs.; Laboean Hadji, 10 bxs.; Lagos, 1,003 pkgs.; Laiwoei, 15 bxs.; Langsa, 150 bxs.; Leghorn, 12 pkgs.; Las Palmas, 779 bxs.; Lho Seumawah, 50 pkgs.; Limassol, 19 pkgs.; Liroeng, 15 pkgs.; Macassar, 2,735 pkgs.; Madras, 55 bxs.; Malacca, 214 pkgs.; Malta, 172 pkgs.; Mauritius, 6 brls.; Menado, 1,974 pkgs.; Meolabah, 25 bxs.; Montego Bay, 25 pkgs.; Monte Video, 35 cs.; Muntok, 20 bxs.; Noumea, 20 bxs.; Nassau, 41 cs.; Olehleh, 600 bxs.; Orotava, 40 bxs.; Osaka, 20 cks.; Padang, 295 pkgs.; Padang Balei, 20 bxs.; Palembang, 350 bxs.; Panama, 470 cs., 750 bxs.; Panarockan, 50 bxs.; Pangkaren Brandon, 50 bxs.; Panka, Pinang, 170 bxs.; Penang, 20 cs., 1,288 bxs.; Petta, 40 bxs.; Pontianak, 2 cs., 100 bxs.; Pt. Elizabeth, 38 cs.; Pt. Harcourt, 200 bxs.; Pt. Louis, 100 bxs., 6 cs.; Pt. Said, 330 bxs., 50 cs.; Pt. Swettenham, 2 brls., 20 drms.; Rotterdam, 18 bxs., 80 cs., 100 bgs.; Rangoon, 2,279 pkgs.; Saltpond, 300 bxs.; Samarang, 354 pkgs.; Samarinda, 100 bxs.; Samanco, 25 bxs.; San Fernando, 1 bx.; Santander, 15 cs.; Saparoea, 20 bxs.; Sarawak, 40 cs.; Sekondi, 45 bxs.; Shanghai, 1,081 pkgs.; Singapore, 10 drms.; Segli, 50 bxs.; Sinoe, 3 bxs.; Soembawa, 10 bxs.; Siauw, 60 bxs.; Sierra Leone, 27 pkgs.; Sourabaya, 1,700 pkgs.; Stavangar, 1 bx.; St. John's, N.F., 523 pkgs.; St. Vincent, 30 bxs.; Sydney, 6 cs.; Tagoelandang, 20 bxs.; Tandjong Balei, 300 pkgs.; Tangiers, 451 bxs.; Tapatoean, 25 bxs.; Taroena, 80 bxs.; Teneriffe, 461 pkgs.; Ternate, 485 bxs.; Tetuan, 275 bxs.; Timor Dilly, 50 bxs.

SOAP—
Trinidad, 775 bxs.; Varna, 1,150 cs.; Vatoeroesa, 50 bxs.; Wellington, 12 drms.; Winnebah, 450 bxs.; Zanzibar, 20 drms.

SODA ASH—
Aalesund, 50 pkgs.; Adelaide, 354 pkgs.; Auckland, 45 cks.; Bourgas, 50 bgs.; Buenos Ayres, 1,035 cks.; Cartagena (Col.), 32 pkgs.; Calcutta, 5,750 pkgs.; Constantinople, 200 pkgs.; Christiania, 300 pkgs.; Copenhagen, 700 pkgs.; Dunedin, 50 pkgs.; Hamburg, 200 pkgs.; Helsingborg, 500 pkgs.; Hong Kong, 615 pkgs.; Kalmar, 80 pkgs.; Kobe, 1,082 pkgs.; Los Angeles, 500 bgs.; Malmo, 1,900 bgs.; Malta, 10 bgs.; Mazatlan, 10 t.; Melbourne, 1,628 pkgs.; Moji, 1,082 bgs.; Oporto, 2 brls.; Riga, 250 bgs.; Rio Grande do Sul, 20 cks.; Rio de Janeiro, 102 pkgs.; Rotterdam, 5,000 pkgs.; Samarang, 18 cks.; Santos, 89 cks.; Shanghai, 4,177 bgs.; Skein, 7,563 bgs.; Stockholm, 1,279 bgs.; Sydney, 48 pkgs., 944 bgs.; Suva, 140 pkgs.; Yokkaichi, 2,164 bgs.; Yokohama, 325 bgs.; Zanzibar, 20 bgs.

SODA CRYSTALS—
Antofagasta, 8 pkgs.; Buenos Ayres, 752 kgs.; Demerara, 34 pkgs.; Durban, 20 pkgs.; Zanzibar, 10 brls.

SODIUM ARSENITE—
Petrograd, 600 drms.

SODIUM BICARBONATE—
Abo, 250 pkgs.; Adelaide, 446 pkgs.; Brisbane, 111 kgs.; Demerara, 50 pkgs.; Dunedin, 90 pkgs.; Genoa, 30 pkgs.; Helsingfors, 40 pkgs.; Larnaca, 1 ck.; Kingston, 50 pkgs.; Kobe, 1,077 pkgs.; Mauritius, 20 pkgs.; Mazatlan, 20 pkgs.; Melbourne, 754 pkgs.; Pisco, 20 cks.; Pt. Said, 80 pkgs.; Pt. Sudan, 25 pkgs.; Rio de Janeiro, 400 pkgs.; San Fernando, 25 kgs.; Shanghai, 84 drms.; St. John's, N.F., 20 kgs.; Sydney, 334 pkgs.; Varna, 340 pkgs.; Vera Cruz, 50 pkgs.; Yokkaichi, 177 bgs.; Yokohama, 538 bgs.

SODIUM CYANIDE—
Sekondi, 80 pkgs.

SODIUM SILICATE—
Funchal, 10 pkgs.; Hankow, 32 cks.; Kobe, 32 pkgs.; Lagos, 15 pkgs.; La Guaira, 16 pkgs.; Madras, 18 drms.; Manzanillo, 100 bgs.; Montreal, 80 pkgs.; Pt. Said, 23 pkgs.; Rio de Janeiro, 53 pkgs.; Sydney, 57 pkgs.; Tripoli (Syria), 16 cks.

SODIUM HYDROSULPHITE—
Delagoa Bay, 5 kgs.
Rio de Janeiro, 10 kgs.

SODIUM SULPHIDE—
Auckland, 8 pkgs.; Piraeus, 21 drms.; Quebec, 90 drms.; Sekondi, 83 drms.

SODIUM TUNGSTATE—
Rouen, 1 cs.

STEARINE—
Pto. Colombia, 12 bgs.; Rangoon, 145 bgs.; Shanghai, 98 dble. bgs.; Singapore, 24 dble. bgs.; Valparaiso, 16 bgs.

TALLOW—
Antwerp, 142 cs.; Hamburg, 15 pkgs.; Helsingfors, 30 brls.; Stockholm, 18 brls.

LONDON.

OFFICIAL AMENDMENTS.

From return for week ending September 26, 1923, deduct—

DISINFECTANTS (*otherwise undes.*)
Bergen, 2 c., £10.

In return for week ending November 7, 1923

TARTARIC ACID—
Yokohama, 12 t., £960.
should read—
TARTARIC ACID—
Yokohama, 12 t., £1,440.

Week ending November 28.

ACETIC ACID—
Auckland, 4 cs., £14. ; Christchurch, 2 cs., £17. ; Jamaica, 1 cs., £6. ; Sekondi, 4 cs., £7. ; Switzerland, 2 cs., £5. ; Trinidad, 2 cs., £5.

ACETONE—
Sydney 1 drm., £8.

ACETYL SALICYLIC ACID
Colombo, 1 cs. (pt.), £5. ; Irish Free State, 3 cs. (pt.), £40. ; Montreal, 4 cs. (pt.), £47. ; Shanghai, 2 cs. (pt.), £17. ; Wellington, 2 cs. (pt.), £33.

ALUM—
Calcutta, 1 cs., £7.

AMMONIA—
Buenos Ayres, 25 cs., £45. ; Cape Town, 18 cs., £31. ; Delagoa Bay, 2 pkgs., £22. ; Durban, 31 cs., £55. ; Irish Free State, 26 pkgs., £54. ; Leghorn, 16 cs., £28. ; Penang, 4 cs., £7. ; Pernambuco, 4 cs., £7. ; Pt. Elizabeth, 13 cs., £26. ; Rangoon, 2 cs., £7. ; Sandakan, 3 cs., £7. ; Shanghai, 5 cs., £9. ; Trinidad, 6 cs., £11.

AMMONIA (ANHYDROUS)—
Irish Free State, 2 cylds., £18. ; Kilindini, 1 cs., £5. ; Lisbon, 8 cylds., £40. ; Pt. Said, 10 cylds., £80.

AMMONIUM ACETATE—
Pt. Elizabeth, 3 cs., £10.

AMMONIUM BICHROMATE—
Adelaide, 2 cs. (pt.), £7.

AMMONIUM BIFLUORIDE—
Paris, 2 cks., £26.

AMMONIUM CARBONATE—
Amsterdam, 6 c., £7. ; Antwerp, 1 t., £26. ; Auckland, 5 c., £8. ; Bangkok, 3 c., £11. ; Brussels, 1 t. 6 c., £36. ; Calcutta, 2 c., £9. ; Cape Town, 3 c., £7. ; Ceuta, 2 c., £5. ; Copenhagen, 1 t. 10 c., £42. ; Genoa, 2 t. 9 c., £64. ; Hamburg, 1 t. 9 c., £39. ; Hong Kong, 1 t. 10 c., £84. ; Kobe, 5 t., £126. ; Madras, 2 c., £7. ; Monte Video, 1 t. 8 c., £74. ; Paris, 4 t. 19 c., £144. ; Penang, 9 c., £5. ; Shanghai, 10 c., £17. ; Sydney, 3 c., £25. ; Tokio, 6 t., £166. ; Yokohama, 5 t., £138.

AMMONIUM CHLORIDE—
Antwerp, 2 cks., £18. ; Auckland, 6 cks., £50. ; Rouen, 14 cks., £190.

AMMONIUM NITRATE—
Harlingen, 49 t. 12 c., £1,100.

AMMONIUM SULPHATE—
Madeira, 20 t., £280.
Teneriffe, 50 t., £700.

ANTIMONY OXIDE—
Barcelona, 10 cks., £106. ; Paris, 15 cks., £194. ; Rouen, 3 cks., £40.

ANTIMONY SULPHIDE—
Budapest, 8 cks., £190.

ARSENIC—
Cape Town, 2 drms., £7. ; Otago, 5 drms., £16. ; Pt. Elizabeth, 3 d rms., £10. ; Sao Paulo, 20 drms. £65 ; Penang, 5 drms., £18.

BARIUM NITRATE—
Buenos Ayres, 2 brls., £8.

BARIUM SULPHATE—
Kobe, 42 cks., £150.

BARIUM SULPHATE (BLANC FIXE)—
Sydney, 12 bgs., £18.

BENZENE—
Singapore, 4 drms., £7.

BISMUTH AMMONIUM CITRATE
Sydney, 1 cs. (pt.), £8.

BISMUTH CARBONATE—
Auckland, 1 cs., £72. ; Brisbane, 1 cs., £38. ; Buenos Ayres, 1 cs., £179. ; Kilindini, 3 cs., £136. ; Melbourne, 2 cs., £143.

BISMUTH SALICYLATE—
Bombay, 4 cs. (pt.), £32.

BISMUTH SUBCARBONATE—
Sydney, 2 cs., £147.

BISMUTH SUBNITRATE—
Auckland, 1 cs., £16. ; Bombay, 4 cs. (pt.), £33. ; Sydney, 1 cs. (pt.), £8.

BISULPHITE OF LIME—
Durban, 5 hhds., £8.

BLEACHING POWDER—
Ascension, 7 brls., £8.

BONE FLOUR—
Channel Islands, 3 t., £18.

BORATE OF LIME—
Petrograd, 31 t., £517.

BORAX—
Amsterdam (F.), 4 t., £104. ; Mauritius, 15 c., £34. ; Rangoon, 10 c., £14.

BORIC ACID—
Alexandria, 13 c., £42. ; Bombay, 5 c., £17. ; Calcutta, 5 c., £15. ; Cape Town, 1 t. (F.), £50. ; Channel Islands, 2 c., £6. ; Durban, 15 c. (F.), £39. ; Durban, 2 c., £8. ; East London, 1 c., £5. ; Hong Kong, 2 c., £7. ; Mauritius, 2 c., £5. ; New Plymouth, 1 c., £7. ; Trujillo, 2 c., £14. ; Wanganui, 1 c., £8.

BROMINE—
New York, 1 cs., £7.

CALCIUM CARBIDE—
Cape Town (F.), 1 t., £12. ; Colombo (F.), 6 c., £13. ; Madras, 19 c., £15. ; Mauritius, 1 t., £16. ; Penang, 5 c., £7. ; Pt. Elizabeth, 3 c., £5. ; Pt. Harcourt, 10 c., £7. ; Sydney (F.), 10 c., £6.

CALCIUM CHLORIDE—
Buenos Ayres, 9 cs., £23.

CALCIUM GLYCEROPHOSPHATE
Melbourne (F.), 1 cs. (pt.), £9.

CALCIUM HYPOPHOSPHITE—
Adelaide, 1 cs., £7.
Calcutta, 1 cs. (pt.), £6.

CARBON BISULPHIDE—
Delagoa Bay, 5 drms., £11.

CARBON TETRACHLORIDE—
Sydney, 1 drm., £6.

CAUSTIC SODA—
Beira, 2 c., £5 ; Comodore, a qty.

CHEMICALS (*otherwise undescribed*)
Adelaide, 36 pkgs., £98. ; Alexandria, 3 cs., £5. ; Alicante, 10 pkgs., £25. ; Antigua, 2 cs. (pt.), £7. ; Antwerp, 50 pkgs., £133. ; Asuncion, 3 pkgs., £9. ; Bangkok, 3 cs., £40. ; Barbados, 2 cs. (pt.), £5. ; Barcelona, 230 pkgs., £595. ; Batavia, 20 pkgs., £26. ; Beira, 59 pkgs. (pt.), £202. ; Bombay, 6 pkgs. (pt.), £21. ; Brisbane, 39 pkgs., £115. ; Calcutta, 15 pkgs. (pt.), £40. ; Canton, 2 kgs., £6. ; Cape Town, 3 pkgs., (F.), £6. ; Cape Town, 7 pkgs., £11. ; Colombo, 2 cs., £20. ; Danzig, 250 pkgs., £625. ; Durban, 18 pkgs., £35. ; East London, 4 pkgs., £8. ; Freetown, 7 cs., £44. ; Galatz, 30 pkgs., £75. ; Gijon, 250 pkgs., £650. ; Gustafsberg, 150 pkgs., £375. ; Hong Kong, 6 cks., £8. ; Irish Free State, 6 pkgs., £112. ; Jaffa, 2 cs. (pt.), £5. ; Madras, 2 cs. (pt.), £42. ; Melbourne, 19 pkgs. (pt.), £78. ; Melbourne, 3 pkgs. (pt.), (F.), £7. ; Milan, 3 cs. (pt.), £8. ; Montreal, 5 cs. (pt.), £51. ; Moscow, 20 pkgs. (F.), £116. ; Otago, 4 cs., £30. ; Penang, 17 pkgs. (pt.), £23. ; Pernambuco, 4 cs., £6. ; Perth, 15 pkgs. (pt.), £18. ; Pt. Elizabeth 4 cs. (pt.), £9. ; Pt. Said, 1 cs., £17. ; Pt. Sudan, 1 cs., £18. ; Pt. Swettenham, 1 cs., £6. ; Rangoon, 12 cs. (pt.), £51. ; Rockhampton, 10 pkgs., £25. ; Rotterdam, 110 pkgs., £286. ; Santos, 250 pkgs., £640. ; Shanghai, 9 pkgs. (pt.), £27. ; Sydney, 47 pkgs. (pt.), £222. ; Tarragona, 200 pkgs., £700. ; Trinidad, 23 pkgs. (pt.), £27. ; Trujillo, 2 cks., £9. ; Wellington, 4 cs., £8. ; Mauritius, 2 cs. (pt.), ; £5. ; Wellington, 2 cs. (F.), £8.

CITRIC ACID—
Antwerp, 10 c., £69. ; Asuncion, 1 c., £6. ; Auckland, 12 c., £84. ; Bangkok, 3 c. (F.), £25. ; Calcutta, 2 c., £26. ; Cape Town, 1 t. (F.), £161. ; Cape Town, 8 c., £55. ; Colombo, 2 c., £17. ; Delagoa Bay, 4 c., £39. ; Demerara, 1 c., £8. ; Dunedin, 10 c., £69. ; Hong Kong, 10 c., £90.

CITRIC ACID—
Pt. Elizabeth, 4 c., £28. ; Singapore, 1 c., £10. ; Sydney, 1 t., £139. ; Tampico, 6 c., £51. ; Toronto, 2 c., £25. ; Wellington, 12 c., £87.

COAL TAR PRODUCTS—
Carbolic Acid
Channel Islands, 4 drms., £34. ; Colombo, 8 cs., £69. ; Hong Kong, 1 cs., £8. ; Toronto, 2 drms., £9.

Creosote
Melbourne, 200 drms., £150.
Oamaru, 5 cs., £67.

Mirbane Oil
Alexandria, 1 drm., £10.

Naphthalene
Adelaide, 11 cks., £38. ; Medan, 2 cks., £10. ; Melbourne, 4 cs., £13. ; Perth, 8 cks., £27.

Pitch
Alexandria, 280 brls., £359. ; Antofagasta, 10 cks., £25. ; Dunkirk (bulk), 1,200 t., £7,650.

Pyridine
Cape Town, 2 drms., £110. ; Durban, 30 drms., £171. ; Rotterdam, 12 drms., £520.

Tar
Alexandria, 116 pkgs., £240. ; Cape Town, 78 drms., £9. ; Delagoa Bay, 50 drms., £13. ; Durban, 935 drms., £150. ; East London, 25 drms., £11. ; Mauritius, 15 runlets., £45. ; Pt. Elizabeth, 275 drms., £38. ; Singapore, 40 cks., ; £171. ; Wellington, 5 cs., £6.

Toluol
Genoa, 6 drms., £36.

COBALT ACETATE—
Branford, 1 kg., £13.

COBALT CHLORIDE—
Penang (F.), 1 ck., £97.

COBALT OXIDE—
Genoa (F.), 2 pkgs., £462. ; Paris, 10 cs., £607. ; Switzerland, 1 ck., £53.

COBALT SULPHATE—
Bilbao, 1 cs., £33.
Brussels (F.), 1 cs., £50.

COLOURS (*otherwise undescribed*)—
Hong Kong, 3 cs., £16. ; Madras, 4 cs. (pt.), £72. ; Montreal, 2 cs. (pt.), £13.

COPPER CARBONATE—
Adelaide, 1 kg., £5.

COPPER SULPHATE—
Bathurst, 11 c., £17.
Bonny, 2 c., £9.

CREAM OF TARTAR—
Adelaide, 4 t., £334. ; Brisbane, 1 t., £84. ; Calcutta, 1 c. (F.), £6. ; Cape Town, 1 t. (F.), £82. ; Dunedin, 7 c., £30. ; Halifax, 12 t. 13 c. (F.), £757. ; Kobe, 5 t., £418. ; Lyttleton, 20 t. 1 c., £1,685. ; Mossel Bay, 1 c. (F.), £6. ; New Plymouth, 2 t., £167. ; Sydney, 12 t., £1,003. ; Wellington, 2 c., £9.

DISINFECTANTS (*otherwise undes.*)
Antigua, 7 c., £17. ; Antofagasta, 2 c., £5. ; Barbados, 2 t. 9 c., £111. ; Beira, 8 c., £30. ; Bombay, 1 c., £16. ; Calabar, 2 c., £6. , Canton, 18 c., £34. ; Christchurch, 2 t. 5 c., £481. ; Colombo, 3 t. 10 c., £125. ; Dar-es-Salaam, 2 t. 8 c., £144. ; Durban, 9 c., £13. ; East London, 9 c., £45. ; Haifa, 5 c., £6. ; Irish Free State, 11 c., £33. ; Jamaica, 4 t. 6 c., £119. ; Karachi, 13 c., £23. ; Montserrat, 1 cs., £6. ; Penang, 1 t. 11 c., £45. ; Pt. Elizabeth, 2 c., £11. ; Pt. Said, 9 c., £12. ; Pt. Swettenham, 2 t. 3 c., £41. ; Sekondi, 6 c., £17. ; Shanghai, 1 c., £11. ; Singapore, 1 t. 5 c., £26. ; Teluk Anson, 2 c., £6, ; Teneriffe, 8 c., £22. ; Trinidad, 9 c., £21. ; Victoria, 1 c., £6.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Auckland, 1 cs., £5. ; Boulogne, 1 cs., £41. ; Cochin, 3 cs., £126. ; Durban, 1 cs. (pt.), £5. ; Madras, 5 pkgs., £169. ; Mauritius, 1 cs., £20. ; Melbourne, 20 pkgs., £454. ; New York, 1 cs. (pt.), £17.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Pt. Elizabeth, 1 cs., £9. ; Sao Paulo 1 ck., £27. ; Singapore, 4 cs., £47. ; Sydney, 9 pkgs., (pt.), £162. ; Wellington, 1 cs., £35.

ETHYL CHLORIDE—
Bangkok, 1 cs., £23.

FERTILISER (DRIED BLOOD)
Teneriffe, 14 t., £250.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 35 t. 19 c., £277. ; Christiania, 10 c., £13. ; Halifax, N.S., 20 t., £345. ; Madeira, 1 t. 9 c., £14. ; Philadelphia, 3 t., £77. ; Wellington, 2 c., £9.

FORMALDEHYDE—
Cape Town (F.), 3 bls., £28.
Pernambuco, 1 cs., £5.

GALLIC ACID—
Brisbane, 1 cs., £8.
Sydney, 1 kg., £15.

GLYCERINE—
Amsterdam, 10 t. 6 c., £505. ; New York, 24 t. 17 c., £1,288. ; Trujillo, 2 c., £13.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
Shanghai, 3 cs. (pt.), £7.

GLYCEROPHOSPHORIC ACID—
Melbourne, 1 cs. (pt.), £5.

HYDROCHLORIC ACID—
Antofagasta, 5 c., £24. ; Colombo, 1 c., £5. ; Penang, 2 c., £7. ; Pt. Elizabeth, 4 c., £12.

HYDROFLUORIC ACID—
Pt. Elizabeth, 2 cs., £21.

HYDROGEN PEROXIDE—
Alexandria, 2 cs., £14. ; Antofagasta, 7 cs., £17. ; Delagoa Bay (F.), 1 crby., £11. ; Iddo, 1 cs., £6.

HYPOPHOSPHITES (*otherwise undescribed*)—
Oamaru, 4 cs., £58.

HYPOPHOSPHOROUS ACID—
Paris, 2 demijhns., £30.

IODIDES (*otherwise undescribed*)—
Copenhagen, 1 cs., £48.

IODINE—
Asuncion, 1 cs. (pt.), £35. ; Calcutta, 2 cs. (pt.), £79. ; Melbourne, 1 cs., 3 cs. (pt.), £78. ; Paris, 40 kgs., £3,835. ; Perth, 1 cs. (pt.), £53.

IODINE (RESUBLIMED)—
Bombay, 5 cs. (pt.), £165. ; Launceston, 1 cs. (pt.), £26. ; Petrograd, 14 cs. (pt.), £2,012. ; Sydney, 2 cs. (pt.), £108.

IRON AMMONIUM CITRATE—
Buenos Ayres, 1 cs. (pt.), £5.
Sydney, 2 cs. (pt.), £13.

LEAD ACETATE—
Madras, 10 kgs., £21.

LEAD ARSENATE—
East London, 2 cs., £7. ; Pt. Elizabeth, 1 cs., £6. ; Supe, 50 cs., £240.

LEAD CARBONATE—
Monte Video, 2 bls., £8.

MAGNESIA—
Auckland, 13 cs., £31. ; Hamilton, 2 cs., £5. ; New Plymouth, 10 cs., £24. ; Paris, 1 cs., £6. ; Sydney, 90 cs., £216. ; Wellington, 30 cs. £72.

MAGNESIA (CALCINED)—
Buenos Aires, 6 brls., £21.

MAGNESIUM CARBONATE—
Buenos Ayres, 5 cs., £38. ; Colombo, 4 cs., £22. ; Launceston, 3 cs. (pt.), £9. ; Melbourne, 2 cs., 2 cks. (pt.), £34.

MAGNESIUM CITRATE—
Rangoon, 1 cs., £12.

MAGNESIUM SULPHATE—
Bombay, 12 c., £18. ; Brisbane, 3 t. 1 c., £68. ; Durban, 1 t., £24. ; Irish Free State, 9 c., £7. ; Melbourne, 6 t. 3 c., £139. ; Newcastle, 2 t. 9 c., £55. ; Otago, 3 c., £6. ; Pt. Elizabeth, 14 c., £18. ; St. Vinceng, 3 c., £5. ; Sydney, 1 t. 3 c., £26. ; Trinidad, 10 c., £7.

MERCURIALS (*otherwise undes.*)—
Bombay, 2 cs. (pt.), £7.

MERCURY AMMONIUM CHLORIDE—
Melbourne, 1 cs. (pt.), £6.

MERCURY BICHLORIDE—
East London, 1 cs., £10.

METHYL ACETATE—
Paris (F.), 9 drms., £168.

NICKEL SALTS (*otherwise undes.*)—
Sydney, 1 cs., £38.

NICKEL SULPHATE—
Hamburg, 8 brls., £37.

NITRIC ACID—
Antofagasta, 3 c., £17. ; Mauritius, 5 c., £7. ; Pt. Elizabeth, 5 c., £22.

OXALIC ACID—
Durban, 1 kg., £10.

PHOSPHORIC ACID—
Otago, 5 cs., £13. ; Sydney, 48 cs., £140. ; Wellington, 2 cs., £6.

PHOSPHORUS—
Napier, 1 cs., £9.
Sydney, 22 cs., £191.

POTASSIUM BROMIDE—
Sydney, 1 ck., £12.

POTASSIUM CARBONATE—
Cape Town (F.), 3 kgs., £7.

POTASSIUM CHLORIDE—
Tobago (F.), 5 t., £45.

POTASSIUM CITRATE—
Brisbane, 1 cs., £12. ; Calcutta, 4 cs. (pt.), £33. ; Cape Town, 1 cs., £5. ; Melbourne, 3 cs., £28.

POTASSIUM CYANIDE—
Canton, 3 cs., £40. ; Launceston, 1 cs., £5. ; Penang, 2 cs., £11. ; Wellington, 2 cs., £19.

POTASSIUM IODIDE—
Asuncion, 1 cs. (pt.), £28. ; Axim, 1 cs., £10. ; Bombay, 2 cs., £91. ; Brisbane, 1 cs., £88. ; Calcutta, 3 cs., £263. ; Colombo, 18 cs., £1,125. ; Durban, 1 cs. (pt.), £44. ; Grand Bassam, 2 cs., £38. ; Melbourne, 2 cs., £175. ; Pt. Elizabeth, 1 cs., £43. ; Rangoon, 3 cs. (pt.), £21. ; Rotterdam, 2 cs., £180. ; Shanghai, 2 cs., £88. ; Singapore, 4 cs. (pt.), £164. ; Sydney, 7 cs. (pt.), £644.

POTASSIUM NITRATE—
Adelaide, 2 cks., £6.

POTASSIUM PERMANGANATE—
Havana, 10 kgs., £28.
Sydney, £5.

POTASSIUM PRUSSIATE—
Colombo, 1 ck., £7. ; Kobe, 10 t., £490. ; Melbourne, 1 kg., £6. ; Monte Video, 2 cs., £23.

PRUSSIAN BLUE—
Rangoon, 3 cs., £19.

ROCHELLE SALTS—
Irish Free State, 1 ck., £21.

SALAMMONIAC—
Adelaide, 1 ck., £8. ; Asuncion, 1 cs., £6. ; Auckland, 1 ck., £16. ; Brisbane, 1 cs., £13. ; Perth, 1 cs., £9. ; Shanghai, 1 ck., £16. ; Wellington, 1 ck., £11.

SALICYLATES (*otherwise undes.*)—
Montreal, 1 cs. (pt.), £12.

SALICYLIC ACID—
Adelaide, 1 cs., £14.
Brisbane, 1 cs., £6.

SALTPETRE—
Irish Free State, 6 t. 15 c., £265. ; Madras, 5 c., £10. ; Melbourne, 1 t., £14. ; New Plymouth, 10 c. (F.), £17. ; Wanganui, 5 c. (F.), £8.

SHEEP DIP—
Beira, 2 t. 13 c., £210.

SODA CRYSTALS—
Cape Town, 6 c., £7. ; Hong Kong, 15 c., £6. ; Malta, 3 c., £8. ; Mauritius, 1 t. 10 c., £20. ; Trinidad, 1 t., £8.

SODIUM ACETATE—
Adelaide (F.), 1 cs. (pt.), £8.

SODIUM ACID PYROPHOSPHATE
Cape Town, 5 c., £18.

SODIUM BENZOATE—
Cape Town, 1 cs., £26.
Paris, 10 cs., £140.

SODIUM BICARBONATE—
Bombay, 2 c., £6. ; Buenos Ayres, 14 c., £10. ; Constantinople, 10 c., £50. ; Durban, 9 c., £12. ; Melbourne, 4 c., £8. ; Mossel Bay, 4 c., £6. ; Pt. Elizabeth, 1 c., £7. ; Sierra Leone, 12 c., £8. ; Smyrna, 7 c., £30.

SODIUM BISULPHITE—
Buenos Ayres, 5 t., £92.
Trujillo, 1 c., £6.

SODIUM CITRATE—
Calcutta, 2 c., £12.
Montreal, 1 t. 10 c., £294.

SODIUM FERROCYANIDE—
East London, 10 c., £27.

SODIUM FLUORIDE—
Delagoa Bay, 10 c., £25.

SODIUM GLYCEROPHOSPHATE—
Adelaide, 1 cs. (pt.), £7.
Melbourne, 1 c., £14.

SODIUM HYPOSULPHITE—
Penang, 1 t., £19.

SODIUM IODIDE—
Bombay, 1 cs. (pt.), £13. ; Melbourne, 1 cs. (pt.), £13. ; Otago, 5 cs. (pt.), £6. ; Rotterdam 1 cs., £102. ; Sydney, 1 cs. (pt.), £7.

SODIUM PHOSPHATE—
Adelaide, 1 t. 1 c., £85.
Cape Town, 1 t., £68.

SODIUM PRUSSIATE—
Kobe, 10 t., £490.

SODIUM PYROPHOSPHATE—
Sydney, 10 c., £23.

SODIUM SALICYLATE—
Calcutta, 3 cs. (pt.), £10. ; Melbourne, 7 cs., £10. ; Sydney, 1 cs., £14.

SODIUM SULPHATE—
Auckland, 1 ck., £7.
Sydney (F.), 15 cks., £34.

SODIUM SULPHIDE—
Dunedin, 8 t. 11 c., £108. ; Lyttleton, 25 t. 17 c., £330. ; Perth, 2 t. 3 c., £30. ; Rotterdam, 5 t. 5 c., £79. ; Timaru, 5 t. 5 c., £66.

SODIUM SULPHITE—
Auckland, 1 t. 2 c., £29.
Durban, 10 c., £8.

SPENT OXIDE—
Amsterdam, 190 t. 12 c., £493.

SULPHUR—
New York, 3 t., £105.
Sydney, 2 c., £7.

SULPHUR (FLOWERS)—
Cape Town, 2 t. 5 c., £32.

SULPHURIC ACID—
Auckland, 2 c., £5. ; Buenos Ayres, 1 c., £6. ; Colombo, 17 c., £30. ; Dar-es-Salaam, 1 t. 5 c., £41. ; Durban, 2 c., £12. ; Mauritius, 2 c., £9. ; Sekondi, 8 c., £8. ; Penang, 3 c., £38. ; Pt. Elizabeth, 2 c., £5. ; Sierra Leone, 5 c., £8. ; Singapore, 8 c., £38. ; Wellington, 11 c., £26.

SUPERPHOSPHATE—
Channel Islands, 120 t., £330.
Las Palmas, 5 t., £35.

TANNIC ACID—
Brisbane (F.), 2 cs., £20.
Melbourne (F.), 1 ck., £8.

TARTARIC ACID—
Adelaide, 2 t., £290. ; Auckland, 9 c., £54. ; Calcutta, 1 c. (F.), £8. ; Calcutta, 3 cks., 2 c., £41. ; Irish Free State, 8 c., £51. ; Kobe, 5 t., £600. ; Larnaca, 3 c. (F.), £18. ; Madras, 2 c., £12. ; Melbourne, 5 t. 10 c., £660. ; Reval, 10 c. (F.), £60. ; Sydney, 3 t., £360. ; Toronto, 4 c., £31. ; Wanganui, 1 c., £6. ; Wellington, 3 c., £13. ; Yokohama, 5 t., £600.

TIN CHLORIDE—
Sydney, 1 cs., £5.

TURPENTINE—
Durban, 1 brl., £8.
Gefle, 1 cs., £6.

ZINC OXIDE—
Amsterdam, 16 bgs., £48.
Trujillo, 1 ck., £8.

ZINC SULPHIDE—
New York, 2 cks., £98.

Week ending December 1.

ANTIMONY—
Calcutta, 2 t. 10 c.

FERRO TUNGSTEN—
Stavanger, 5 t.

FERRO VANADIUM—
Paris, £950.

FULLER'S EARTH—
Hamburg, 87 t. ; Seville, 10 t.

GLUE, SIZE, AND GELATINE—
Auckland, 3 c. ; Calcutta, 4 t. 4 c. ; Cape Town, 12 c. ; Dairen, 1 t. 2 c. ; Durban, 11 c. ; East London 1 c. ; Karachi, 1 c. ; Kilindini, 2 c. ; Libau, 1 t. ; Kobe, 10 t. ; Madras, 1 c. ; Melbourne, 1 t. 10 c. ; Newcastle, 1 t. 3 c. ; Paris, 5 c. ; Perth, 10 c. ; Pt. Elizabeth, 1 c. ; Rouen, 5 t. ; Sydney, 4 t. 19 c. ; Wiborg, 19 c.

LEAD RESIDUE—
Antwerp, 27 t.

MINERAL WAX—
New York, 1 t. 10 c.

PLUMBAGO—
Adelaide, 5 c. ; Alicante, 4 t. 18 c. ; Antwerp, 1 t. ; Bilbao, 3 t. 13 c. ; Brussels, 15 c. ; Cartagena, 6 c. ; Lourenco Marques, 10 c. ; Pt. Said, 1 t. 2 c. ; Pt. Swettenham, 1 t. ; Santos, 2 t. 7 c. ; Valparaiso, 11 c.

QUININE—
Calcutta, 18,184 oz. ; Melbourne, 1,600 oz. ; New York, 10,000 oz. ; Piraeus, 6,250 oz. ; Rio de Janeiro 356 oz.

ROSIN—
Dunkirk, 10 t. 13 c.

SALT—
Bombay, 1 t. 6 c. ; Colombo, 3 c. ; Dairen, 9 c. ; Durban, 3 t. 7 c. ; Karachi, 1 c. ; Madras, 16 c. ; Sekondi, 2 c. ; Trinidad, 13 c.

SOAP—
Accra, 2 t. 11 c. ; Addah, 2 t. 16 c. ; Alexandria, 1 t. ; Amsterdam, 6 c. ; Antofagasta, 2 c. ; Antwerp, 12 c. ; Auckland, 17 c. ; Bagdad, 1 c. ; Bahamas, 9 c. ; Barbados, 2 c. ; Basra, 2 c. ; Bombay, 1 t. 5 c. ; Boston, 1 t. 19 c. ; Bluff, 9 c. ; Boulogne, 16 c. ; Brussels, 1 c. ; Buenos Ayres, 8 c. ; Calcutta, 10 c. ; Canary Islands, 18 c. ; Cape Town, 14 c. ; Channel Islands, 1 c. ; Christchurch, 1 c. ; Cologne, 2 t. 18 c. ; Cuba, 5 c. ; Dar-es-Salaam, 6 c. ; Durban, 9 c. ; Hong Kong, 4 c. ; Irish Free State, 1 t. 8 c. ; Jamaica, 2 c. ; Karachi, 1 c. ; La Libertad, 1 c. ; Lyttleton, 2 c. ; Madras, 1 t. 7 c. ; Malta, 14 c. ; Melbourne, 13 c. ; Messina, 1 c. ; Monte Video, 3 c. ; New York, 2 c. ; Paris, 1 c. ; Panama, 1 c. ; Penang, 5 c. ; Pt. Elizabeth, 2 c. ; Pt. Said, 6 c. ; Rotterdam, 2 c. ; St. Helena, 15 c. ; Sekondi, 14 t. 4 c. ; Singapore, 8 c. ; Tanga, 8 c. ; Valparaiso, 1 t. 11 c. ; Wellington, 1 c. ; Zanzibar, 8 c.

SPERMACETTI WAX—
Kobe, 7 c.

TALLOW—

Antwerp,	1 t.	1 c.
Hamburg,	57	1
Harlingen,	124	
Nantes,	10	3
Pasages,	30	
Rotterdam,	8	7

TAR (STOCKHOLM)—
Durban, 16 c.

WAX (*otherwise undescribed*)—
Osaka, 5 c.

WHITE LEAD—
Adelaide, £42. ; Auckland, £619. ; Barbados, £28 ; Bombay, £13. ; Calcutta, £91. ; Cape Town, £41. ; Channel Islands, £59. ; Christchurch, £44. ; Durban, £44. ; Invercargill, £44. ; Lyttleton, £477. ; Melbourne, £1,314. ; Napier, £64. ; Newcastle, £173. ; New Plymouth, £396. ; New York, £31. ; Pt. Elizabeth, £128. ; Rangoon, £78. ; Sydney, £250. ; Timaru, £215. ; Wellington, £206.

MANCHESTER.

Week ending November 30.

AMMONIUM SALTS (*otherwise undescribed*)—
Copenhagen, 5 cks.
Rouen, 10 kgs.

BITUMEN—
Switzerland, 6 cks.

CARBON BLACK—
Switzerland, 21 cs.

CHROME ALUM—
Holland, 95 cks.

COAL TAR PRODUCTS
Aniline Salt
Limassol, 2 cs.
Anthraquinone
Basle, 12 cks.
Creosote
Holland, 150 drms.
Tar
Alexandria, 469 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Adelaide, 1 kg. ; Australia, 2 cks., 43 kgs., 40 drms. ; Basle, 8 kgs. ; Melbourne, 2 kgs. ; Rouen, 15 cks., 3 kgs., 2 cs., 1 bx. ; Switzerland, 25 cks., 55 drms. ; Sydney, 1 kg., 18 drms.

GLUE—
Alexandria, 2 cs.

LEAD NITRATE—
Sydney, 8 cks.

LEAD SULPHATE—
Belgium, 3 cks.

POTASSIUM BICHROMATE—
Limassol, 1 cs.

SALT—
Calcutta, 1,521 t. ; Holland, 14 kgs. ; St. John, N.B., 400 sks.

SIZE—
Holland, 10 brls.

SODIUM BICHROMATE—
Canada, 250 bgs.

TALLOW—
Holland, 10 cks.

TANNING MATERIALS—
Unspecified
Melbourne, 45 cks.

VERDIGRIS—
Melbourne, 6 cks.

ZINC CHLORIDE—
Bombay, 18 drms.

NEWCASTLE-ON-TYNE

Week ending December 1.

ALUMINA—
Barcelona, 200 bgs.

AMMONIA—
Barcelona, 1,541 bgs. ; Bergen, 10 kgs. ; Copenhagen, 10 brls.

ANTIMONY—
Bremen, 2 cks.
Copenhagen, 6 cks.

CAUSTIC SODA—
Bergen, 16 drms. ; Copenhagen, 107 drms. ; Christiania, 64 drms.

CHEMICALS (*otherwise undescribed*)
Savanda, 10 drms.

COAL TAR PRODUCTS—
Benzol
Dunkirk, 192 t.

COPPER SULPHOCYANIDE—
Copenhagen, 2 cks.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Bergen, 1 kg.

LITHARGE—
Christiania, 4 cks., 2 kgs.

RED LEAD—
Christiania, 26 cks.

SOAP—
Christiania, 2 cs.

WHITE LEAD—
Copenhagen, 5 cks.

N. & S. SHIELDS.

Week ending December 1.

NIL.

PRICES CURRENT.

WEDNESDAY, DEC. 5, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & CO., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary.

	£	s.	d.
ACIDS.			
Acetic, 40% and 80% ..*cwt.	23- / & 46/-		
Acetic, (Glacial, B.P.) in carboys ..*ton	70	0	0
Arsenic, S.G. 2.000 .. ton	90	0	0
Boric (crystals) ..†ton	48	0	0
Citric .. lb.	0	1	5
Formic, 80/85% ..*ton	51	0	0
Hydrofluoric, 59/60% ..*lb.	0	0	7½
Lactic, 50% .. ton	43	0	0
Muriatic (Tower Salts), 28° Tw. ..*carboy	0	4	0
Nitric, 80° Tw. ..*ton	21	10	0
Oxalic .. lb.	0	0	5¾
Phosphoric, 1,500° tech. ..*ton	33	0	0
Sulphuric (168°) ..*ton	7	10	0
Sulphuric (140°) ..*ton	3	15	0
Sulphuric (free from Arsenic, 144°) ..*ton	4	10	0
Tannic (commercial) .. lb.	0	1	6
Tarteric (crystals) .. lb.	0	1	1½
COAL TAR PRODUCTS.			
Aniline Oil ..*lb.	0	0	9
Aniline Salt ..*lb.	0	0	9
Anthracene, 40/45%, "A" .. unit	0	0	4
Benzol, 90% ..*gallon	0	1	3
Carbolic Acid (crude 60%) .. gallon	0	3	4
Carbolic Acid (crystals 40°) .. lb.	0	1	1
Creosote ..*gallon	0	0	9¼
Cresylic Acid, 97/99% ..*gallon	0	2	1
Naphtha, crude, 30% ..*gallon	0	0	8½
Naphtha, solvent (90/160) ..*gallon	0	1	3
Naphthalene, refined .. ton	17	10	0
Pitch (f.a.s. Liverpool) .. ton	6	2	6
Pyridin .. gallon	1	2	0
Tar, crude .. ton	4	10	0
Tar, refined .. barrel	2	4	6
Toluol ..*gallon	0	1	9
Xylol, (pure) ..*gallon	0	2	3
GENERAL CHEMICALS.			
Acetone ..*ton	124	0	0
Alum, loose lump (delivered) ..*ton	10	10	0
Aluminium Sulphate, 17/18% .. ton	10	10	0
Aluminium Sulphocyanide .. lb.	0	0	7
Aluminoferric (in slabs) 20° Tw. .. ton	7	0	0
Ammonia, anhydrous ..*lb.	0	1	4
Ammonia, .880 ..*ton	22	10	0
Ammonia, .920 ..*ton	14	10	0
Ammonium Carbonate (lump) .. lb.	0	0	4
Ammonium Muriate (grey) ..†ton	30	0	0
Ammonium Nitrate .. ton	35	0	0
Ammonium Phosphate .. ton	60	0	0
Ammonium Sulphate, 25¾% delivered ..†ton	14	15	0
Ammonium Sulphocyanide, 95% .. lb.	0	1	3
Antimony (Golden Sulphide) .. lb.	0	0	9
Arsenic (Cornish White) .. ton	68	0	0
Barium Carbonate (native), 92/94% .. ton	5	15	0
Barium Chlorate .. lb.	0	0	7
Barium Chloride (in casks) .. ton	14	10	0
Barium Sulphate .. ton	£5	to	£7
Barium Sulphocyanide, 95% .. lb.	0	0	9½
Bleaching Powder, 35% ..*†ton	11	5	0
Bleaching Liquor, 7% ..*ton	4	5	0
Calcium Chloride ..†ton	5	10	0
Carbon Bisulphide ..*ton	26	0	0
Casein (commercial) .. ton	81	0	0
China Clay (at Runcorn), in bulk .. ton	50/- to 90/-		
Chromium Acetate (crystals) .. lb.	0	0	8
Copper Sulphate .. ton	25	0	0
Formaldehyde, 40% .. ton	62	10	0
Glycerine (chemically pure, S.G. 1,260) ..*ton	85	0	0
Glycerine (crude), 80% ..*ton	60	0	0
Iodine ..*oz.	0	1	0
Iron Nitrate, 80° Tw. ..*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk*ton	2	2	6
Iron Sulphide (lumps) .. ton	6	0	0
Lead Acetate (white) .. ton	45	0	0
Lead Acetate (brown) .. ton	45	0	0
Lead Carbonate (White Lead) .. ton	47	0	0
Lead Nitrate .. ton	44	0	0
Lime Acetate (brown) ..*ton	14	10	0
Lime Acetate (grey), 80% ..*ton	22	0	0
Lime Bisulphite (S.G. 1,070) ..*ton	8	0	0
Lime Superphosphate, 30% .. ton	3	5	0
Litharge (British) .. ton	45	0	0
Magnesite, Calcined (delivered) .. ton	11	0	0
Magnesite, Raw .. ton	3	0	0
Magnesium Carbonate (light) .. cwt.	1	16	0
Magnesium Chloride (solid) .. ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.) ton	4	0	0
Magnesium Sulphate, B.P. .. ton	6	0	0
Manganese Borate, 85% .. ton	112	0	0
Manganese Sulphate, 90% .. ton	45	0	0
Methylated Alcohol, 64° (industrial) .. gallon	0	3	1
Naphtha (Wood), Solvent ..*gallon	0	5	9
Naphtha (Wood), Miscible, 60° .. gallon	0	5	9
Potassium Bichromate .. lb.	0	0	5½
Potassium Carbonate, 90% .. ton	30	0	0
Potassium Chlorate .. lb.	0	0	3¼
Potassium Hydrate (Caustic Potash), 88/90% ton	35	0	0
Potassium Hydrate (Caustic Potash), 75/80% ton	31	0	0
Potassium Hydrate (liquid), 50° Tw. .. ton	19	0	0
Potassium Chloride 80% .. ton	8	10	0
Potassium Nitrate (refined) .. ton	25	0	0
Potassium Permanganate (commercial) .. lb.	0	0	8½
Potassium Prussiate (yellow) .. lb.	0	0	9½
Potassium Prussiate (red) .. lb.	0	2	6
Potassium Sulphate, 90% (ex ship) .. ton	11	0	0
Potassium Sulphocyanide .. lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd cwt.	55/- & 52/6		
Sodium Acetate .. ton	24	0	0
Sodium Arsenate, 45% .. ton	45	0	0
Sodium Borate (Borax), Crystals ..†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags) ..†ton	10	10	0
Sodium Bichromate .. lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags ..†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd. †ton	5	5	0
Sodium Chlorate .. lb.	0	0	3
Sodium Cyanide (100% basis) for export lb.	8d. to 8½d.		
Sodium Hydrate (76% C. Soda), f.o.r. ..†ton	19	7	6
Sodium Hydrate (70% C. Soda) ..†ton	17	17	6
Sodium Hydrate (60% C. Soda) ..†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.) ..†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%) †ton	22	0	0
Sodium Hyposulphite (commercial) ..†ton	9	10	0
Sodium Hyposulphite (photographic) .. ton	15	10	0
Sodium Manganate (basis 25%) .. ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool .. ton	13	5	0
Sodium Nitrite, 100% basis .. ton	28	10	0
Sodium Perborate .. lb.	0	0	11½
Sodium Phosphate .. ton	14	10	0
Sodium Prussiate .. lb.	0	0	5½
Sodium Silicate (glass), Alkaline ..†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.) ..†ton	9	0	0
Sodium Sulphate (Saltcake) ..†ton	4	10	0
Sodium Sulphate (Glauber's Salt) .. ton	3	10	0
Sodium Sulphide (conc.), 60/65% .. ton	14	10	0
Sodium Sulphide Crystals (casks) ..†ton	9	0	0
Sodium Sulphocyanide (liquid) .. lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian .. ton	8	0	0
Sulphur (Roll Brimstone) .. ton	8	0	0
Sulphur (Texas Gulf) .. ton	5	5	0
Tartar Emetic, 43/44% .. lb.	0	1	1
Tin Crystals .. lb.	0	1	3½
Tin Perchloride fused .. lb.	0	1	10
Titanous Chloride .. lb.	0	1	0
Zinc Chloride (solution, 102° Tw.) ..*ton	20	0	0
Zinc Sulphate, Crystals .. ton	13	10	0
METALS.			
Aluminium (Ingot Metal 98/99%) .. ton	115	0	0
Antimony .. ton	42	0	0
Copper .. ton	62	5	0
Lead (Chemical Sheet), delivered .. cwt.	1	17	6
Lead (Foreign Pig) .. ton	31	10	0
Nickel .. ton	130	0	0
Silver .. oz.	0	2	9¼
Tin, English Ingots .. ton	237	0	0
Zinc (Spelter) .. ton	32	17	6
Zinc Dust, 90/92% .. ton	46	0	0
OILS.			
Cottonseed ..*ton	45	0	0
Linseed, Raw ..*ton	45	0	0
Stearine, 115-120° M.P. .. ton	48	0	0
Tallow .. ton	40	0	0
Turpentine .. cwt	3	13	3

* *Packages extra or returnable*; otherwise prices usually include packages.

† Makers' prices for home consumption only

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
Nitrogen Fixation in Great Britain	697
The Fifth Report on Colloid Chemistry	698
A Costly Victory	698
River Pollution	698
Overseas Trade in November	698
The Manufacture of Vinegar	699
Analysis of Organic Accelerators	701
The Manufacture of Mustard Gas	702
Direct Determinature of Glycerine	702
Society of Public Analysts	703
The Late Mr. J. M. Wilkie	703
Electrolytic Oxygen and Hydrogen	704
The New Parliament	706
The Institute of Chemistry	707
The Theory of the Filter Press	708
The China-wood Oil Trade	709
The Chlorination of Toluene	709
Items of Interest	710
German Foreign Trade in Chemicals	711
Coming Events	711
Correspondence	712
Fertiliser News	713
Cumberland Coking and By-product Industries	713
South Wales Notes	713
Reports of Companies	715
Legal Intelligence	715
New Companies	715
Our Bookshelf	715
Gazette News	716
Trade Inquiries	716
The Patent List:—	
Applications for British Letters Patent	716
Complete Specifications Accepted	716
Complete Specifications Open to Public Inspection before Acceptance	716
Abstracts of Latest Complete Specifications	716
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	717
Market Reports:	
London "Open Market" Report	718
London Metal Market	720
Manchester Chemical Market	720
Swansea Market Report	720
Liverpool Chemical Market	720
West of Scotland Chemicals	721
Imports of Chemical Products	721
Exports of Chemical Products	724
Prices Current	728

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CURRENT TOPICS.

NITROGEN FIXATION IN GREAT BRITAIN.

WE were rather surprised the other day, when reading through an article in one of our most important morning newspapers, dealing with "Synthetic Nitrogen," to come across the statement: "Great Britain alone, among the leading commercial and agricultural nations, is neglecting an inexhaustible source of supply. We are neither manufacturing 'synthetic nitrogen' from the air nor conducting any systematic research into processes whereby the manufacture may be accomplished." The statement itself seemed positive enough to leave little room for doubt as to what the writer really meant, but any lingering doubt that might have existed in our minds was completely dispelled by the following further statement which occurred at the end of the article: "Naturally, they (the nitrogen fixation processes) can be further improved; in Germany, the United States, Norway, France, and Japan, research on the development of one or other of the processes is being conducted on a large scale. In Great Britain there is no manufacture; the researches instituted during the war have been allowed to lapse, and save possibly in a few private small-scale laboratories, nothing is being done." The article itself was evidently based upon Mr. Kilburn Scott's Cantor Lectures to the Royal Society of Arts last year, and on the technical side the facts, although somewhat scanty, are sound enough. We should be rather interested, however, to learn further particulars about the plant for the manufacture of cyanamide, on the erection of which very "large expenditure was incurred in this country" and which "has now been scrapped." As is well known, the work of the Nitrogen Products Committee of the Munitions Inventions Department was discontinued after the war, and to this extent there is some justification for the writer's statements; but in view of the remarkable progress made by Synthetic Ammonia and Nitrates, Ltd., in the manufacture of synthetic ammonia by the Haber Process at their works at Billingham-on-Tees, and the progress made by the British Cyanides Company at Oldbury towards the manufacture of cyanides and of ammonia from atmospheric nitrogen, sweeping assertions that this country is doing nothing towards the establishment of a nitrogen-fixation industry are obviously unfounded. At the same time, it must be admitted that very little has been done on the part of those now engaged in the development of the new British

nitrogen-fixation industry to inform the general public of their activities, and although such developments are now entirely in the hands of private undertakings, we are of the opinion that a little more publicity would be as much in the interests of the firms engaged as in those of the public. Brunner, Mond and Company, in their recently issued jubilee commemorative volume, did lift the corner of the veil of mystery covering their Billingham enterprise, and the glimpse one was able to obtain showed clearly the enormous amount of progress that has been made. A general policy of judicious publicity would at least prevent the broadcasting of unreliable if not of absolutely misleading information.

THE FIFTH REPORT ON COLLOID CHEMISTRY.

The fifth Report on Colloid Chemistry and its General and Industrial Applications has just been published for the British Association by the Department of Scientific and Industrial Research (London, H.M. Stationery Office; price 2s. 6d. net). The preparation of this Report (the last of the series), like that of its predecessors, has been the work of the special committee of the Association of which Professor F. G. Donnan is chairman and Dr. W. Clayton secretary. Six valuable papers are included, namely: "The Measurement of Surface Tension," by Dr. Allan Ferguson; "Collagen and Gelatin," by Professor H. R. Procter and Mr. J. A. Wilson; "Colloid Phenomena in Bacteriology," by Dr. E. K. Rideal; "Industrial Applications of Wetting Power," by Mr. W. H. Nuttall; "Colloids in Relation to the Manufacture of Inks," by Mr. C. A. Mitchell; and "The Manufacture of Artificial Silk in Relation to Colloid Chemistry," by E. Wheeler. It is interesting to note the remarkable fact pointed out by Mr. Ainsworth Mitchell that the first application of colloid phenomena to industrial processes should have been in connection with the manufacture of ink. In the preparation of Chinese and Indian ink—an account of which, dating back to about 2600 B.C., is extant—lampblack is obtained by burning an oil such as Chinese wood oil with a limited supply of air, and is then pounded with a solution of glue or gum and made into sticks which are dried. The utility of the five reports is enhanced considerably by the publication of a comprehensive author-and-subject index with the final report. The Association has done valuable work both for pure and applied chemistry in gathering together the most important data on colloid phenomena. With the rapid progress now being made on the subject, however, we are afraid the necessity for a new series of reports will be realised at no very distant date.

A COSTLY VICTORY.

For the time being, the country has rejected definitely the proposals put forward by Mr. Baldwin for ameliorating our unemployment problem and for protecting our manufacturers against unfair foreign competition. Whatever be the form of Government ultimately adopted, whether a Liberal-Labour Coalition or a Conservative-Liberal Coalition, this much is certain, that the issue of Protection will not be raised in the lifetime of the present Parliament. Yet we venture to predict that the issue has not been settled once and for all, but has only been postponed, and that the necessity for the fiscal change advocated by Mr. Baldwin will be realised with increasing intensity as the months go by. For the moment the forces of *laissez-faire* are triumphant. There is little doubt that the dominant factor making towards the defeat of what in our opinion is the only logical policy that the nation can at present adopt, has been the manner in which both the "progressive" parties have exploited the "dear food" bogey and have attributed to the Premier intentions which he has never expressed either by mouth or in print. Whether the next general election will occur within the next six months or the next twelve months, we are unable to prophesy, but whatever be the period intervening we are afraid that it is destined to produce in the shape of continued unemployment and in steady reduction of the activities of our manufacturers even more powerful arguments in favour of Protection than have been advanced during the last three weeks.

RIVER POLLUTION.

We understand that the Standing Committee appointed by the Ministry of Agriculture and Fisheries to deal with the problem of river pollution is to issue a report within the next few days. Largely because it has adopted in its work a policy of conciliation and co-operation in respect of the local authorities with whom it has had to deal, the committee believes that definite progress has been made towards the object in view. Legislation for the avoidance of this social evil has failed in the past, and in any case financial considerations would to-day prevent drastic legislation to compel local authorities thoroughly to purify effluents before their discharge into rivers and streams. The committee has, therefore, set itself to try and improve the condition of the rivers by directing the attention of the authorities in those areas where the discharge of sewage is killing fish, to the existence of the problem, and to encourage them to adopt more efficient methods of disposal. It has also discussed with manufacturers various methods of treatment whereby the effluents may be purified at a reasonable cost. Whether this conviction of the committee that an educative policy alone will secure the avoidance of pollution is correct, the future alone can show, but we are at one with the committee in believing that river pollution consequent wholly upon the callous negligence by local authorities can now only apply in a very small number of cases.

OVERSEAS TRADE IN NOVEMBER.

The Board of Trade Returns for November, which reach us as we go to press, show that imports during the month were valued at £101,585,000, against £99,915,000 in October. British exports amounted to £65,768,000, compared with £71,323,000 for the previous month. Re-exports diminished by almost £1,000,000. Imports of chemicals, drugs, dyes, etc., were valued at £1,138,000, against £1,246,000 in October; exports reached £2,015,000 in November, a considerable reduction on the October figure of £2,573,000.

THE MANUFACTURE OF VINEGAR.

TECHNOLOGY OF THE FERMENTATION PROCESSES.

By "Biochemist."

GENUINE vinegar consists of the dilute aqueous solution of acetic acid resulting from the life-processes of certain oxidising bacteria in dilute alcoholic infusions. Its use for table purposes arose concurrently with that of wine, while attention was early directed to its solvent properties. Concentration by distillation and freezing were utilised by the alchemists in order to prepare "radical," "aromatic" or "Venus's" vinegar.

Although generally attributed to Schützenbach (1822), the modern "quick" vinegar processes are in reality development of the original French method, described in the *Transactions* of the Royal Society for 1670. In this country, malt or grain vinegar is mainly consumed; on the Continent, wine vinegar; while the American public inclines to the use of cider or apple vinegar. Very recently, the production of orange vinegar from the juice of spoilt or frozen oranges has received attention in the United States. Wood vinegar, prepared from pyroligneous acid free from tarry matter, is now an increasingly active competitor of alcohol vinegar. The absence of "bouquet bodies," however, results in an unpleasant, pungent odour, a defect not easily remedied by the addition of esters or essential oils.

The Mechanism of Acetification.

That the formation of acetic acid from alcohol is essentially an oxidation process was first recognised by Döbereiner. Later, Liebig formulated the acetic fermentation as a two-stage process with acetaldehyde ("light oxygenated ether") as the intermediate product. This view has recently received a measure of support as a result of the investigation of Neuberg and Nord (*Biochem. Zeits.*, 1919), who were able to "fix" the aldehyde by the formation of its compound with calcium sulphite. Liebig, however, regarded the acetic ferment as so much catalytic surface, and it remained for Pasteur to show that acetification resulted from the life-processes of the vinegar yeast." A modification of Pasteur's theory was that of Nägeli, according to whom the oxidation was a consequence of vibrations induced in the alcohol as a result of similar vibrations in the living organisms.

The isolation of the enzyme zymase from yeast led Buchner to the attempt at separating an enzyme from "mother-of-vinegar." His early efforts in this direction, by applying hydraulic pressure to the pellicle after disintegration by grinding with kieselguhr or quartz, were unsuccessful. In 1906, however, Buchner and Gaunt succeeded in obtaining stable enzyme preparations capable of oxidising not only ethyl alcohol to acetic acid but also propyl alcohol to propionic acid. The method finally adopted was to free the pellicle from water by centrifuging, and then to extract the residue with acetone in the presence of a trace of toluene as preservative. From experiments recorded by Wieland (*Berichte*, 1913), the acetifying enzymes appear to act by dehydrogenation. Thus, like palladium black, an enzyme prepared from *Bacterium aceti* will oxidise alcohol to acetic acid in the absence of free oxygen, provided substances like quinone and methylene blue are present.

The More-Important Vinegar Organisms.

The vinegar ferment was at first considered to be a species of mould, but later investigations demonstrated its bacterial nature. Of the many acetifying organisms described from time to time, the more important are *Bacterium aceti*, *B. Pasteurianum* and *B. Kützingianum* due to Hansen, the non-motile *Bacillus xylinus* due to A. J. Brown, and Henneberg's *Bacillus acetigenus*. The last named is the chief organism used by German vinegar brewers.

By the swelling and coalescence of the walls of adjacent cells, a mucilaginous surface-skin forms, and this zoogloeal structure constitutes "mother-of-vinegar." A similar formation, arising from Brown's *Bacillus xylinus*, is the so-called "vinegar-plant," a tough gelatinous pellicle which, if unchecked, may reach a thickness of several inches and cause operating difficulties. By treatment with starch it is possible to detect the presence of *B. Kützingianum* in a zoogloea of Hansen's three organisms. Thus, the gelatinous envelope of this species will be stained blue, while those of the two others remain unaffected, the cells themselves being stained yellow in every case. The acetic bacteria afford excellent examples of morphological change induced by temperature variations. In a particular case investigated by Hansen, the cells of a culture grown at 34° C. developed into long filaments (200$\mu\mu$ in length) when transferred to a light-beer medium at 40° C. On re-establishing the original conditions, occasional bulbous protuberances were induced on the filaments, but after 24 hours reversion to the original chain-form occurred.

For active development the acetic bacteria and bacilli require a well-aerated nutrient medium, comprising water, alcohol, nitrogenous substances and alkali salts. This should be maintained between the temperature limits 20° and 35° C. An alcohol concentration of more than 15 per cent. is fatal as are also temperatures above 50° C., while an abrupt change in conditions will retard development. Bright light has a deleterious effect on the vitality of these organisms. Thus, as a result of a series of experimental acetifications in vessels of coloured glass, it was found that violet light has the most and red light, the least retarding effect. However, owing to the very large scale on which modern vinegar processes are operated, this influence is of no great industrial importance.

Defective aeration results in the formation of acetaldehyde, which, in part, combines with alcohol to form acetal ("heavy oxygenated ether"). Ethyl acetate, one of the chief "bouquet bodies," is also formed. Both *B. aceti* and *B. xylinus* appear to be selective in their action on aliphatic alcohols, propyl alcohol being converted to propionic acid, while methyl and amyl alcohols are not oxidised. With glycerol, the oxidation products are water, carbon dioxide and a small quantity of an acid of doubtful constitution; glycol, however, yields glycollic acid. Small quantities of formic and succinic acids are present in wine and grain vinegars respectively, while spirit vinegar contains fusel oil. Although *B. aceti* is without action on cane sugar, glucose and mannitol yield gluconic acid and fructose respectively. Strangely enough, under the action of the vinegar plant (*B. xylinus*), cellulose is formed from fructose. The cause of the fall in acetic-acid content in prolonged acetifications has been elucidated by Pasteur, who found that the vinegar ferment could decompose acetic acid in the absence of alcohol with the formation of carbon dioxide, a process which bears some analogy to oxidation with palladium black.

In the case of wine vinegar, it has been established definitely that different acetic organisms will result in vinegars of different aroma and flavour. In English practice, the introduction of pure cultures would without doubt allow of much improvement both in the process and in the product.

The Preparation of the Wort.

Described in outline, the operations in vinegar manufacture are as follows: A wort containing fermentable substances is first prepared and this then undergoes consecutive alcoholic and acetic fermentations. The dilute alcoholic solution containing suitable bacterial nutrient substances is known as the gyle. In this country it is usual to prepare this from various malted and raw grains or from mixtures of the latter with fermentable sugars. On the Continent, however, diluted potato- and maize-spirit containing ammonium salts and phosphates constitute the acetification media.

The technique of the process for preparing a vinegar-wort (mashing), resembles that of spirit-distilling rather than that of beer-brewing. While in the case of the latter the aim is to leave a residue of unfermentable dextrins in the wort, in vinegar-brewing, the object is to obtain the highest possible concentration of fermentable sugars. With this view, a rather high temperature obtains during the mashing-process. For grains such as malted barley a malt of low diastatic power (about 30) is very serviceable, while the presence of raw grain will naturally necessitate a more powerful malt.

The mixture of grain and malt is crushed to form the grist, treated with hot water in a mashing-machine and then further extracted in the mash-tun. One form of mashing-machine consists of a cylindrical vessel provided with propellers and rakes. Another (Maitland's), is composed of a double cylinder, the grist being fed into the inner one, where it is subjected to fine sprays of hot water, entering from the outer cylinder through perforations. The early form of the mash-tun, stirred with oars, has given place to well-lagged vessels supplied with mechanical agitators. For heating, steam coils are provided beneath a false bottom, and a rotating sprinkler (the sparge) for wetting the mash uniformly.

From an initial temperature of about 49° C., the contents of the mash-tun are gradually raised to a temperature of

about 67° C. and maintained at this point until all the starch has been converted (no blue colour with iodine). Clean, live steam may be utilised, provided care is taken not to injure the malt-diastase. After draining, the mash is treated with a smaller quantity of water at about 68° C., and finally sparged with water at this temperature. The mixed extracts should have a specific gravity of 1.060 at 15.5° C. It is essential to maintain the correct temperature-range during mashing, as too low temperatures will result in cloudy worts containing uncoagulated albuminous matter, while if the wort is boiled the dextrins become unfermentable and a weak gyle is the consequence.

In an accelerated process, a temperature range of 55°-77° C. is first applied gradually, so as to convert a considerable proportion of the starch, the sugar formed initially serving to protect the diastase at the higher temperatures. After this preliminary treatment any residual starch is gelatinised by 50 minutes heating at above 90° C., and the conversion rapidly completed at 55°-68° C. in the presence of fresh malt.

The Use of Pre-treated Cereals.

To facilitate the action of the diastase, the grain may be subjected to a preliminary heat-treatment, when the starch granules swell. With this gelatinised grain, a much smaller proportion of malt can be used, or a malt of lower diastatic power will suffice. "Popped barley" is a similar slightly roasted product in which the starch granules have been ruptured. This treatment results in reduced moisture and fat contents, the presence of fatty matter being of no value for vinegar-making. "Flaked maize" and "flaked rice" are prepared by crushing, removing the germ and with it the bulk of the oil, and then gelatinising the germ-free products. These materials are frequently designated as "malts" owing to the conversion of the starch induced by heating.

Converted Grain and Glucose.

A wort suitable for the manufacture of vinegar may be prepared by treating maize or rice with dilute mineral acids in place of malt. For this purpose the material is treated with 3 per cent. sulphuric acid for 3 hours, under 10lb. steam pressure, in an iron "converter" capable of taking a charge of about 7 tons of grain. When all the starch has been converted, the product is neutralised with lime and chalk and filtered. For making strong vinegar, the liquor (Sp.Gr. 1.070) is fermented directly, but it is more usual to dilute it to a gravity of 1.055-1.060 before alcoholic fermentation. The product, unlike glucose, retains the phosphates and nitrogenous compounds of the original grain, and its use may lead to the presence of calcium sulphate in the finished vinegar.

In order to raise the strength of the wort and so to increase the output of any particular plant, glucose ("invert sugar") may be added. As worts containing the latter result in finished products lacking in "body," the glucose may be "doctored" with compositions containing unfermentable dextrins or molasses may be mixed with it.

Preparation of the "Gyle" and Yeast Culture.

Before "pitching" with yeast the wort is cooled to about 20° C. by passing over cold-water pipes (refrigerators). In one system, the liquor is distributed over a series of pipes, oval in section, so as to increase the effective cooling surface. In another, the pipes are laid in a horizontal trough, so partitioned that the wort travels over the whole cooling surface. It is advisable to use a fresh supply of the strain of yeast found by trial to be most suitable for each batch of wort. After pitching, there is, at first, a rise in temperature to about 34° C., followed by a fall to about 30° C. on the third day. When fermentation is at an end the yeast is separated and the gyle allowed to "brighten" spontaneously, when it deposits dead yeast cells and undergoes a preliminary acetification.

If yeast production is the main consideration, more efficient aeration, a much cooler wort (15° C.), and lower fermentation temperatures (21°-24° C.) are necessary than when vinegar is the end in view, as otherwise the yeast produced is slimy and difficult to filter. Vats equipped with internal cooling-coils ("attemperator") and "roses" for distributing the air are essential. To collect the yeast a "skimming-board" is rotated over the surface of the vat and the yeast driven into a "parachute." This contrivance is a funnel-ended tube leading through the floor of the vat, a valve operated from outside controlling the egress of the yeast. After separation, the latter is washed and filter-pressed.

Acetification by the Slow or Barrel Process.

As applied to fermented wort, this process, which occupied several months, is now obsolete. Rows of partly-filled casks ("the vinegar field") were exposed to the air, the whole process being known as "fielding." For the manufacture of wine vinegar, however, the slow (Orleans) process is still in vogue. It is advisable to use ripe wine, that is, wine free from albuminous matter—for unripe wine induces the growth of the organism *Saccharomyces mesembryanthemum*—which develops as a white surface-skin and may arrest the propagation of the vinegar ferment. Before use the wine is filtered through a mass of shavings ("wine-rape"), a process which is repeated after acetification. The casks or "mothers" are stacked in cellars maintained below 30° C.; the monthly output being of the order of 9 gallons per cask. It is usual to mature wine vinegar in oak casks. To avoid this lengthy process, a recent specification proposes to add extract of oak-wood to the vinegar. This is prepared by steeping the finely-divided wood in dilute alcohol (25 per cent.) followed by water and distilling off the solvents *in vacuo* (Brit. Pat. 148,829, of 1920).

Owing to the length of the acetification process, it is difficult to eliminate the development of the vinegar eel, mother-of-vinegar, and troublesome tartar deposits. One point in its favour, however, is the formation of "bouquet bodies" and odoriferous esters, the outstanding characteristics of French vinegar. Claudon has devised a substitute for the "mothers" which embody Pasteur's recommendations. This comprises a stack of superimposed shallow rectangular tanks, provided with adjustable air-vents and with a floating receptacle for the bacteria. Arrangements were made for sterilising both the raw material and the finished product. However, in spite of the efforts of Pasteur and his followers the original procedure still holds its ground. In a modification of the slow process, a mass of shavings is suspended above the surface of the liquor in the cask. From time to time the latter is rolled so that the shavings are saturated. This process has been applied principally, to the preparation of cider, orange and other fruit vinegars.

Quick or Generator Processes.

The modern generators consist of vats of from 4,000 to 5,000 gallons capacity, housed in chambers known as "stoves." About two-thirds of the way up is a perforated false-bottom, on which is spread a quantity of beechwood shavings or raisin stalks to promote bacterial development. Other materials such as maize-cobs, bunches of cord and wicker-work have been utilised for this purpose. Aeration proceeds through holes in the sides of the vat, below the bacterial medium. Very large plants are provided with internal steam coils in order to heat the gyle to about 20° C. to begin with. In English practice, the optimum operating temperatures have been found to be 40°-46° C., but frequently it is advantageous to work at more elevated temperatures, particularly to check the development of the vinegar eel.

This organism (*Leptodera oxophila*), which was originally supposed to impart the sourness to vinegar by pricking the tongue, varies in length from 1/25th to 1/16th of an inch. It thrives in dilute alcohol, dilute acetic acid and in vinegar, and may impede and even arrest acetification owing to the dearth of air resulting from its multiplication. In such cases resort is had to complete sterilisation of the vat at about 70° C., temperatures above 63° C. and below 5° C. being fatal to the eel. Another air-breathing organism is the vinegar mite, which appears in vinegar as fine white specks. To prevent their entry into the generator, it has been proposed to protect the air-vents with fine wire-gauze filters.

An intermittent shower of gyle is distributed over the shavings, previously innoculated with a vigorous growth of the ferment, by means of a sparge. The partially-acetified liquid is passed through the apparatus repeatedly until the alcohol is practically all oxidised, a matter of two or three weeks. To avoid contaminating the vinegar, sparges may be of vulcanite, block tin or wood, very large installations being equipped with mechanically-driven box-sparges made of wood. The latter are not liable to clog and can easily be cleaned. Intermittent operation can be secured by syphon action or by the tipping-trough system. Wicks of cotton or hemp serve to guide the gyle from the distributing-tray to the shavings.

(*To be continued.*)

ANALYSIS OF ORGANIC ACCELERATORS.

A NEW SYSTEMATIC METHOD.

A JOINT meeting of the Manchester Sections of the Society of Chemical Industry and the Institution of the Rubber Industry was held in the rooms of the Textile Institute on Friday, December 7. Dr. Levinstein occupied the chair and was supported by Mr. J. H. Mandelberg, chairman of the Manchester Section of the Institution of the Rubber Industry. The attendance was only moderate.

Mr. G. Martin, B.Sc., A.I.C., Superintendent of Rubber Investigations at the Imperial Institute, read a paper entitled "Methods to be Adopted in Comparing the Activities of Different Accelerators." He dealt mainly with the effects of the variable factors—*e.g.*, purity of the raw rubber, concentration of the fillers, of the zinc oxide, and of the accelerator itself in the interpretation of the "acceleration factor," and pointed out that the latter as usually adopted required modification in the majority of cases.

A very interesting paper was then read by Dr. T. Callan (Chief Analytical Chemist to the British Dyestuffs Corporation). This paper was compiled in collaboration with Mr. N. Strafford, B.Sc., A.I.C., and was entitled "The Analysis of Rubber Vulcanising Accelerators." Dr. Callan outlined a systematic scheme for the qualitative identification and quantitative estimation of the chief commercial organic rubber vulcanising accelerators. This is the first scheme that has been proposed and was worked out by the authors in the laboratories of the Dyestuffs Corporation. The accelerators dealt with were sodium phenolate and naphtholate, the nitroso compounds, the aryl guanidines and biguanides, thiocarbanilide, the metallic and alkyl ammonium salts of alkyl dithio-carbamic acids, and the alkyl thiuram disulphides.

Purification and Separation into Groups.

The procedure recommended by Dr Callan is briefly as follows:

First effect a preliminary examination of the product by heating it over the bunsen flame (*not* on platinum foil, since many of the accelerators contain zinc which would alloy with the platinum). Observe the odours evolved and the type of combustion and also examine the ash left, if any. It must be remembered that inorganic constituents may be valueless diluents or on the other hand they may be a fundamental part of the accelerator as in the zinc complex salts.

The second step is to extract the product in a Soxhlet apparatus successively with petroleum ether, ether, benzol, alcohol, and water—stopping, of course, when a suitable solvent is found. Petroleum-ether extraction is usually an important help, as the tarry organic impurities may be removed from the accelerator. The pure product is then prepared by crystallisation from the most suitable solvent and examined for nitrogen and sulphur, when four groups are possible—namely, compounds containing neither nitrogen nor sulphur, those containing nitrogen only, and sulphur only, and those containing both nitrogen and sulphur.

The most important compounds in the first group are sodium phenolate and sodium naphtholate. These are soluble in water and the solutions, if free NaOH be present, give a pronounced colouration with Thiazol-yellow paper. The former is estimated quantitatively by the tribromophenol method, and the latter by titration with a standard diazo solution.

The second group contains the simpler amines, the nitroso compounds, the aldehyde-amines and the guanidine derivatives. The simpler amines are recognised and estimated by ordinary well-known analytical methods.

Detection and Estimation of Nitroso-Compounds.

Of the nitroso compounds, the more important are para-nitroso-dimethylaniline, para-nitrosophenol, and α nitroso β naphthol. The first is recognised by reduction with zinc dust and acid to the corresponding para amino compound, which then gives the well-known methylene blue reaction with oxidising agents. The nitroso naphthol when dissolved in acetone gives a dark brown precipitate with ferric chloride solution. A method for the direct quantitative determination of nitroso compounds, based upon their reaction with phenylhydazine with the liberation of nitrogen gas was proposed by Clausen a few years ago. Dr. Callan has examined this method and found it unsatisfactory, as it consistently gives results 5 to 10 per cent. too low. He utilises the titanous-salt reduction method of Knecht, but stated that in the application of this method to nitroso compounds very gentle heating should be resorted to.

The Guanidine Compounds.

Dealing with the complex guanidine compounds, which are now being manufactured in large quantities and coming into great prominence as vulcanisation accelerators, Dr. Callan arrived at what was hitherto practically virgin territory in analytical chemistry. He pointed out that as regards the guanidines (of which diphenyl guanidine (D.P.G.) and triphenyl guanidine (T.P.G.) are at present the most important commercial members), these are all strong bases, soluble in alcohol and insoluble in water. A characteristic feature is that all the members of the guanidine family form sparingly soluble nitrates, picrates, thiocyanates, and perchlorates. These salts differ slightly in their solubility from one member of the family to another. In examining a suspected guanidine accelerator, the first step is to determine the neutralisation equivalent of the product by titration with standard acid using bromphenol blue as indicator.

The molecular weight is then determined, and in this connection Dr. Callan laid great stress on a method proposed by Rast (*Berichte*, 1922), as being exceptionally suitable to the needs of an industrial analytical laboratory. According to this method, the depression in the melting point of pure camphor by the admixture of a small percentage of the compound under investigation is found and from this the M.W. calculated. Under normal conditions a temperature difference of about 18-20° C. between the M.Pt. of pure camphor and the mixture is obtained, and the use of an expensive Beckmann thermometer is unnecessary. This method is of course not universally applicable, as some compounds decompose under the conditions of the test and others have a tendency to separate out from the camphor during the melting, but for a large number of cases, Dr. Callan has found the method of great value and pointed out that it can be carried out by an unskilled laboratory assistant. To confirm the identification and also quantitatively to estimate the compound, the picrate should be made. Dr. Callan and his staff have worked out a procedure for this purpose, which will be given when the paper is published *in extenso*, as will also the various physical constants of the purified accelerators and their derivatives

Suggested Specifications for D.P.G. and T.P.G.

As the result of his experience Dr. Callan recommends that commercial diphenyl guanidine should conform to the following specification: It should melt not lower than 143° C., it should contain not less than 94 per cent of alcohol soluble base, and it should contain not more than 10 per cent. of T.P.G. Commercial triphenyl guanidine should melt not lower than 142° C., and should contain not more than 1 per cent. of D.P.G. A simple test for differentiating between D.P.G. and T.P.G. consists in adding a 10 per cent. aqueous solution of ammonium perchlorate to a 5 per cent. aqueous solution of the hydrochloride of the base. In the case of D.P.G., no precipitate is formed, whilst in the case of T.P.G. a very heavy precipitate results.

With regard to the biguanides, the only compound investigated by Dr. Callan has been *o*-tolylbiguanide. Its distinguishing features were its solubility in water (giving a solution strongly alkaline to litmus), and the fact that its aqueous solution when treated with copper-sulphate solution gives a pink precipitate. The compound also forms a picrate containing two molecules of picric acid, but the second molecule is not firmly combined, for on recrystallising the original picrate, the picric-acid content progressively diminishes.

Dealing with aldehyde-ammonia, Dr. Callan pointed out that all commercial samples contained free lime, and that unless this were taken into account erroneous analytical results would follow.

The Thiocarbamates and Thiuram Sulphides.

Of those accelerators containing sulphur but no nitrogen, such as the thio- and dithio-acids, Dr. Callan had had no experience, and he went on to deal with those containing both sulphur and nitrogen in the molecule. These include thiocarbanilide and its homologues, the complex thiocarbamates and the thiuram sulphides. Thiocarbanilide is best estimated

by the bromate titration method, together with a determination of the total sulphur content. For the latter purpose, Dr. Callan recommended the use of a silica tube instead of the usual platinum crucibles. A procedure for the qualitative and quantitative estimation of the dithiocarbamate type of accelerator had been worked out, and was based on the fact that these bodies when heated with dilute sulphuric acid give off carbon bisulphide in quantitative yield. This CS_2 is distilled off, dissolved in alcoholic KOH and titrated with iodine. The base remaining in the distillation flask is liberated with alkali and separated by distillation. The thiuram disulphides are oxidation products of the dithiocarbamates, but their reduction to the parent bodies proved a very difficult matter. Finally, Dr. Callan worked out a method of reduction with magnesium powder and sulphuric acid. The resultant dithiocarbamates are, of course, examined in the manner described above.

THE MANUFACTURE OF MUSTARD GAS.

CLAIMS OF DR. LEVINSTEIN AND PROFESSOR GREEN.

IN the Law Courts, London, on Monday, Mr. Justice Tomlin, president of the War Inventions Commission, heard the claim of Dr. H. Levinstein and Professor A. G. Green in respect of mustard gas.

It was contended for the claimants that the gas was the only product of this class which was used by the British army. The invention was made on a large scale at the works of the British Dyestuffs Corporation, Ltd. At the request of the Government the applicants supplied all information at their disposal and their working drawings to the Government of the United States free of charge, and thus enabled their product to be manufactured on an immense scale without delay. In the same way the invention and drawings were placed at the disposal of the Italian Government. The applicants charged no manufacturing profit and no royalty in supplying the Government with the substance.

Sir Duncan Kerley (for the claimants) said no one would dispute that the claimants were two great chemists, but neither of them had received one penny or any acknowledgment in respect of the part they had played in the production of this gas. The British Dyestuffs Corporation, although they were paid, had made a loss on the whole transaction.

Mr. Hunter Gray said the Crown maintained that this invention was, in fact, covered by an existing patent. Sir Duncan Kerley said the process of the applicants differed chemically from the patented process invented by Professor Pope. At the first attempt (he said) to make a large quantity of the gas the whole potful bubbled up and got out of its container, and but for the fact that a covered catchpot had been provided, every man on the job would have been killed and the works themselves would have been unapproachable for weeks. In May, 1918, they were told that nothing could be of greater military importance than a quick supply of mustard gas, as our troops were being discouraged by the fact that the Germans had got this stuff, while we had none.

Levinstein Method Adopted at Avonmouth Factory.

Counsel went on to refer to the attempt of the Ministry of Munitions to make the gas at Avonmouth, and said there were 1,400 casualties there. As to the value of the product, Sir Duncan said it was used for the first time in the field in September, 1918, in the artillery preparation for the Fourth Army's attack on the Hindenburg Line. Two nights before the attack several villages near the line and many strong points and gun positions were shelled with mustard gas for six hours. In the latter case the effect of the gas was seen at once, as the hostile batteries ceased fire and remained silent for twenty-four hours or longer.

It was a long time, said counsel, before the Ministry of Munitions were convinced that their process was the proper one and that they were producing the proper stuff. But at last they were convinced, and Professor Gibson was sent to Avonmouth to install the Blackley process and to produce the identical product that they were preparing at Blackley. The Ministry were driven by their own want of success to adopt the Levinstein method. As to the question of compensation on the stuff produced at Avonmouth, which amounted to 545 tons. A royalty of one penny per pound on the total production would amount to £5,000. The Commission adjourned till next Monday.

DIRECT DETERMINATION OF GLYCERINE.

ITALIAN METHOD APPLICABLE TO THE CRUDE PRODUCT.

IN a recent issue (the *Chemical Trade Journal and Chemical Engineer*, August 3, 1923, page 127) a description of a method of direct determination of glycerine worked out by Professor Fachini and Somazzi at the Royal Experimental Station for the Oils and Fats Industry at Milan, was published. This method was based upon the oxidation of the glycerine by potassium bichromate, and the measurement of the quantity of carbon dioxide evolved by the oxidation. The amount of bichromate used in the oxidation is also determined, and, by a simple calculation, the quantities of glycerol and also of trimethylene glycol present in the sample can be determined. This method was originally worked out for distilled glycerines, but a later communication by the two authors (*Bolletino del Industria degli Olii e dei Grassi*, October, 1923) extends the use of the method to crude glycerines.

Crude glycerines, especially those recovered from soap lyes, contain generally from 80—82 per cent. of glycerol and a number of impurities, such as fatty acids, resin acids, proteins, chlorides, carbonates, and alkaline hydrates. It is therefore necessary to purify the samples before the bichromate oxidation method can be applied. All oxidisable materials naturally must be removed, and, in addition, carbonates, if present, interfere greatly with the accuracy of the results. The different methods of purification have been examined by the authors. The distillation method was tried and abandoned. Purification with zinc sulphate proved unsatisfactory, as all the carbonates were not eliminated. Finally, a method of purification with basic lead acetate was worked out.

Purification with Basic-Lead-Acetate Solution.

The basic acetate is prepared by boiling a 10 per cent. solution of lead acetate with excess of litharge for one hour. The hot solution is then filtered under conditions whereby contamination with carbon dioxide is avoided. It was found that even if the basic-acetate solution deposits a precipitate after standing for some time, its efficiency is in no way reduced. This solution is capable of eliminating the proteins and albuminoids by coagulation, the organic acids as insoluble salts, and the alkaline carbonates as insoluble carbonates. Again, if the purified mixture be cooled to 0° C. for one hour, practically all the chlorides are removed as insoluble lead chloride. To remove the final traces of chlorides, the addition of a slight excess of silver carbonate may be employed.

The presence of a slight excess of the basic lead acetate in the purified glycerine will not affect the accuracy of the results, for Vizern and Guillot have shown that at temperatures below 120° C. lead acetate is not oxidised by chromic acid. The author's own experience has confirmed this conclusion, for under the conditions of their method of analysis the acetic acid present (5 c.c. of a 10 per cent. solution for every 250 c.c.) cannot modify the results as shown by the tests below:—

Sample	Purity of the Glycerine Found.
A. Pure glycerine No. 1	88.02 per cent.
B. Mixture of 4.2315 grammes of glycerine No. 1 with water and 5 c.c. of the basic acetate solution...	88.04 per cent.
C Mixture of 3.8335 grammes of glycerine No. 1 with water, 0.15 gramme of NaCl, and 0.05 gramme of Na_2CO_3	88.00 per cent.

It is thus established that the carbon dioxide method is quite applicable to crude glycerines when they have been well purified and freed from carbonates. The details of the estimation are as follows:—

Details of the Estimation.

About 20 grammes of lye or 2 grammes of the crude glycerine itself are weighed out accurately and transferred to a 250 c.c. graduated flask. Water is added until a volume of 50 c.c. is obtained, and 5 c.c. of the basic-lead-acetate solution, prepared as described above, are introduced. The flask is well shaken, and the contents left at rest for 30 minutes. A further small quantity of the lead acetate solution is then added cautiously. If a further amount of pre-

cipitate is formed, it is necessary to recommence the analysis, weighing out less of the sample. If no further precipitate is produced, the contents of the flask are made up with water to 250 c.c. at 15° C. The flask and its contents are then cooled in ice to 0° C. for at least one hour. The liquid is then filtered through a dry, cool filter. When the filtrate has reached a temperature of 15° C., 25 c.c. are removed with a pipette and transferred to the oxidation flask, and the analysis continued as described in the previous article for the case of pure glycerine. It is necessary, however, to add 12 c.c. of sulphuric acid (66° Bé.) to provide the necessary acidity, which, as has been shown previously, must be constant. Thus the method for the analysis of glycerines is complete. It is divided into three parts: (1) Purification of the sample; (2) determination of glycerol; (3) estimation of glycerol and trimethylene glycol.

Determining the Origin of a Glycerine.

The practical applications of this method are very important. It permits a much better control of the distillation process, and greater accuracy in the analysis of commercial samples. It was shown in Italy during the war that even in the case of highly purified glycerines, the properties of explosives made from them varied to some extent with the origin of the glycerine. It was found that glycerines of animal origin were composed almost entirely of glycerol, whereas glycerines of vegetable origin always contained varying amounts of trimethylene glycol. The new method of Fachini and Somazzi should thus prove highly serviceable in determining the origin of a glycerine. The Italian War Ministry has taken a great interest in the work.

SOCIETY OF PUBLIC ANALYSTS.

AT the ordinary meeting held at the Chemical Society's Rooms, Burlington House, on Wednesday, December 5, 1923—Mr. P. A. Ellis Richards, President, in the chair—certificates were read for the first time in favour of F. Knowles, A. Knox, C. R. Middleton, H. R. Read, G. Hogan, and T. F. Doyle. Certificates were read for the second time in favour of:—R. C. Frederick, and H. T. S. Britton.

The following were elected members of the Society:—L. E. Campbell, J. T. Hannen, C. L. Hinton, D. W. Kent-Jones, T. W. A. Shaw, W. H. Simmons, K. E. N. Williams, and P. N. Williams.

The Crystalline Bromides of Linseed Oil.

In a paper read by Harold Toms, M.Sc., A.I.C., on this subject, it was stated that the "insoluble bromide" of linseed oil, first described by Hehner and Mitchell, appears to consist of mixtures in varying proportions of two crystalline bromides—viz.: (1) a linolic-dilinolenic bromo-glyceride; and (2) the trilinolic bromo-glyceride or the oleic-linolic-linolenic bromo-glyceride. These two bromo-glycerides have been obtained in pure condition by crystallisation from ethyl acetate. They melt at 153° C. (corr.) and 117° C. (corr.), respectively. The solubility of the more insoluble bromide in ethyl acetate lies between 0.15 and 0.20 grammes per 100 c.c. at 15° to 20° C. The methods of estimating the bromine in these compounds have been studied, and it is shown that theoretical results can be obtained by the method of Carius and by a modification of the method of Stephanow, but not by the lime method. Various methods of estimating the more insoluble crystalline bromides are described, the yields of the purest product varying from 9.39 to 11.6 per cent. in the case of different oils. The results obtained suggest that there is some relationship between the yield of this crystalline bromide and the iodine value of the original oil.

A Plea for Standardisation.

M. S. Salamon, M.Sc., speaking on standardisation, emphasised the fact that in every field of analytical chemistry instances are continually occurring where different, although well-recognised methods of analysis yield varying results. He referred in particular to the case of dried milks, and instanced one example where one sample of dried milk was sent to four well-known analysts and a considerable divergence of figures resulted according to the methods used, particularly in the case of the fat and lactose estimations.

Referring next to essential oils, the need for standardisation seem to be urgent, for in many cases minute modifications in detail cause substantial differences in results. The same remarks apply to the case of inorganic materials of simpler composition, and the author saw a recognition of the difficulties in the details laid down for analyses under the Fertilisers and Feeding Stuffs Act, and he strongly advocated the formation of a Committee to consider the whole question.

The Volumetric Estimation of Chromium.

H. T. S. Britton, M.Sc., F.I.C., in a note on this subject, discussed the gravimetric methods of estimating chromium as oxide. Whatever precautions are taken to use only the purest reagents and salts and platinum crucibles, the ignited oxide is always found to contain some chromate. Hence, such methods lead to high results. It has been found that chromium can be quickly and accurately estimated volumetrically. The procedure is to add to an approximately neutral solution of a chromium salt an excess of sodium peroxide—about a gramme—and boil for ten minutes to complete the oxidation to chromate and to decompose the unused peroxide. After acidification with either sulphuric or hydrochloric acid, excess of potassium iodide is added and the liberated iodine titrated in the usual way.

Estimation of Lead in Cream of Tartar.

Mr. R. L. Andrews, who discussed this subject, stated that during 1921-22 all importations of cream of tartar to New Zealand were examined for lead, and the following colourimetric method was found to give concordant results and to be less cumbersome than the B.P. method. One c.c. of 5 per cent. potassium-cyanide solution, 1 c.c. of ammonia, and 40 c.c. of water are added to 2 grammes of cream of tartar, and solution effected by warming and shaking. After cooling and filtering, any tint is matched in the standards by the addition of very dilute caramel. These standards are prepared in a similar way from 2 grammes of lead free from cream of tartar, with the addition of requisite amounts of lead-nitrate solution containing 0.01 per cent. of lead. A few drops of 10 per cent. sodium-sulphide solution are added, and the solutions are all made up to the mark and the amount of lead estimated by comparison. If a standard water solution of lead is used a serious error is introduced as the colour is only about half the depth of that produced with a tartrate solution.

THE LATE MR. J. M. WILKIE

A WELL-KNOWN ANALYTICAL CHEMIST.

IN our last issue we referred briefly to the sudden death, on November 29, of Mr. J. M. Wilkie, chairman of the Nottingham Section of the Society of Chemical Industry. The following biographical details concerning the late Mr. Wilkie are published in the December 7 issue of the *Journal* of the Society:

John Matthew Wilkie was born at Montrose in 1876, and was educated as a pharmaceutical chemist. After passing his minor in Edinburgh he came to Derby as assistant to Mr. Frost, a high-class pharmacist of the old school. Later he went to London, and in 1900 was appointed as an assistant analyst in the laboratory of Boots Pure Drug Co., where he remained till his death. For many years past he was the deputy chief analyst, and was largely responsible for the work of the laboratory. By indomitable energy and by studying after a hard day's work he took the B.Sc. degree of the London University and the Associateship of the Institute of Chemistry by examination, taking the Fellowship in due course.

Mr. Wilkie was always a keen investigator and numerous methods are known by his name. Perhaps the best known of his researches are the paper on the estimation of small quantities of lead, published with Mr. Harvey, the silver methods for the determination of phosphoric acid and the alkaline iodine oxidation of phenols. He also devised a most ingenious method for the estimation of sulphur and oxidised sulphur compounds, which depended on the formation of acid by the bromine oxidation, but this research has only been published in abstract. These sulphur oxidation methods have, however, been in use at Boots' laboratory for some years with most satisfactory results. The last four years of his life was devoted to an almost monumental research on the determination of minimal quantities of arsenic. The late Mr. Wilkie was always a keen supporter of the Society, and as secretary to the Nottingham Section from 1914 to the present year he was largely responsible for the success of that Section and the great increase in the membership.

ELECTROLYTIC OXYGEN AND HYDROGEN.

FEATURES OF THE KNOWLES PATENT PLANT.

FOR many years, the attention of numerous inventors on the Continent, in America, and to a lesser degree, in this country, has been devoted to evolving an efficient type of electrolytic oxygen and hydrogen producing plant, and the patents covering this subject are very numerous. The majority of the new types suggested have never been carried beyond the experimental stage, and very few of those manufactured on a commercial scale have been entirely satisfactory in practice and stood the test of time. The reason for so many failures may be traced in the majority of cases to a fundamental lack of knowledge of the essentials of a satisfactory electrolytic cell. These may be briefly summarised as follows:—(*a*) simplicity, (*b*) low or moderate cost, (*c*) high efficiency, (*d*) safety in operation, (*e*) durability, (*f*) generation of pure gases, (*g*) flexibility.

Battery of Knowles Cells at the Erith Oil Works.

Among those plants that have evolved from the experimental to the commercial stage may be mentioned, the Knowles patent plant (made by the International Electrolytic Plant Co., Ltd., City Electricity Works, New Crane Street, Chester), which has had its practical efficiency demonstrated clearly. Plants on this system, the outcome of a large amount of experimental work carried on over a long period combined with over thirty year's practical experience, have been installed in this country and abroad of an aggregate capacity of over 100 million cubic feet of hydrogen per annum, and have been operating for a number of years safely at high efficiency and very low upkeep charges.

General Design of the Multipolar Cell.

The cell consists of a tank containing the electrolyte, in which are suspended alternately anodes and cathodes, each covered by a collecting bell. Alternate plates in each cell are connected in parallel, and copper links at both ends of the cell couple each set of electrodes in series with those of opposite polarity in the cells at both ends. The number of cells employed is controlled by the supply voltage and the number of bells per cell by the current necessary with this voltage to produce the output of gas required. Asbestos diaphragms separate the electrodes and effectually prevent mixing of the gases. Each electrode and collecting bell is a complete unit in itself, but all the bells in one cell are rigidly connected together, and may be lifted from the cell, complete with connections, in one operation.

Current is led to the electrode plates by staggered bolts with terminals on the tops of the bells. Oxygen and hydrogen are carried off from the bells by two pipes, one for each gas, running across the top of the cells, and these in turn connect with common offtake pipes for each bank of cells. The gas evolved by the cells carries with it a certain amount of electrolyte in the form of a fine spray. This is collected in the offtake pipes which are of a special form to assist in returning it to the cells. Each bank of cells is supplied with distilled water by a feed tank placed at the end of the row, and the distilled water flows to the cells by gravity. The inlet to the feed tank is controlled by a ball valve so that the level of the electrolyte remains constant, independent of the quantity of gas being evolved. The electrolyte consists of a 15 per cent. solution of the highest quality caustic soda in pure distilled water. Once a solution of the right strength is made up, the only addition required is distilled water. It is, however, of the utmost importance that this shall be absolutely pure, as the durability of the cells is very largely dependent on the quality of the water supplied to them.

A dominant factor in the Knowles cell is its simplicity of construction. All the bells are welded together to form one solid block, and by simply disconnecting the offtake pipes and electrical connections, they may be lifted from the tank with the electrodes for inspection, adjustment or overhauling, or by simply unscrewing the nuts forming the terminals of the electrode bolts, the electrodes and insulators are readily accessible for examination or replacement.

Durability and Efficiency.

Apart from the asbestos diaphragms, the only materials entering into the construction of the cell are steel, ebonite, and copper. Both the steel and ebonite are of special quality, and the asbestos cloth used for the diaphragms is specially chosen for its durability and requires renewal at very infrequent intervals, its average life being 6 years. In all electrolytic cells, the anodes are more liable to corrosion than any other part, and some makers admit that their

anodes are gradually eaten away and have to be renewed periodically. By specially treating the anodes in the Knowles cell, corrosive action is eliminated, and plates examined after 5 years continuous operation are stated to show no signs of wear.

Several distinctive features in the design of the cell contribute to its efficiency. All electrical connections are calculated to run at a low current density and the volt drop over them thereby reduced to a minimum. There are no current-carrying joints subjected to the action of the electrolyte to corrode and set up a high resistance in the electrical circuit. Each electrode has its current leading-in bolts solid welded to it and the leads are staggered and connected in such a manner as to ensure an equal distribution of current, and consequent evolution of gas over the whole surface of the electrodes. The asbestos diaphragm is of a special texture to permit complete saturation by the electrolyte and thus to minimise its electrical resistance. The electrodes, off-take pipes and feed water pipes are insulated in a thoroughly effective manner, ensuring that the whole of the current applied to the cells is utilised in electrolysing the water. Further, to guard against leakage of current, every cell is mounted on porcelain insulators.

Purity of Gases Produced.

The gases are generated under a fixed pressure which is kept constant by the unvarying height of the electrolyte in the cell. If for any reason whatever the pressure in the gas bells increases beyond a predetermined limit, the seal formed by the electrolyte round the tubes carrying the leading-in bolts is broken and the gases are released to atmosphere before any mixing can take place. As an additional precaution, two safety tubes, one for each gas, are fitted in each cell. It must not be assumed that the plant does not require reasonable and systematic attention to guard against unforseen contingencies, and no claim is made that it may be safely run without attention, but it is claimed that it is safer and more fool proof than the majority of electrolytic plants in operation to-day.

The exceptionally high purity of the gases produced by the Knowles cell is largely due to the low depth of the electrodes and the large volume of electrolyte between them. Knowles generators are guaranteed to produce gases of a minimum purity of oxygen 99 per cent. and hydrogen 99.5 per cent. Prolonged tests on cells are, however, stated by the makers to show an average purity of oxygen 99.5 per cent. and hydrogen 99.8 per cent. Where higher purities are required, special purifying plant, as described below, can be installed.

Where cost of current is relatively low, the generating plant can be run above the normal amperage, the increased production per hour thus realised giving the requisite gas capacity with a small number of cells. Here the lower current cost justifies the slightly lower electrical efficiency. Where the price of current is high, it will be advantageous to use a current of less than normal amperage, thus taking advantage of the higher electrical efficiency. But a larger plant will be needed to give the gas capacity sought. Tests carried out over long periods show it is claimed that Knowles cells can be run at the maximum output without damage to the plant and at no increased cost for upkeep.

Purifying Plant.

The gases evolved by the cells are sufficiently pure without further treatment for welding and cutting work, but in a number of special cases it is essential that the oxygen or hydrogen, as the case may be, should be practically 100 per cent. pure, and to attain this, special plant must be installed. The Knowles plant has been designed to meet cases of this description, and a number are now working in connection with oil hardening processes in various parts of the world.

Before the gas is passed through the purifiers, it is essential that any traces of electrolyte which have not been returned to the cells, either by the sloping off-take pipes or with the feed water, should be washed from the gas. To accomplish this, the gas is passed through scrubbers packed with hard coke, and in its ascent is washed by a descending stream of water. The number and size of the washers depends on the quantity of gas per hour being purified, but they are always of ample size to ensure a low gas velocity, and the entire elimination of the last traces of electrolyte.

The Knowles Patent Furnace.

The hydrogen or oxygen is passed through the furnace over a heated catalyst, and the impurity consisting of a very small percentage of the other gas is ignited to form water vapour. The furnace is designed on a reverse current system, so that the hot gas leaving it heats up the cold incoming gas. Due to the large surface area of the catalyst and the low velocity at which the gas passes through it, the impurity is almost completely ignited and the gas on leaving the furnace is 99.98 percent. to 100 per cent. pure. The action is started and maintained by means of an electrically-heated resistance secured on the inside of the furnace cover, the temperature being controlled by a variable rheostat and indicating pyrometer on the switchboard. Slag wool is packed between the furnace and outer case to conserve the heat evolved and render the action largely self-supporting, the current used being negligible.

The constructional details of the Knowles furnace are shown in the accompanying diagram (Figure 4). Gas enters the furnace at A and rises into the chamber B where it is deflected by the baffle plate C, and flows at a much decreased

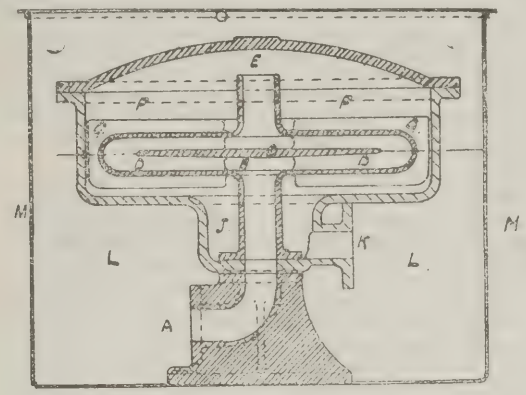

Fig 4.

velocity between a series of radial ribs DD over the edge of C, and through more ribs into the top chamber of the furnace at E. Here it is heated by an electrical resistance and passes down through the catalyst FF into the outer chamber GG. By means of more ribs, the flow is directed radially over the periphery of the inner chamber back to the centre at J, and away through the outlet pipe at K. A large number of heat units in the purified gas are transferred to the incoming gas through the ribs and the walls of DD. The whole furnace is placed in an outer case MM, lagged with slag wool LL. The catalyst is practically everlasting and retains its efficiency, providing that none but thoroughly washed gas is passed through it. In the event of carelessness, the catalyst only requires washing with distilled water to recover its efficiency.

Before and after the furnace, the gas passes through water seals to ensure that the effects of a possible explosion due to careless handling, shall not reach either the washers, cells or coolers. Any increase of gas pressure in the furnace immediately breaks the water seals and releases the gas to atmosphere before it can enter the pipe lines connecting the seals to the washers or coolers. A feature of these seals is that after they have once been filled with water, the level is maintained by water formed in the furnace, and separated from the gas in the coolers. The water flows by gravity through the two seals in series. The coolers are of the usual pattern, consisting of tubes welded into tube plates at both ends.

Description of Knowles Plant at Erith Oil Works.

The first plant to be built under the Knowles patents was erected at Bromborough, Port Sunlight, for the supply of hydrogen to Lever Bros., Ltd., for oil hardening. This plant consisted of 200 cells in series, each designed to carry a current of 2,200 ampères, but on completion it was found to be capable of running economically up to 3,000 ampères.

The most recent plant erected is one at Erith for the Erith Oil Works, Ltd., and is particularly interesting as, although not the largest battery constructed under the Knowles patents, the size and conditions are such that the layout includes every detail necessary for plants of the largest capacity. The plant is intended to run normally at 2,000 ampères, but is guaranteed capable of running continuously at 3,000 ampères. The capacity of the cells in the two installations is therefore the same, and the improvement in

design (all the original features being retained) is indicated by the fact that the cells at Erith have only 14 electrodes in each, against 42 in the original cells at Bromborough. In other words, the floor space had been reduced to one-third, and as this has been done without increasing materially the current density on the electrodes, the extraordinary life of the electrodes realised with the original plants has not been jeopardised in any way in the later design. The question is often asked whether the plant can be installed on an upper floor. The Erith plant is so placed, as were earlier plants at Durban and Sydney. The weight in running order is moderate, and involves no unusual floor construction.

Buildings and Electric Supply.

The plant is installed in two rooms on an upper floor of a two-storey building. This is of ferro-concrete with ferro-concrete floor. One room contains the battery, distilling plant, distilled water storage tank and the automatic feed tanks. This room has a floor space of about 2,700 sq. feet, which provides ample gangways and spare floor space on which to deal with cells during overhaul. The adjoining room has a floor area of about 1,300 sq. feet, and accommodates the switchboard, gas boosters and governors for both gases, washer traps, meters and test boards for both gases, also purifying plant for the oxygen and three compressors for hydrogen.

The supply of electricity is obtained from the works power station situated at some little distance from the battery room. No separate generating plant has been installed for the electrolytic plant and the voltage of 210 to 220 D.C., which is common to the whole works, cannot therefore be varied. Provision has, however, been made for cutting out cells when it is desired to run the battery at maximum output. The cables from the power station feed the battery through a main incoming supply panel and battery panel on the switchboard in the auxiliary plant room. Paper insulated lead covered cables run between the switchboard and the positive and negative busbars on the battery at opposite sides of the cell room.

Production Efficiency and Purity of the Gases.

The 104 cells are arranged in eight rows of thirteen each, while two spare cells are provided so that overhauling may be carried out without reducing the capacity of the plant. The wood benches supporting the cells carry steam pipes to maintain the temperature of the cells when the battery is temporarily shut down or run at outputs lower than normal.

An important new feature in this plant is the automatic feed to the cells, the water for which is first used for washing the outgoing gases, thus eliminating practically the only source of loss of electrolyte. The chief advantages, however, of the automatic feed are the great reduction in labour required to run the plant and the certainty that the level of the electrolyte will remain constant under all conditions.

The guaranteed production of the battery was 7.22 cubic feet of hydrogen and 3.61 cubic feet of oxygen per KWH at a current of 2,000 amperes, equivalent to a voltage of 2.25 per cell, and 6.5 cubic feet of hydrogen and 3.25 cubic feet of oxygen per KWH at 3,000 amperes, equivalent to 2.5 volts per cell. The actual results obtained on test were 5 per cent. to 8 per cent. better than the guarantees. Hydrogen direct from the cells was guaranteed to be 99.5 per cent. pure and oxygen 99 per cent. pure. Since the plant was first started, the hydrogen has been consistently 100 per cent. pure and the oxygen almost continually 99.6 to 99.8 per cent. pure.

A double distilling plant is installed on the gallery at the end of the cell room to ensure a supply of perfectly pure distilled water to the cells. The purity of this water is indicated on an instrument on the main switchboard so that any variation in the quality is immediately noted by the attendant in charge. Special attention has been paid to effectively insulating the gas offtake pipes both on the inlet to and outlet from the automatic feed washing tanks. Oxygen and hydrogen gas bus mains, which collect the gas from each bank of cells, run across the top of the cell room under the gallery and carry the gases to the auxiliary plant room.

Auxiliary Plant.

A positive type booster driven through gearing by a motor has been installed for raising the pressure of the hydrogen. From the booster, the hydrogen passes through a special safety seal and gas meter to the gasometer situated at some distance from the plant building. The oxygen pressure is similarly raised by means of a motor driven centrifugal booster, also equipped with a governing gas holder. After leaving the booster, the oxygen is washed in a coke scrubber to remove any traces of electrolyte that may still remain in the gas, and then passes through a special seal to the purifying furnace. The reverse current system, by which the hot gas leaving the furnace heats up the cold incoming gas, renders the action practically self-supporting once it has been started. The gas is next cooled to about atmospheric temperature in a combined tubular cooler and water seal, and is finally metered before entering the pipe line to the gasholder.

A small auxiliary panel mounted apart from the main switchboard is equipped with oxygen and hydrogen gas testing sets and a special multiple arm water pressure gauge. By means of a number of small pipes run to this panel from various points on both oxygen and hydrogen gas mains, the gas purities before and after the boosters, before and after the furnace, etc., may very conveniently be tested. These gas test pipes are permanently coupled to the multiple arm water gauge already mentioned, enabling the attendant to see at a glance whether undue pressure is occurring at any point in the installation.

THE NEW PARLIAMENT.

REPRESENTATION OF CHEMICAL AND ALLIED INTERESTS.

ALTHOUGH many well-known figures in the chemical and allied industries have not been successful in securing election or re-election to the present Parliament, yet the successful candidates embrace within their numbers representatives of almost every branch of the industries. The victory of Sir Sydney H. Henn, the chairman of Lankshear, Wickstead and Co., tartaric acid manufacturers, as one of the members for Blackburn, which seat he also held in the last Parliament, should lend appreciable weight to the support chemical interests will receive in the new House of Commons.

The explosives industries will receive representation in the person of Colonel J. W. Weston, who was returned as the unopposed Unionist member for Westmoreland. Colonel Weston is a director of W. H. Wakefield and Co., explosives manufacturers, Kendal, and of Nobel Industries, Ltd. Sir Leonard Lyle, managing director of Tate and Lyle, Ltd., sugar refiners of Silvertown and Liverpool, who was an unsuccessful candidate last year has now secured a seat in the House as the Unionist representative for Epping.

Sir William Alexander, A New M.P.

The choice of Brigadier-General Sir William Alexander by the electors of Central Glasgow means that one of the greatest leaders of our chemical industry will be in a position to voice his views in the auditorium, where they should command most attention. We need hardly recall to our readers that in addition to his other activities Sir William is the managing director of Charles Tennant and Co., Ltd., Glasgow, and of the British Dyestuffs Corporation. The re-election of Dr. G. C. Clayton as the Unionist member for Widnes is a matter upon which the whole chemical industry has reason to congratulate itself. During the short life of the last Parliament, Dr. Clayton proved convincingly his worth as a skilful marshaller of telling fact and as a speaker of no mean ability. Mr. H. Hogbin, who unsuccessfully contested North Battersea in the Liberal interests last year, has now reversed the situation and defeated the Labour candidate by a narrow majority. Mr. Hogbin is a member of the firm of Lawe's Chemical Manure Company. Lieut.-Colonel K. Vaughan-Morgan, a director of the Morgan Crucible Company, has succeeded in securing re-election for East Fulham in the Conservative cause. Among the other members of the new House may be mentioned Sir Robert Bird (U., West Wolverhampton), the head of the well-known business, founded by his father; Major A. G. Church (lab., East Leyton), the General Secretary of the National Union of Scientific Workers; Mr. E. D. Simon (L., Withington), an ex-Lord Mayor of Manchester, and member of the well-known chemical engineering firm Simon-Carves, Ltd.; Sir John Brunner (L., Southport), a director of Brunner, Mond and Co.; and Sir Thomas Robinson (L., Stretford), a director of the Bradford Dyers' Association.

THE INSTITUTE OF CHEMISTRY.

DISTINGUISHED GATHERING AT ANNIVERSARY DINNER.

THE forty-sixth anniversary of the Institute of Chemistry was celebrated on Monday, December 10, when a dinner was held at the Hotel Victoria, London. Mr. A. Chaston Chapman, F.R.S., the President of the Institute, presided over a very distinguished gathering, which included Viscount Haldane, Viscount Milner, Viscount Burnham, Lord Clinton, Sir Charles Sherrington, Sir Herbert Jackson, Professor J. Millar-Thomson, Sir John Anderson (Home Office), Sir William Duke (Indian Office), Sir Sidney Chapman (Board of Trade), Sir Bertram Cubitt (War Office), Sir L. Amherst Selby-Bigge (Board of Education), Sir Daniel Hall (Ministry of Agriculture and Fisheries), Sir Arthur Robinson (Ministry of Health), Sir Frank Heath (Dept. of Scientific and Industrial Research), Sir Malcolm Delevingne (Home Office), Captain J. C. W. Henley, Lieut.-General Sir Noel Birch, Air Vice-Marshal Sir W. G. H. Salmond, Dean Inge, Dr. Alexander Russell, Mr. E. H. Moritz, Sir Charles Morgan, Professor E. C. C. Baly, Sir Joseph Petavel, Sir William Willcox, Sir Humphrey Rolleston, Sir William Pope, Colonel Sir Edward Brotherton, Lord Justice Sargant, Sir John Brunner, Sir Robert Hadfield, Sir Robert Robertson, Major A. Boyd-Carpenter, Professor F. G. Donnan, Professor Brönsted (Copenhagen), Dr. Ernest Barker, Sir Richard Redmayne, Sir Thomas Holland, Mr. R. C. Nesbitt, Sir John Dewrance, Mr. P. A. Ellis-Richards, Professor G. T. Morgan, Mr. W. Marshall, Mr. G. Keville-Davis, Mr. E. R. Bolton, Mr. P. H. Kirkaldy, Professor Arthur Smithells, Mr. W. Macnab, Professor J. C. Philip, Dr. T. Slater Price, Mr. G. Rudd Thompson, and many other distinguished members of the profession. There were also many ladies present.

Viscount Haldane on the Development of Science.

Viscount Haldane, K.T., O.M., F.R.S., proposed the toast of "The Institute of Chemistry of Great Britain and Ireland." There had, he said, been controversies about tariffs, but there was one thing that went far deeper, and that was the growth and prosperity of the British nation, which depended much more upon science and organisation than upon controversies which, however important they might seem, were bound to be ephemeral. The production of young men of science in this country had gone on with extraordinary vigour, and there was an extraordinary amount of new science in the country, but we had to take warning. If we did not develop science to the utmost, and, above all, see to its application to industry, we should fall far behind. The problem of the future was to see that more science was applied to industry, and that its application was organised in the best way.

The Chairman, responding, said the Institute was formed in 1877 for the purpose of formulating a scheme of training for professional chemists, and of instituting examinational tests whereby the proficiency of persons to practise chemistry could adequately be determined. Although not exempt from infantile troubles, the Institute made steady headway, and in 1885 it was granted a Royal Charter, in virtue of which it was authorised to examine, to grant certificates of competency, and to register persons qualified. To-day, there were on the Register 1,615 Fellows, 2,714 Associates, and 862 registered Students, totalling 5,191. One of the chief aims of the Institute was not only to maintain its very high standard, both in respect of the training it demanded of those who applied for admission to its examinations and in the character of the examinations themselves, but also to secure a high standard of conduct on the part of all its members.

The Post-war Decline in the Recognition of the Chemist.

He would not say that during the war the Institute was actually discovered, but, for the first time, the nature of its activities and its great usefulness was widely recognised; the Institute was the chief mobilising agency for all purposes in which chemistry was concerned, not only in relation to the active forces for offence and defence, but also in connection with the no less important matter of the production of munitions and other materials of war. Notwithstanding all this, could it be said that since the termination of the war the influence of chemists as a body had increased? He believed not, but rather the reverse. He asked the many distinguished guests present to do what they could to increase, in the interests of the nation, the general knowledge and better understanding of the services which chemistry was ever rendering to the community.

Professor Arthur Smithells, proposing "The Houses of Parliament," said that in addressing such a distinguished assembly of guests representing a great variety of institutions—not only the House of Legislature, but the Church, Army, Navy, Air Force, Civil Service, the Press, and other interests—it was impossible for a chemist not to feel conscious of the neglect which his science suffered at their hands, and to attempt to pronounce to each in turn a suitable homily on the importance of chemistry. It was eminently desirable that science should be more diffused amongst those who had to enact the laws of this country. He paid a tribute to Viscount Haldane and Mr. Robert C. Nesbitt, M.P., whose names he coupled with the toast.

Viscount Haldane replied on behalf of the House of Lords. Mr. Robert C. Nesbitt, M.P., responded for the House of Commons.

Chemistry and "The Forces."

Sir Robert Robertson proposed "The Forces." He emphasised the need for constant review by the Services of the chemical products of the country, not only at home, but Imperial and foreign, from the point of view of seeing that this country was well provided in respect of them. He coupled with the toast the names of Captain Henley (Director of Naval Ordnance), Lieut.-General Sir Noel Birch (Master-General of the Ordnance), and Air Vice-Marshal Sir W. G. H. Salmond. Captain J. C. W. Henley, R.N., responded for the Navy. Hitherto, perhaps, he said, they had failed to appreciate fully the value of science and research, but they had learned their lesson, and the policy of the Navy was now to encourage and to benefit by science and research to the very utmost. Lieut.-General Sir Noel Birch, K.C.B., K.C.M.G., for the Army, said no one would contradict the statement that the chemists saved this country from defeat in the Great War. As Master-General of the Ordnance, he would always do his best to get as much money as he possibly could applied to research. Vice-Marshal Sir W. G. H. Salmond, K.C.M.G., C.B., D.S.O., referred to the dependence of the Royal Air Force upon chemistry.

Science in Education and in Industry.

Sir Herbert Jackson, proposing "The Civil Service," referred to the cordial relations which had existed between the Institute of Chemistry and the various Government Departments with which it had come into contact. Sir L. Amherst Selby-Bigge, Bart., K.C.B. (Permanent Secretary, Board of Education), responding, said the Institute had, with admirable public spirit and considerable practical wisdom, been willing to take a responsible share in solving the problem which was always before the Board of Education—of getting better value for the public money spent on education. He believed the Institute and the Board were in agreement in believing that at the root of the application of science to industry there lay as an absolute essential a good general education, unprejudiced by premature specialisation. We had made a beginning in the last few years of that close co-operation which ought to exist between Government Departments and the great professional and scientific institutes of the country, and he saw no reason why it should not go further.

Viscount Burnham proposed the toast of "Science in Industry." There were, he said, no more convinced believers in technical education based on general knowledge than the enlightened captains of our industries to-day. Science had saved its cost in money a hundredfold. No works could be efficient or progressive without a works chemist; he knew what the works chemist meant in paper mills. Schopenhauer had said "Philosophy never saved me a sixpence," but he (Lord Burnham) could say unhesitatingly that science saved us all even more than we could possibly get from the Capital Levy. Sir John F. L. Brunner, Bart., M.P., responding, agreed that we were improving in the matter of the application of science to industry. The reason why the heads of businesses had hesitated in the past to engage highly trained chemists was because they would not have known what to do with him when they had got him. Having been elected a member of Parliament, he hoped to be of use to the profession.

Sir William Pope proposed the final toast, "The Guests," and said that the Institute was fortunate in being able to welcome such a distinguished list of guests. It was a very welcome sign that a chemical gathering should be able to collect together so many distinguished men, who had been in the forefront of the activities of the Empire during the last fifty years, and who had identified themselves with the "organism" of the British Empire. The toast was responded to by Dean Inge and Lord Justice Sargant.

THE THEORY OF THE FILTER PRESS.*

CONDITIONS FOR CONSTANT RATE OF FLOW.

In working a filter press there are, in general, four different methods of extracting the solid material from the filtrate —viz., (1) the constant-pressure method in which the pressure on the cake is kept constant during the run, and filtration is stopped when the volume of liquid delivered is too small; (2) the constant-rate method, in which the volume of liquid delivered is maintained constant by gradually increasing the pressure during the run until the maximum pressure is reached; and (3) and (4) methods with and without filter aids; in the former case, filter aids such as diatomaceous earth, etc., are used where the sludge is slimy and compressible. The paper describes some work done in the Practice School of the Imperial College, London, to investigate the applicability of an equation developed by Dr. W. K Lewis on a Sweetland press filtering "defecated" sugars and syrups at a constant rate of flow, using kieselguhr as a filter aid. The Lewis equation appears in a book by W. H. Walker, W. K. Lewis, and W. H. McAdams, "Principles of Chemical Engineering," published by the McGraw-Hill Co. in 1923.

The details of the equation are given in the paper, but they are too lengthy to be given in full. The authors' account of their experimental work, however, makes the position clear.

The work, as already stated, was done on some Sweetland filter presses at a sugar refinery. The sugar and syrup liquors are sent to "blow-ups" or defecators, where they are brought to the correct degree of blueness (litmus paper) by adding either lime or acid calcium phosphate. This brings down calcium phosphate, albuminous, and gummy materials, which have to be filtered off. The sugar liquors receive fresh kieselguhr as a filter aid, but the syrups use reclaimed sludge —which consists of used kieselguhr from the sugar presses— from a sludge-settling tank. The normal operation of the syrup press was to give the cloth a pre-coat of kieselguhr by running sugar through it for ten minuates, when the sugar was emptied out and the filter refilled with syrup from the blow-ups by gravity. This was then filtered for 90 minutes, gradually increasing the pressure to approximate to a constant-rate run.

Effect of Pre-coat of Kieselguhr.

Work done by previous groups on the same filters showed that the compression of the sludge was an irreversible effect— *i.e.*, on releasing the pressure the sludge does not return to its original porous state, so that in working a press at constant rate the pressure must be kept well in control. Previous work also showed that if clear solutions of syrup— which have been previously filtered free from suspended matter—were pumped through the press, the pressure rose with time, and that when coming down from a high rate to a low rate the pressure required for the low rate was much greater than that previously used. This shows that a very small amount of suspended matter is liable to clog up the holes of the filter cloth and act as a large resistance to the flow of the liquid through it. This principle is recognised in the case of the syrup liquors by giving the cloth a pre-coat of kieselguhr by means of the sugar liquor already referred to

Operation of the Experimental Sweetland Press.

In order to obtain data, one leaf, on which the cloth was fairly new, was chosen, instead of the whole filter press of 72 leaves. A hose was attached to the sight-glass coupling, and this was the source of the filtrate. The over-all pressure on the press was read by a mercury manometer up to 20lb. gauge, and by a calibrated steam gauge from 12lb. to the maximum. Pressure adjustment was obtained by means of a hand-valve in the feed line. The press was filled with syrup from the blow-up tank by gravity, so as not to disturb the kieselguhr pre-coat left by the sugar, and when full the gravity line was closed and the pump line opened. The effluent was measured in two ways. A rate was obtained at frequent intervals either by filling a graduated cylinder or by filling a calibrated beaker which rested on a scale pan, the time being measured in each case by a stop-watch. The integration of these rate data should give the total effluent, and this figure was checked by weighing the total effluent in pails. Constancy of flow was obtained by the use of a specially constructed rectangular weir. The hose from the leaf was led into the back compartment of this weir, and the liquor flowed out through a very narrow slit in front.

Lewis's Formula and Press Resistance.

The form of curves obtained for the constant rate should give a straight line according to theory, which, however, they by no means did, and this tended to show that the formula of Lewis would not apply to constant-rate filtration. This formula, however, was designed to disregard press resistance, and, therefore, the press resistance of the initial pre-coat of filter-aid deposited by the sugar solution must be considerable. The authors show, however, that press resistance must be taken into account, that it can be raised considerably by pumping more or less clear liquor through it, and that it can be modified by giving it a pre-coat of kieselguhr. These facts, they allege, indicate that more attention should be paid in investigations to the initial clogging up of the filter-cloth pores by the precipitate. One of the chief objects of dealing with the problem of filtration in the manner indicated in the paper was to obtain a table of values for the specific resistance for all kinds of materials, and also to ascertain in what way various changes in operation and in method of preparation can affect its value. In this way, it should be possible to design a filter press from a known constant of the substance to be filtered.

Cloth Resistance in the Ordinary Filter Press.

Mr. A. E. Alliott, opening a short discussion, said that in the ordinary filter press the conditions were hardly constant pressure, and there was hardly a constant rate of flow. The filtering began with a constant rate of flow and ended with a considerable period of constant pressure. As regards the scouring effect, in some cases that was very noticeable. He himself had observed that with such a simple cake as calcium carbonate, the finer particles were precipitated and, if filtering went on for a sufficiently long time, seemed to get washed forward to the filter cloth, and the resistance was gradually increased, due to the scouring of the cake by the velocity of the liquid passing through it. He had also noticed that the pre-coat is of importance. One had to go quite steadily in putting the first layers on to the cloth, or else the whole cycle of the filtration suffered disturbance. In an ordinary filter press he had found that with such a simple cake as calcium carbonate, the cloth resistance is appreciable, and the same applied to certain dyes, in which one would have thought that the resistance of a thickness of the dye, once a fair layer had been put on the cloth, would have swamped the resistance of the cloth. The fact was, however, with a somewhat difficult filtering material, that apparently the initial layer on the cloth presented a higher resistance.

The Value of Formulæ in Filter Press Work.

In the case of the plate and frame or recess type of filter press, one could not simplify the formulæ so much, because one had to bring in the end resistance in completing the cake, but one would probably get near enough in many cases with these formulæ. Personally, he was always very much against taking anything for granted in filtering problems. People were apt to suppose that because their particular precipitate had the same chemical formula as that of somebody else, therefore the filtering qualities would be the same. By doing that, however, one was very apt to get into trouble. Nevertheless, the existence of these formulæ in the paper ought to shorten the ordinary tests, because, having made one or two tests, one would be able to get any value that was required from the formulæ and be reasonably sure that they were sound values. The formulæ should assist considerably in the matter of calculating capital cost and labour cost. The great difficulty is that one has to be certain the stuff that is being filtered is not altering whilst one is waiting about experimenting with it, but that was a thing which could not be managed with a formula.

How a Magnesium-hydroxide Filtration Problem was Solved.

Mr. Donald said he would like to add one more thing to his remarks. Some work was done at Bangor (Maine) in a paper mill. There they had an electrolytic cell for producing chlorine for bleaching the pulp, and the salt used had a considerable amount of magnesium in it and a certain amount of other things. These had to be precipitated out as magnesium hydroxide. It was filtered without any

* Abstract of paper and discussion before the Institution of Chemical Engineers on November 14. By M. B. Donald and R. D. Hunneman. The Paper represents work done in partial fulfilment of the requirements for the degree of Master of Science in Chemical Engineering at the Massachusetts Institute of Technology.

filter aid, but it was found that they were getting very bad results. Not only was it found impossible to filter it out, but they used to break the cloths and got a very muddy filtrate which, once it had got into the cloths, used to cause a lot of trouble. The firm wrote to the filter-cell people, and asked what they could do as regards supplying kieselguhr for improving the product and also increasing the rate of flow. The kieselguhr people, as, perhaps, most firms would, said that a very large amount of kieselguhr was needed for every charge, but the firm worked it out and found that it would not pay them. Some of the students were put on to the problem to find out how the amount of kieselguhr needed could be reduced. It was a Kelly Leaf filter press, and it was found that by putting a pre-coat of kieselguhr—about 5lb.—on to the leaves, they could get a very clear filtrate. When Mr. Donald left the station the press had been going for three weeks and was still giving a clear filtrate, and generally very much better results were being obtained, using this very small amount of kieselguhr. This seemed to point again to the fact that the important factor in filtering has something to do with the initial coating on the filter cloth.

THE CHINA-WOOD OIL TRADE.

IMPORTANCE OF CORRECT SAMPLING.

By Charles V. Bacon (New York).

THE correct sampling of china wood oil is even more important than the accurate analysis of the sample obtained. It is an easier matter properly to analyse wood oil than to secure a representative sample, yet unfortunately, this very important factor is over-looked by the majority of buyers. It is only in recent years, since the system of tanking was installed in the Far East that china wood oil showed any reasonable tendency to uniformity in quality.

Some years ago the writer examined some two thousand individual barrels, alleged to be a uniform shipment. The results of this work disclosed some pure oil, but also some oil adulterated as high as 25 per cent., while there were also found some barrels that contained absolutely no wood oil, but tea-seed, tallow-seed, and peanut oils.

Whilst, as stated above, the tanking of oil has greatly increased the uniformity of arrivals, there are even to-day many deliveries that are not uniform. Recent examination of eighteen individual barrels, all alleged to be uniform, disclosed that only five barrels were pure, two contained an excessive amount of foots and the balance were adulterated from three to eight per cent. There seems to be a very decided tendency in the trade to under sample and improperly sample. This is no doubt occasioned by what may be termed false economy, as sampling, like everything else, takes time and requires certain experience and care. The writer has made it his business to be present on the docks and to observe methods of sampling, and unfortunately has witnessed conditions that are little short of criminal. The so-called sampler proceeds to drive out the bung, rolls a newspaper, sticks it in the bung-hole, tilts the barrels and fills possibly three cans, then he takes another barrel, goes through the same procedure and fills another three cans. These six samples from two different barrels, which may not be the same are then tendered as a representative sample of three or four hundred barrels.

Sampling Oil in Barrels.

If the oil in barrels or drums is to be sampled properly, there are two factors that must be given due consideration; firstly, the sample must be drawn from at least ten per cent. of the packages well distributed; secondly, the method of drawing the sample must be such that material representative of both the top and the bottom is secured. If the oil is liquid, the proper way to do this is by means of a cylindrical glass tube about 1½in. in diameter and sufficiently long to reach the bottom of the barrel. The lower and upper ends are constricted, and underneath the latter there is a brass band holding two rings through which the fingers are inserted. The tube is gradually lowered through the bung-hole until it strikes the bottom of the barrel. The thumb is now used to close the top opening, and prevent the oil from running out of the tube when withdrawn. Samples taken in this manner should be mixed into one large container, and the number of each barrel recorded and stated on the sampling certificate.

During the winter, when the oil is very often in a solid condition, the same procedure should be followed, replacing the glass tube however with a tallow trier, which is essentially a graduated piece of steel tubing semi-circular in form and about 3ft. long. This is pushed into the oil, turned a few times and withdrawn, when it brings out with a solid core of oil. During the last two years a very large amount of china wood oil has been imported from the Orient in bulk; this oil is generally loaded into a deep tank on regular freight-carrying vessels at Shanghai. The quantity varies, ranging from four hundred to a thousand tons.

The Sampling of Bulk Cargoes.

The writer has sampled bulk cargoes in excess of a hundred thousand tons, and in no instance knows of any complaint. The procedure followed is first to draw samples from the top and bottom of both port and starboard sections of the tank. These samples are visually examined and if the general appearance gives indications that the oil is "O.K.," pumping is started and samples are drawn from a bleeder in the discharge line every 30 minutes. These individual samples are mixed to make one uniform sample representative of the entire cargo.

The analysis is generally based on the bleeder sample, although many shippers also have the tank cars into which bulk cargo is to be loaded sampled. This is usually done as an additional precaution, in the event of any dispute arising relative to a specific tank car. It should also be noted that in all instances, the sample drawn shall be of sufficient quantity to enable it to be distributed as the owner of the commodity may direct. If the sample of the goods is delivered to the owner, as covered by instructions, it should also be under seal. In any event all samples should be held intact for a period of three months. If the purchasers of china wood oil will insist upon the aforesaid procedure when they are buying oil, they will better protect their interests and be in a position readily to interpret any differences in analysis.

THE CHLORINATION OF TOLUENE.

EFFECT OF LIGHT ON THE REACTION.

A COMPREHENSIVE study of the photochemical aspects of the reaction between toluene and chlorine has been carried out recently in the Photochemical Laboratories of the Akt.-Ges. für Anilin fabrikation, Berlin, under the guidance of Dr. Ollendorff, the director of the laboratories. The results have just been published in the *Zeitschrift für Elektrochemie* (November, 1923) in a paper by G. Book and J. Eggert. The results of the work may be summarised as follows:

(1) If toluene be chlorinated at a temperature of 105-110° C. in a regular current of chlorine, the fractionation of the resultant product shows that its composition is the same whether the chlorination be carried out in the dark or in ordinary daylight.

(2) If the chlorination as in (1) be carried out in the presence of a chlorine carrier—*e.g.*, ferric chloride, a mixture of ortho- and para- chlorotoluenes is formed, whereas without the carrier, the chlorination product is almost entirely benzyl chloride. At the high temperature employed, however, the presence or absence of ordinary daylight makes no difference to the course of the reaction.

(3) The spontaneous reaction between chlorine upon toluene is very greatly retarded if the reaction mixture be cooled to −80° C. In an experiment at this temperature and in the dark, which was continued over a period of 70 hours, practically no chlorination was found to have occurred.

(4) By suitable illumination of the cooled reaction mixture a distinct acceleration of the speed of reaction is recognisable. This acceleration has been measured and found for the particular light intensity employed to be in accordance with the photochemical equivalent law—namely, twenty-five times the speed of the reaction in the absence of light.

(5) The presence of small quantities of iodine in the system increases the tendency for spontaneous chlorination to occur at the low temperatures employed, and in the absence of light. In the presence of light, however, the presence of the iodine has no apparent effect upon the course of the reaction.

ITEMS OF INTEREST.

Belgian Radium Production.—It is announced that the production of radium from the works at Oelem, Campine, amounts this year to 12½ grammes.

Erratum.—In the article entitled "Concentrated Hydrogen Peroxide," published in our issue of December 7 (page 676), the name of the author should read "J. R. Booer, B.Sc., F.C.S.," and not "J. R. Booer, B.Sc., F.I.C."

Smokeless Fuel.—At a meeting of the Royal Scottish Society of Arts, on Monday, at Edinburgh, Mr. Robert Maclaurin gave a paper on the "Carbonisation of Coal." He pointed out that industrial gas could be produced by the Maclaurin process at a cost of ¾d. a therm.

Commission on Mining Subsidence.—The Royal Commission on Mining Subsidence will meet on Tuesday and Wednesday, December 18 and 19, at 10.30 a.m. each day, at 5, Old Palace Yard, Westminster, to resume their hearing of evidence. The fifth and sixth days of the Commission's public sittings will be January 22 and 23.

Asbestos Factory in Quebec.—One of the important industrial developments in the Province of Quebec is the establishment of a plant for the manufacture of asbestos products. The undertaking is of special interest, because it represents a new venture in the manufacture of asbestos products on a large scale in Canada.

Fatality at Ironworks.—Four men were gassed while engaged on a new gas dry-cleaning plant at the Blaenavon Coal and Iron Co.'s works at Blaenavon yesterday, and one of them, P. Harrington, an employee of Messrs. Fraser and Chalmers, Kent, died. The plant had only just been completed, and was put in commission for the first time yesterday after satisfactory tests.

Gretna Factory for Sale.—The Disposal and Liquidation Commission have decided to realise by public auction at an early date the whole of the real estate of the Government factory at Gretna, and they have appointed Messrs. W. L. Tiffin and Sons and Messrs. W. P. Gibbings and Sons, of Carlisle, joint auctioneers, to conduct the sale, which is expected to be held next spring.

Tariff Notes.—As from November 1, the following revised duties on products exported from Nigeria are in force: palm oil £2. per ton; palm kernel oil, £2. per ton; palm kernels, £1. 2s. 6d. per ton; and ground nuts, 10s. per ton.—The manufacturing tax and corresponding customs surtax on picric powders and other explosive products, excluding smokeless powders have been rescinded with certain conditions, by the Italian Government.

Ship Fumigation Fatality.—A scaler named William Hall was overcome by fumes of sulphur and cyanide, states a Press report, while down a hatch of the ss. Barrymore, berthed in the South Hornby Dock, Liverpool, recently. The Port Sanitary Authority had been fumigating the ship, and when subsequently the forepeak hatch was opened to allow the fumes to clear, Hall, not apprehending the danger, went down the hatch and was rendered unconscious and died later

South African Tariff Proposals.—The South African Board of Trade and Industries recommend that the duties on the following items be withdrawn or rebated:—Salt, under certain conditions; whiting, tin oxide, zinc oxide, copper oxide, cobalt oxide and coloured glazes used in pottery making; dry shellac; wax, turpentine, dyes and tinfoil for polishes; metabisulphite of potash; ammonium oxalate; soya bean oil, citronella oil, oil of mirbane, oxalic acid, oleine, hydrosulphite of soda, naphthalene crystals, perchloride of iron, whiting, zinc and iron oxides, nickel sulphate and fuller's earth for soap making.

Chemical Stocks in Japan.—The Acting British Consul at Osaka reports that stocks of drugs and chemicals, etc., destroyed in Tokyo and Yokohama in the recent earthquake and fire amounted in value to not far short of yen 90,000,000. Stocks of both heavy and fine chemicals in the Osaka district at the time of the disaster were very low, and the present drain on local supplies will cause an acute shortage. Large orders are reported to have already been placed in England and America. Prices at present are very high and there is naturally much activity in the trade. It should be noted however that, if present decisions are maintained, the import duty on chemicals and drugs which took effect from September 17 last, will be re-imposed after March 31 next.

British Coal Output.—The coal output at the mines of Great Britain for the week ended December 1 was 5,719,200 tons, against 5,726,300 tons for the preceding week and 5,573,300 tons for the corresponding week last year.

Change of Address.—As from December 10, the address of Vivian and Sons, Ltd., will be Bartlett House, 9-12, Basinghall Street, E.C. 2. Telegrams: "Vivians, Stock London"; telephone: "London Wall 4650."

Gas Company's War Memorial.—A memorial window to the employees of the South Metropolitan Gas Company who fell in the war, 386 in number, was formally unveiled in Southwark Cathedral on Saturday afternoon last at a service attended by directors, officials, and men of the company and relatives of the fallen.

Imported Dyestuffs in November. — During November, the total number of applications received by the Board of Trade under the Dyestuffs (Import Regulation) Act was 612, of which 485 were from merchants or importers. Of these 433 were granted, 119 referred to British makers of similar products, and 40 referred to Reparation supplies available.

U.S. Commercial Treaty with Germany.—The new commercial treaty between the United States and Germany was signed at Washington on Saturday last, states a Reuter message, by Mr. Hughes, Secretary of State, and Dr. Otto Wiedfeldt, the German Ambassador. This pact, which will take the place of that abrogated during the war, will be prepared for early submission to the Senate for ratification.

Beet Sugar in Suffolk.—Mr. F. H. Keeble Pearson, director of the East Suffolk Development Syndicate, Ltd., speaking at Halesworth, on Tuesday, said the syndicate was erecting a sugar-beet factory at Southwold Harbour in time for next season, and had also acquired the harbour, while a circular railway of about 45 miles in length and embracing about 200,000 acres was in contemplation.

Obituary.—We regret to state that Mr. Frederick Wardle, head of the firm of Rayner and Wardle, tanning material importers, of Leeds, died at his residence in Leeds yesterday, aged 74. He was a past president of Leeds Chamber of Commerce.—We regret to have to record the death, in his 63rd year, of Mr. Alfred Smith, formerly of Messrs. Alfred Smith, Ltd., rubber chemical manufacturers, of Manchester, from which he retired in 1919.

American Company Dividends.—The Texas Gulf Sulphur Corp. has declared an extra dividend of 50 cents and a regular quarterly dividend of 1.50 dollars. E. I. du Pont de Nemours and Co. have declared a quarterly dividend of 2 dollars on the common stock. This is an increase from previous rate of 1.50 dollars quarterly. The American Cyanamid Co. has declared a dividend of 1½ dollars per share on preferred stock, and 1 dollar per share, plus 50 cents extra, on common stock. The National Lead Co. has declared a quarterly dividend of 2 per cent. on its common stock. The Utah Copper Company announces a dividend of 1 dollar per share.

Poisoning Fatality at Liverpool.—The facts of a fatality of a rare kind were investigated by the Wallasey coroner on Monday last. A gang of men were unloading a cargo of iron drums of cyanide on Friday (December 7), when seven of them showed symptoms of poisoning and were taken to the Liscard Hospital. Six of them recovered quickly, but George Edward Jones, aged twenty, died three hours later without recovering consciousness. He was treated by the doctors for poisoning through inhalation, but it was found later that he had excoriations from burns on his arms and knees, and that the poison was absorbed from his clothing through the broken skin.

Chemical Manufacture in Mexico.—According to the U.S. Consul at Vera Cruz, Mexico, a plant for the manufacture of caustic soda, hydrochloric acid, and nitric acid is being established at Orizaba in the State of Vera Cruz. The salt used will be obtained from Salina Cruz and from Yucatan, the high duties prohibiting the use of New Orleans salt. The monthly output of the new factory is stated to be 2½ tons of caustic soda, 4 tons of hydrochloric acid, 3 tons of bleaching powder and considerable quantities of chlorine products. The hydroelectric equipment of 1,200H.P., purchased from the U.S., has already been installed. The capital of the company which is organised under Mexican laws is 300,000 pesos (1 peso = 0.482 dollars), and is under the control of American, Spanish, and Mexican interests. The plant, it is further reported, will not be in operation for six months.

German Bauxite Mining Industry.—It is reported that the bauxite mining industry in Germany is at a standstill. Before the war Germany obtained most of its bauxite from France, importing approximately 38,000 metric tons in 1913. During the war deposits in Upper Hessen were developed. The monthly output was about 1,200 tons, having an aluminium content a little less than that of the French.

Iron Ore Deposits in Lapland. — In 1913 the Swedish Riksdag decided to have a detailed investigation of the iron ore resources in Lapland. This has just been concluded and has proved that the amount is far greater than had been indicated by a previous examination. It is now estimated that 1,500,000,000 tons of iron ore of high quality are available. Over 2,000 samples have been tested for iron, sulphur, and phosphorus contents. As a result of this investigation, it is anticipated that large quantities of non-phosphorus ore of class "A" will be released for export purposes.

Institute of Chemistry Exhibition.—An exhibition has been arranged to take place on Wednesday, December 19, from 6 p.m.—10 p.m., at 30, Russell Square, W.C. 1, under the auspices of the Institute of Chemistry. The following firms have promised to send exhibits: Messrs. British Drug Houses, Evans Adlard, Balston, Ford, Allnut and Son, Becker, Baird and Tatlock, Gallenkamp, Hilger, Brown, Duroglass, Wood Bros., H. K. Lewis' Circulating Library. Apparatus and chemicals of a new and interesting type will be shown. Complete details will be available at the Institute on the day of the Exhibition.

Manufacture of Soda in China.—For nearly forty years the manufacture of soda has been carried on in Japan, and, more recently, factories have been started in China, although, up to the present, no very great degree of success has attended these enterprises. There is reason to suppose, however, that in future those factories favourably situated in the latter country will be able to reckon on a fair measure of success. According to *Finance and Commerce* (Shanghai), the production of soda in China is on the average about 50,000 or 60,000 piculs annually. Considerable quantities are produced in Harbin, Dairen, Suifenho, and other Manchurian towns.

Tasmanian Carbide Production.—The Tasmanian Government has placed a receiver in the works of the Carbide Company of Australia. The company owed the Government £96,854. on June 30 last, while the bill for electric power averages about £850. per month. Liquid assets amount to over £16,000., besides various stocks on hand. Nearly 400 tons of carbide are produced per month, and importations for July amounted to 322 tons. The latter are subject to a variable duty, the lowest amount being £7. 10s. per ton. The company had commenced operations for duplicating the plant so as to be in a position to meet the whole of Australian requirements, but after £10,000. had been spent, the lifting of the embargo, early in the year, resulted in the company being unable to meet foreign competition, and the works were closed for four months. However, production has continued since last July, when work was resumed. About £70,000. Australian and £40,000. London money is represented by the company. If the duplication of the plant was finished, the company officials estimate that the cost of production would be reduced by £5. a ton.

Pulverised Fuel and Efficient Steam Generation.—A paper presented by Mr. David Brownlie, B.Sc., F.C.S., A.I.Mech.E., before the Institution of Electrical Engineers last night (Thursday, December 13), gave a most detailed consideration of the whole question of the application of pulverised fuel to steam generation, more especially from the point of view of the "Lopulco" system for large water tube boilers and the efficient generation of electricity in power stations. Very extensive data were given, part of which has not before been published, relating to the pioneer large pulverised fuel-fired electricity station, the "Lakeside" station of Milwaukee, together also with a description of the River Rouge power plant of the Ford Motor Co. at Dearborn, Detroit, using pulverised fuel and blast-furnace gas, and which the author stated was the most remarkable power plant in the world. For comparison, there were given the figures of the Dalmarnock electricity station, Glasgow, one of the largest and most modern and efficient in Great Britain, of course working with mechanical stokers. The paper contained numerous statistics, figures, diagrams, and illustrations, the slides including 20 views of the Ford plant at Detroit and about a dozen of Lakeside, Milwaukee.

British Lead Mining Industry. — The directors of the Brimsdown Lead Co. state that negotiations for amalgamation with other important firms carrying on business similar to the company's own, referred to at last annual general meeting, have recently made further progress. In these circumstances the directors feel that it would be inadvisable there should be a public discussion of company's affairs until they are in a position to submit a definite proposition for the shareholders' consideration.

GERMAN FOREIGN TRADE IN CHEMICALS.

ALTERATIONS IN GOVERNMENT REGULATIONS.

A NUMBER of alterations have just been made in the conditions governing the export of chemical products from Germany. According to a notification issued by the Reichswirtschaft Minister on December 1, the following products, the export of which from Germany has hitherto been only permissible by special Government licence, may now be exported without restriction. (A selection of the more-important products only is here given): Gypsum (all forms), soda ash and soda crystals, sodium bicarbonate, caustic soda, cryolite, aluminium oxide and hydroxide, acetate and formate of lime, matches, and artificial silk.

The following products have been placed on the list of those the free exportation of which is prohibited: Lead, brass, metallic residues and oxides, radium, and meso-thorium and their salts and preparations. Modifications have also been made in the following products: Grape sugar and fruit sugar and caramelised sugar products may be exported wthout licence, provided the net weight of the consignment does not exceed 10 kilogrammes. A similar ruling as to the maximum quantity permissible for export applies also to benzol and other coal-tar hydrocarbons, anthracene and other heavy coal-tar products, salt (all grades), sodium nitrate, and ammonium sulphate.

Removal of Import Restrictions.

Unrestricted import into Germany of the following products (among others) is now allowed, until further notice: Vegetable waxes, dyewoods, kauri and other similar gums, dammar and similar gums, shellac (except ruby and bleached shellac), gum acacia, gum tragacanth, camphor, beeswax, agar-agar, wood oil, talc, borate of lime, monazite sand, pyrites, asphalt, wood tar, crude iodine, argols, citrate of lime, turpentine, and citrus fruit essential oils.

COMING EVENTS.

Oil and Colour Chemists' Association.—Meeting, **Friday, December 14,** at **7.30 p.m.,** at Birkbeck College, Fetter Lane, London, E.C. Paper: "The Colloidal Theory of Corrosion," by Dr. J. Newton Friend.

Physical Society. — Meeting on **Friday, December 14,** at **5 p.m.,** at the Imperial College of Science, South Kensington, S.W. The papers include: "X-Ray Analysis of Zinc-Copper Alloys," by Dr. E. A. Owen and G. D. Preston.

Manchester Literary and Philosophical Society (Chemical Section).—Meeting, **Friday, December 14,** at **7 p.m.,** at 36, George Street.

West of Scotland Iron and Steel Institute.—Meeting, **Friday, December 14,** at Glasgow. Paper: "The Sulphur Content of the Acid Charge," by J. H. Whiteley.

Society of Chemical Industry (Birmingham Section).—Joint dinner with the Institute of Chemistry on **Saturday, December 15,** at **7.15 p.m.,** at the Queen's Hotel.—**(Glasgow Section):** Ramsay Chemical Dinner on **Thursday, December 20,** at the Ca'doro Restaurant.

Institution of the Rubber Industry. — Meeting, **Monday, December 17,** at **8 p.m.,** at the Engineers' Club, Coventry Street, Piccadilly, W. Paper: "The Position of the Rubber Tyre Industry," by Col. Sealy Clarke.

Chemical Society.—Meeting, **Thursday, December 20,** at **8 p.m.,** at Burlington House, Piccadilly, W. 1.

Society of Dyers and Colourists (Manchester Section).—Meeting, **Friday, December 21.** Paper: "The Dyeing of Cellulose Acetate," by L. G. Laurie.

CORRESPONDENCE.

*** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

BLEACHING WITH PEROXIDES.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—We were very interested in the account of the lecture to the Society of Dyers and Colourists in London, on October 25, by Mr. I. E. Weber (chief chemist to B. Laporte, Ltd., of Luton and Bradford), given in your issue of November 2, pages 515 and 516. Mr. Weber suggests (on page 516, col. 2) that the method of making appreciable saving is to make the bleach bath not with sodium peroxide—"sulphuric acid and ammonia being used to neutralise"—but to make it with "hydrogen peroxide, using silicate of soda." On the opposite side of the same page, under the heading "Neutralising the Acidity of Hydrogen Peroxide," Mr. Weber said: "One-third the cost of hydrogen peroxide used in bleaching can be saved by neutralising with silicate of soda," instead of with ammonia. It is therefore quite illogical, in the comparison between bleaching with sodium peroxide, sulphuric acid, and ammonia on the one hand, and bleaching with hydrogen peroxide and sodium silicate on the other hand, to ascribe the improvement to the use of hydrogen peroxide as against sodium peroxide, when Mr. Weber himself shows that an even larger improvement is due to sodium silicate, as against ammonia for the final neutralisation.

We can, however, make the comparison between sodium peroxide, sulphuric acid and ammonia, and hydrogen peroxide and ammonia by using Mr. Weber's own statement concerning the savings due to the use of sodium silicate in place of ammonia. Mr. Weber says that a bleaching with hydrogen peroxide, using sodium silicate to neutralise, cost 0.9d. per lb.; therefore, a bleaching with hydrogen peroxide, using *ammonia*, would cost 1.35d. per lb., which cost can now be compared with the 1.23d. per lb., using sodium peroxide, sulphuric acid, and ammonia.

It is a fact, however, that bleachers using sodium peroxide and sulphuric acid may, and do, use sodium silicate for neutralising the acidity of the hydrogen peroxide they produce, and assuming the correctness of Mr. Weber's statement as to the advantages to be derived from the use of silicate of soda for neutralising the bath, similar results will obviously be obtained if sodium peroxide be used instead of hydrogen peroxide. The use of sodium silicate in preparing the bleaching bath is not confined to those bleachers who use Messrs. B. Laporte's hydrogen peroxide, but is the common practice of all bleachers working on products which are best bleached by means of peroxides.—Yours, etc.,

Harry Baker
(Chemist to the Castner-Kellner Alkali Co., Ltd.)

Weston Point, Runcorn, December 11, 1923.

[Mr. Baker also points out that the figure of £4,000. given by Mr. Weber as the annual saving effected by a bleacher who bleaches 6,000lb. of material per week, and who, by using hydrogen peroxide and sodium silicate instead of sodium peroxide, sulphuric acid and ammonia in his bleach liquor, cuts the costs of bleach per pound of material treated from 1.23d. to 0.9d., is erroneous. By a simple calculation, and assuming a 52-week year, Mr. Baker shows that the total saving can only be just over £400.—Ed., *C.T.J. and C.E.*]

CONCENTRATED HYDROGEN PEROXIDE.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—Referring to the article on "Concentrated Hydrogen Peroxide" in your issue of December 7, we are in perfect agreement with your contributor's opening remarks as to the value of hydrogen peroxide as a bleaching agent. We join issue with him, however, in regard to his contention that the 100 volume (30 per cent.) peroxide possesses any preponderating advantages over the usual 12 to 20 volumes.

In most technical and other applications of peroxide, the 12 or 20 volumes is considerably diluted before use, and, it is only in certain special cases that higher strengths are required. When necessary we have manufactured and supplied peroxide of 50, 100 and even 120 volumes, and are prepared to take steps to deal with any demand that may arise for these or still more concentrated solutions.

During the war, and for some time after, various Government Departments and many firms engaged in the textile and other staple trades had every reason for satisfaction that Britain was absolutely independent of foreign supplies of hydrogen peroxide as well as the raw materials necessary to its production.

It may not be generally known that the production of hydrogen peroxide is linked up with a very important series of manufactures. The chief requirement is barium peroxide, and the manufacture of this from mineral barytes and its conversion into hydrogen peroxide involves the production of a number of other barium compounds and sundry by-products for which there is an active demand for home consumption and, what is of still greater importance at the moment, for export. Moreover, as practically all the raw materials required in this industry—namely, barytes, fuel, alkali, sulphuric acid and other acids, fireclay goods, lead, iron, engineers' stores, etc., are indigenous, it follows that all disbursements in respect of such wares and for labour, direct and *indirect*, rates, taxes and all charges connected with the running and upkeep of the various works concerned, are a direct benefit to the country in which the industry is established.

In view of the existing unemployment and the desirability, for many reasons, of maintaining "key industries," we are inclined to believe that consumers of hydrogen peroxide will continue to support the home producers as loyally as hitherto.—Yours, etc., (for B. Laporte, Limited),

Luton, R. Stewart, Director.

December 10, 1923.

GLYCERINE PRICES.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I was surprised to hear that the U.K. Glycerine Producers' Association confirmed your price of £60. per ton for the crude product as correct. I take it that this price refers to crude soap-lye glycerine, 80 per cent., and if so, might I inform you that there is no such price for that quality of glycerine? After all, the Glycerine Association are not the only sellers of glycerine in this country, and I take it that the purpose of your quotations in your review is to inform readers as to the prices at which they are in a position to buy either crude soap-lye, 80 per cent.; crude saponification, 88 per cent.; and dynamite glycerine.

The price of crude soap-lye glycerine to-day, delivered in this country, would be £50. per ton, drums included; that of crude saponification, 88 per cent., B.S.S., £55. 10s.; and dynamite glycerine, Nobel's test D21, can be supplied to any buyer in the U.K. at £74 10s. per ton, free on rail London.

If anybody in the trade likes to challenge these prices, I am prepared to take up the challenge.—Yours, etc.,

Fl. Bourgeois.

London, E.C. 3, December 11, 1923.

[Our correspondent originally communicated with us on Nov. 27 with reference to the letter from Mr. Geo. W. Phillips, of Messrs. Haller and Phillips, published in our issue of November 23, Mr. Bourgeois supported the prices as given by Mr. Phillips, and criticised our statement in the footnote to Mr. Phillip's letter. We then referred the matter to the U.K. Glycerine Producers' Association, and were assured that our price of £60. per ton for crude 80 per cent. glycerine was a correct average, although, of course, a lower price might be fixed for a large contract. The controversy appears to be between the importer of foreign material, on the one hand, and the British producer on the other. In view of present conditions of employment in this country, one's sympathies are strongly in favour of the home production.—Ed., *C.T.J. and C.E.*]

Celanese in France.—It will be remembered that some months ago it was announced that a leading Belgian artificial silk concern, the Soie Artificielle de Tubize had decided to take an interest in the manufacturing process which is being used by the British Celanese Company. At a recent general meeting of the Belgian company the chairman informed the shareholders that the extensive trials made with this new textile material had proved satisfactory. Owing to the large sale which it already enjoyed in France, he further stated that a French company with a capital of 50,000,000f. was to be constituted shortly. It was to have a producing capacity of between 3 and 4 tons per day. Lyons firms, which had taken up this article, were to have a financial interest in the undertaking.

FERTILISER NEWS.

Nitrate of Soda.—Production of nitrate in Chile continues to improve in spite of several obstacles to progress, the output for July-November, 1923, reaching about 830,000 tons, compared with 507,000 tons in the corresponding period of last year. The announcement a day or two ago, of the resignation of the Chilean Government, may give the quietus to the revenue-raising scheme referred to last week. A tax of 3 per cent. on the profits of foreign companies operating in Chile would certainly hit the nitrate industry severely. Compensation in the direction of decreased export duties could hardly have been expected in view of the Chilean Government's proverbial shortage of ready money. With regard to a remark made in this column on September 28 last about the postponement by the Chilean Government of the export duty on certain quantities of unsold nitrate, a correspondent in Valparaiso writes that this statement is incorrect. He says it is untrue that the Chilean nitrate producers, in view of the support from the Chilean Government by means of the postponement of the export duties, have shipped large cargoes of unsold nitrate to consuming markets to await sale there. All the nitrate sold since the Producers' Association started in 1919, he continues, has been sold on usual f.a.s. terms, paying duty at time of shipment, in accordance with law. Our correspondent admits, however, that a bill was elaborated and presented to Congress with a view to giving facilities in the manner stated, but contends that, like many other official projects produced by successive finance ministers from time to time, nothing further was done. At Iquique, where the strike of union workmen has considerably affected the exportation of nitrate, the Government are taking a strong hand, and non-union labour is being utilised under police protection, while a warship has been stationed in the harbour. At the oficinas labour is scarce, and 200 workmen who arrived in the Tarapaca district were immediately absorbed. Sales by the Producers' Association lately have contracted somewhat, and according to a cable from Valparaiso, dated December 6, the quantity reached only 56,000 metric quintals during the week, compared with 221,000 quintals in the preceding week, and 490,000 quintals in the week previous.

Sulphate of Ammonia.—Shipments of this fertiliser to overseas customers are rather more satisfactory, and the export market appears to be largely in the hands of the British producers. The domestic demand, however, despite the moderate increase of 1s. per ton, making the current price £14. 16s. per ton delivered to consumer's station in 4-ton lots for neutral quality sulphate having 25¾% ammonia basis, is disappointing. Even the scheduled rise in the New Year has failed to produce any great interest amounting to inquiry among the British consumers. One result of the recent election may be the defeat of the Government's proposals in the matter of assistance to agriculture, and this would undoubtedly affect the farmer very adversely. As our premier industry, agriculture is at the point where support is absolutely essential. Undersold by foreign imported produce, handicapped by high rates and transport charges, and at the present time severely hurt by the great prevalence of foot-and-mouth disease, the farmer is hardly likely to increase his costs by purchasing fertilisers, however cheap. The necessity for propaganda and education in this matter was never more pronounced than it is to-day, and there is still much to be done to convince the consumer that the judicious application of artificial manures is bound to pay. The activity of the Sulphate of Ammonia Federation is revealed in the comparison of present consumption with pre-war figures. In the United States, certain farming and cotton interests in Congress are organising with a view to securing amendment of the tariff, particularly with respect to ammonium sulphate, which they wish to have placed on the free list. At the present time, the duty amounts to about £1. per ton. British exports during November, particulars of which are available at the time of going to press, have experienced a decrease compared with the October figures, but the total for November of last year is exceeded by 5,000 tons. Last month's total amounted to 19,005 tons, valued at £227,185.

General Notes.—The output of the Alsatian potash mines during the first eight months of 1923 amounted to 613,976 metric tons, compared with 501,948 tons during the corresponding period of last year. This is equivalent to 154,399 tons of pure potash against 123,301 tons in 1922.

It is reported from Prague that the draft of a law to encourage the establishment in Czecho-Slovakia of the nitrogenous fertiliser industry is to be presented by the Minister of Agriculture. The industry is to be assisted by reducing, or temporarily abolishing, the taxation. The increasing difficulty of obtaining supplies of nitrogen fertilisers from Germany is the main reason for desiring to develop the domestic production.

The October report of the American Cyanamid Company, states that at the New Jersey plant there was no production of ammo-phos., but there was continued during the month the manufacture of certain secondary products. At the phosphate mines in Florida operations were at the rate of approximately 60 p.c. of capacity, while at the Niagara Falls plant operations were upon the basis of full capacity.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

There is every reason to believe that in the course of a month or two there will be such an increase in the local requirements of coke that the ovens will have to be worked at their fullest capacity. So far no additional furnaces have been lighted to smelt ordinary iron, but it is plain that this step will have to be taken in January. Ironmasters have secured a substantial amount of forward business and as soon as their stocks, which are already sold, are cleared they will be compelled to put more furnaces into draught. The outlook in the iron and steel trade having improved, it becomes a question whether smelters will be able to get all the coke they want from the ovens that are attached to their works or whether they will have to buy more of the dearer East Coast coke. As far as the coal trade is concerned it also is very strong, and even now the production is inadequate to meet demand. The effects of the strike at Whitehaven, when a considerable body of the miners left for the Yorkshire, Durham, and Northumberland coalfields, are still being felt. Until these men all return the production, it is feared, will remain below the figure which it should easily reach. It is perhaps unnecessary to say that the whole of the make of coke is going to the smelters of ordinary iron, and these mainly in West Cumberland. What is going to the Furness district is an insignificant tonnage. Prices are maintained, the figure to the smelter being 25s. to 26s. per ton. For export it is 35s., but only small parcels have been sent this last quarter. East Coast coke supplies fall just short of 10,000 tons.

SOUTH WALES NOTES.

(Specially Contributed.)

Business in the tinplate industry is keeping up well, and the majority of the works have sufficient orders to last for the next three or four months. Buyers seem to have difficulty in getting early deliveries, and in some quarters premiums are being offered and taken for quick dispatch. The dispute with the auxiliary workers seems to have been settled. The patent fuel workers are fully employed, and with the reduction in the price of pitch some concessions can be given to purchasers of briquettes. Export trading is fairly good. There is a good call for coke and in consequence of the good demand for all residuals, by-product plants are working better time. At several collieries further ovens and plant are being installed. The galvanising industry is keeping in a satisfactory condition, particularly in corrugated sheets. Some good business is being done with the South of Ireland, while the Colonies are taking more tonnage. During the last few days large quantities of basic slag have been consigned to home counties, and there has also been a better export movement in sulphate of ammonia.

Among the imports for the week were 30cwt. zinc ashes from Dublin, 81 tons copper precipitate, 16 tons zinc matte from Havre, 60 tons copper precipitate from Seville to Swansea; 483 tons dried asphalt from Trinidad to Newport. Among the exports were 4½ tons zinc chloride to New York, 11 tons painters' colours, 3 tons laundry blue to Buenos Ayres from Newport; and 4 tons sulphate of ammonia, 10 tons superphosphate, 1½ tons muriate of potash to Lisbon from Port Talbot.

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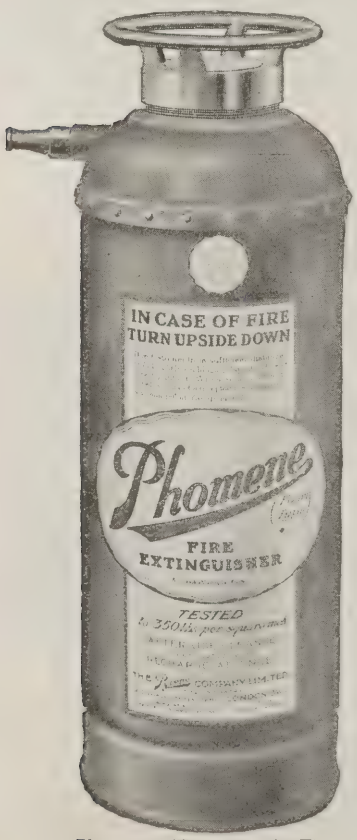

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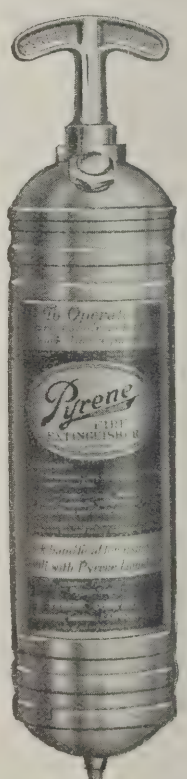
9, GROSVENOR GARDENS, LONDON, S.W. 1.
Telegrams: "Pyrenextin, Sowest, London." *Telephone: Victoria* 8592 (4 *lines*).



Pyrene Fire Extinguisher, 1 quart capacity. Weight 6lbs. Height 14ins. Diameter 3in.

THERE IS A PYRENE APPLIANCE FOR EVERY FIRE RISK

REPORTS OF COMPANIES.

Tate and Lyle, Ltd.

The report states that, after making full provision for depreciation, for the estimated liability to taxation, and for the remuneration of the managing directors, the balance-sheet and profit and loss account show a net profit of £1,759,462. for the three years' working from October 1, 1920, to September 30, 1923. Out of this net profit dividends have already been authorised on the preference and the ordinary shares for the years 1921 and 1922, absorbing £1,015,033, leaving a disposable balance of £744,429., which the directors propose to appropriate as follows: To pay the preference shareholders a year's dividend at 6 per cent., absorbing £71,500.; to pay the ordinary shareholders of Henry Tate and Sons, Ltd., at the date immediately prior to amalgamation with Messrs. Abram Lyle and Sons, Ltd., the balance distributable to them under the terms of the agreement for amalgamation; to pay the ordinary shareholders of Tate and Lyle, Ltd., a final dividend of 7½ per cent., making with the interim dividend of 7½ per cent. paid June 1, 1923, a total of 15 per cent. per annum, free of tax, on their capital of £3,312,000., £496,800., and to carry forward £38,650.

Egyptian Salt and Soda Company, Ltd.

Report for the 12 months ending August 31 states that the gross profits earned are £E52,088., deducted for general administration expenses £E6,190., interest on debentures £E2,542., leaving a net profit of £E43,356. Directors have set aside for depreciation of various factories £E9,817., and provision for eventualities £E1,400., leaving £E32,138., and £E48,808. was brought in, making £E80,947. Directors propose dividend of 7½ per cent. on share capital (1s. 6d. per share), leaving to be carried forward £E44,546.

Sulphide Corporation, Ltd.

The report for the year ended June 30 last states that the net profit, after providing £57,324. for future taxation, amounted to £220,961. From this £105,000. was paid on July 12 as an interim dividend of 10 per cent. on the preference shares and 10 per cent. on the ordinary shares, leaving £115,961. at the credit of profit and loss account. The directors now recommend that a further dividend of 5 per cent. be paid on the preference and 5 per cent. on the ordinary shares, and that of the balance of £63,461. at the credit of profit and loss account £50,000. be placed to reserve for contingencies, and £13,461. be dealt with in the next accounts.

DIVIDENDS.

Pinchin, Johnson and Co., Ltd.—At a meeting of the board of directors, it was resolved that the usual dividend at the rate of 6½ per cent. per annum, less tax, on preference shares for six months to December 31 shall be payable on January 1.

South American Copper Syndicate, Ltd.—The accounts for the year ended June 30 show an adverse balance of £20,536., which has been written off share premiums account.

British Burmah Petroleum Company, Ltd.—Final dividend of 4½d. per share, making 7½d. per share, tax free, for the year ended July 31.

British Motor Spirit Co., Ltd.—The accounts show a loss of £12,233. (against £11,050.), no dividends being received from America. A debit of £70,960. was brought forward, so that there is now a total debit of £83,193. to profit and loss.

Boots Pure Drug Co., Ltd.—Interim dividend of 9 per cent., less tax, for quarter to December 31, 1923, payable on that date.

Unemployment Decreasing.—The number of persons on December 3, 1923, recorded on the live registers of the Employment Exchanges in Great Britain was 1,194,700. This was 23,524 less than in the preceding week, and 291,178 less than the figure recorded on January 1, 1923.

LEGAL INTELLIGENCE.

UNSUCCESSFUL DEAL IN SOAP.

W. Hewitt and G. Cowen.

On December 7 the public examination was held of William Hewitt and Godfrey Cowen (lately carrying on business as Reginald Godfrey and Co.), merchants, 110, Cannon Street, E.C. The joint statement of affairs showed liabilities £10,080, of which £6,352. was expected to rank for dividend. No realisable assets were disclosed. The debtor, Hewitt, said that in January, 1917, he entered into partnership with Cowen and they began business as merchants at Bush Lane House, E.C., removing in 1919 to 110, Cannon Street, E.C. In 1919 he and Cowen entered into a contract with Gossages to take up 300 tons of soap at prices varying from £85. to £95. a ton according to quality, delivery to take place in October and November, 1919, but when delivery was tendered the partnership was not in a position to take up the soap. Subsequently, they sent 50 tons to Italy for disposal there, and 200 tons were sent to a company styled the Techno Products Trading Co. On the remaining 50 tons they paid £750. damages in respect of breach of contract. They were introduced to the Techno Co. by their bankers who knew of the position regarding the contract. Apparently, the bankers advanced the company the money to pay as follows:—60 per cent. at port of arrival, Danzig, and 40 per cent. when the soap was sold. The soap was delivered at Danzig, but the Techno Company failed to pay the balance, and afterwards went into liquidation. Gossages account was paid by debtors with moneys advanced by the bank. Debtor considered that the firm's loss on the deal amounted to £9,750. He first realised the firm was insolvent in May, 1920, when the firm particularly felt the fall in the German mark, but they had not since contracted any liabilities.

The examination of both debtors was concluded.

NEW COMPANIES.

Artificial and Real Silk Company, Ltd.—Private company. Capital £300. Solicitors: Blyth, Dutton, Hartley and Blyth, 112, Gresham House, E.C.

British Synthetics, Ltd. — Private company. Capital £7,000., in £1. shares (6,000 preference). Chemical dye manufacturers, etc. Office: Imperial House, Kingsway, W.C.

Cement and Steel, Ltd.—Private company. Capital £1,000. Metallurgists, etc. Office: 147, Fenchurch Street, E.C.

Cockson's, Ltd. — Private company. Capital £1,000. Manufacturing, wholesale, and retail chemists, druggists, etc. Office: 32, Aldersgate Street, E.C.

J. M. Huber, Ltd. — Private company. Capital £2,000. Dealers in printing and other inks, etc. Office: 69, Southwark Street, S.E.

Normanby Park Tar Supply Company, Ltd.—Private company. Capital £15,000. Tar distillers, etc. Solicitors: Coburn and Co., 5, Drapers Gardens, E.C.

Standard Varnish Works (of Great Britain), Ltd.—Private company. Capital £2,000. Manufacturers of and dealers in varnish colours, paints, etc. Office: 34-35, Norfolk Street, Strand, W.C.

Tar Surfacing, Ltd.—Private company. Capital £1,000. Office: 46, Woodhouse Lane, Leeds.

Dundalk Chemicals, Ltd.—Private company. Capital £3,000. Office: 6, Francis Street, Dundalk.

OUR BOOKSHELF.

Mechanical Stoking. David Brownlie. London: Sir Isaac Pitman and Sons, Ltd.; 5s.

A liberally illustrated account of the various types of mechanical stoker in modern use, together with much information concerning their characteristic details and general efficiency. A useful account for all who are contemplating the overhaul of their boiler plant.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Brookhouse, Johnson, Ltd., Derby, cement manufacturers. —Registered November 27, deb., to Westminster Bank, Ltd., securing all moneys due or to become due to the bank.

Clement and Johnson, Ltd., London, W.C., chemists.—Registered November 27, £100., £200., £100., £200., and £100. debs., part of £60,000.

Cornish Meledor China Clay Company, Ltd., London, E.C. Registered November 22, £10,000. deb., to D. G. Collins, 118, Newgate-st., E.C., and others.

Wyke Dyeing Company, Ltd. — Registered November 26, £5,000. debs. (secured by Trust Deed dated November 23, 1923).

SATISFACTIONS.

Brooksbank (E.) and Co., Ltd., Manchester, soap makers. Satisfactions registered November 28, £12,000., registered December 5, 1908; and all moneys, etc., registered July 30, 1923.

India Rubber Gutta Percha and Telegraph Works Company, Ltd., London, E.C.—Satisfaction registered November 23, £250,000.; registered March 10, 1922.

Reynolds and Branson, Ltd., Leeds, chemists.—Satisfaction registered November 24, £1,250.; registered April 28, 1919.

Welsh Silica Company, Ltd., Connahs Quay. — Satisfactions registered November 22, £250., part of amount registered November 18, 1919, and £1,000., part of amount registered December 11, 1919.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Blunt, W. H., and Son, 69 and 70, Snow Hill, Birmingham; manufacturing chemists; £25. 19s. 3d. October 22.

Ex-Service Polish Company, 530, Ashton New Road, Clayton; polish manufacturers; £16. 14s. 10d. October 30.

Isis Chemicals and Dyes, Ltd., 87, Bishopgate, E.C.; £42. 18s. October 11.

Rockcastle Chemical Company, 94, Market Street, Manchester; £52. 4s. 7d. October 22.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Australia.

A Melbourne manufacturers' agent and importer and exporter desires to obtain the representation of British manufacturers of raw materials used in Australian industries such as aluminium, chemicals, oils, colours, tanners' supplies, etc. (Ref. No. 600.)

A Melbourne manufacturers' agent and importer and exporter is prepared to accept buying commissions for Australian products, such as tallow, etc., on behalf of British importers. (Ref. No. 601.)

Norway.

A firm of commission agents in Christiania desire to secure the representation for Norway of British manufacturers of lead sheets and tubes. (Ref. No. 618.)

Egypt.

Tenders are invited for the supply of miscellaneous drugs, chemicals, etc., required by the Egyptian Department of Public Health during 1924-25. Tenders will be received by the Director of Stores, Department of Public Health, Cairo, up to January 14, 1924. (Ref. No. 11,945/F.E./G.C.)

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

November 26 to December 1 (inclusive).

Adhesive Paste from Rubber Latex. Braund, E. T., and Peachey Process Co., Ltd. 29,925.
Cyanide Compounds. Bredig, G., and Elod, E. 30,305.
Oxidation of Naphthalene. Coke, B. E., and Maxted, E. B. 29,800.
Oxidation of Aromatic Hydrocarbons. Coke, B. E., and Maxted, E. B. 29,801.
Fertiliser and Insecticide. Duckworth, H. H., and Illingworth, C. 30,047.
Dyeing Cellulose Acetate. Frank, G. H., and British Dyestuffs Corporation, Ltd. 30,186.
Albumen Products. Haco Ges. Akt.-Ges. Bern. 30,193.
Albumen Dyestuff Compounds. Haco Ges. Akt.-Ges. Bern. 30,202.
Dyes for Dyeing Cellulose-acetate Products. Hall, A. J., and Silver Springs Bleaching and Dyeing Co., Ltd. 29,797.
Vat Dyestuff. Imray, O. Y. (*Soc. of Chemical Industry in Basle*). 30,102.
Hydrogen or Gases containing Hydrogen. Johnson, J. Y. (*Badische Anilin- and Soda-Fabrik*). 29,748.
Electrical Precipitation of Suspended Particles from Gaseous Fluids. Lodge-Cottrell, Ltd. (*Metallbank-und Metallurgische Ges.*). 30,063
Insecticides. McDougall and Yalding, Ltd. 30,304.
Hypochlorites. Mathieson Alkali Works, Inc. 29,972.
Synthetic Cocaine. Merck, E., [Firm of]. 30,087.
Alkyl Resorcinols. Sharp and Dohme, Inc. 29,970.
Aralkyl Resorcinols. Sharpe and Dohme, Inc. 29,975.
Vertical Evaporators. Soc. Anon. Appareils et Evaporateurs Kestner. 29,784.
Acetyl Cellulose. Stevenson, W. J. 29,737.
Metal Oxides. Wiskemann, Smith, and Co., Ltd. (*Plantz*). 29,766.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1*s. in stamps to the Comptroller, Patent Office Sales Branch,* 25, *Southampton Buildings, Chancery Lane, W.C.*

1922.

Paints and Varnishes. Lytton, E. 13,958. **207,209**
Separating Dissolved Substances for Crystallisation. Marsh, H. S., and Cochran, R. S. 19,738. **184,166**
Recovery of Caustic Soda from Mercerised Fabrics. Farrell, E. 20,100. **207,224**
Iron and Titanium Compounds from Titanium Ores. Gardner, D., and Taverner, L. 22,728. **207,247**
Treating Liquids with Chemical Reagents. Paterson, W. 23,063. **207,267**
Oil Colours and Printers' Inks. Plauson's (Parent Co.), Ltd. (*Plauson Dr. H.*). 23,262. **207,275**
Paper from Peat. Plauson's (Parent Co.), Ltd. (*Plauson, Dr. H.*). 28,327 **207,337**
Imitation Gutta-percha and Leather Hydroloid, Ltd. (*Exportingenieure fur Papier und Zellstofftechnik Ges.*) 29,056. **207,352**
Liquid Fuel Mixtures containing Alcohol. Loriette, P. 30,106. **188,336**
Distillation. Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd., and Morgan, J. S. 31,012. **207,366**

1923.

Distillation of Solid Materials. Piron, E., and Caracristi, V. Z. 7,997. **207,460**
Active Charcoal. Farbenfabriken vorm. F. Bayer and Co. 8,119. **195,390**
Vat Dyestuffs from Anthraquinone. Imray, O. Y. (*Soc. of Chemical Industry in Basle*). 11,617. **207,476**
Producing Intimate Mixture between Gases and Liquids. Farbenfabriken vorm. F. Bayer and Co. 15,547. **199,718**
Sulphonation of Fatty Substances of Animal Origin. Guilleminot, P. L. 16,479. **199,743**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Purifying Gases. Koppers Co. 780. **207,488**
Oxalic Acid. Bhopal Produce Trust, Ltd. 1,775. **207,489**
Formaldehyde Condensation Products of Aliphatic Amines. Naugatuck Chemical Co. 19,595. **207,499**
Re-activating Adsorption Media. Naamlooze Vennootschap Montaan Metaalhandel. 29,591. **207,547**
Vat Colouring Matters. Kalle and Co. Akt.-Ges. 29,730. **207,553**
Titanic and Zinc Compounds. Pipereaut, P., and Helbronner, A. 29,774. **207,555**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Cellulose Products. H. Dreyfus, London. British Patent **205,195**, of 1922.

Trichlor-tertiary butyl alcohol is employed as the solvent or plastifying-agent in the preparation of celluloid-like materials, dopes, varnishes, films or sheets, etc., from methyl, ethyl, benzyl or other ethers of cellulose.

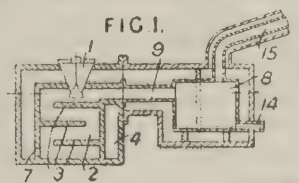
Producing Colloidal Dispersions. J. W. Hinchley and Plauson's (Parent Company), Ltd., London. British Patent **205,220,** of 1922.

In a process for the dispersion of a solid in a liquid medium, the mixture is subjected to disintegration substantially entirely by shearing of the liquid, and dispersion of a solid or liquid in a liquid medium is effected by shearing between members moving with a relative velocity of 6,000 feet per minute or over. The apparatus employed consists of two preferably apertured surfaces in very close proximity, but not in actual contact, and the relative movement may be rotary.

Refining Sulphur. C. S. Robinson, Cape of Good Hope, South Africa. British Patent **205,141,** of 1922.

To obtain sulphur free from the impurities which prevent satisfactory combustion, the sulphur is volatilised from materials containing it in the free state, the necessary heat being provided by the combustion of the minimum proportion of the sulphur. Preferably the sulphur-containing material is maintained in continuous motion counter-current to the gas for effecting combustion. In an example, the crude sulphur is fed by the device 1 into a chamber 2, provided with shelves 3 over which it travels in counter-

FIG.1.



current to an air-supply entering from the flues 4 within the walls of the chamber by an opening 7. The volatilised sulphur passes by way of a passage 9 to a condensing chamber 8 also air-jacketed and fitted with a condenser 15. By passage through the jackets the air-supply is pre-heated. Molten sulphur is tapped off by a pipe 14. If the plant is associated with a sulphuric acid plant, the jackets may be omitted. Instead of the above described apparatus, ordinary sulphur burners, such as the Herreshoff or Wedge furnaces, may be employed, but in all cases a condenser must be fitted.

Casein Distempers. H. O. Weller, London. British Patent **205,262,** of 1922.

In distempers of the kind comprising casein and slaked lime, waterproofing qualities are conferred by adding slaked lime in excess of that required to combine with the casein, together with a balsam or gum-resin and a fatty acid of high molecular weight. There may also be added alkali fluorides, phosphates, arsenates, sulphites or borates to act as antiseptics, etc. The usual extenders and pigments are employed. In an example, 8 parts by weight of casein, 2 parts of slaked lime, 40 parts of powdered chalk, 4 parts of lithopone, 4 parts of "gum thus," 1 part of stearic acid, and 1 part of sodium carbonate are mixed with 64 parts of water.

Synthetic Resins. G. Petroff, Moscow. British Patent **205,167,** of 1922.

In the production of phenol-formaldehyde condensation products, the initial condensation, carried out with a portion only of the total formaldehyde necessary for the complete reaction, is conducted under reduced pressure in the presence of coal-tar or mineral oils, or both, with or without emulsifying agents such as aromatic sulphonic acids of high molecular weight, sulphonated castor oil or alkali metal salts of the oxyacids obtained by the oxidation of drying oils. The barium, calcium, or strontium derivatives of phenols may be present as catalysts.

Drying-agents. P. S. Moyer, Chicago, U.S.A. British Patent **205,173,** of 1922.

A dehydrating composition moulded into a brick consists of inorganic porous material such as infusorial earth, a fibrous heat resistant such as asbestos, calcium chloride, or similar hygroscopic substance, lime or the like for neutralising acids, and a gas absorbent such as charcoal. Alternatively, it may consist of non-fibrous moisture absorbing material, hygroscopic material, and fibrous binding material, for example, infusorial earth, calcium chloride and asbestos. The ingredients are intimately mixed and moistened to form a paste which is moulded into bricks, cakes, wafers, etc., and dried by baking. After use, the bricks, etc., may be restored to the original condition by baking, etc.

Sulphur Dioxide. C. R. Houseman, North Wembley; and British Oxygen Company, Ltd., Upper Edmonton, London. British Patent **205,224,** of 1922.

Sulphur dioxide is produced by burning a film of sulphur in oxygen in such manner that the film of sulphur is kept in contact with the gases after passing the point at which the oxygen is supplied, while heat is removed so that fumes of sulphur vapour are avoided. The apparatus shown comprises a drum A which rotates so as to dip into molten sulphur D in a casing C, the space x at the top between the casing and drum being narrow. Oxygen is supplied by

FIG.1.

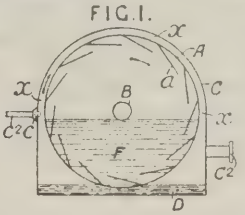
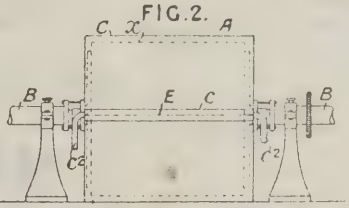


FIG.2.



pipes c^2 and escapes by a long slit or row of perforations E, the supply pipe being covered by a cover c. A cooling agent such as water F is provided inside the drum A, which is provided with vanes a to facilitate the cooling effect. Vapour generated within the drum escapes through the hollow shaft B upon which it is mounted. The sulphur dioxide escapes by a pipe C^2. The speed of rotation of the drum is arranged so that the film of sulphur is just molten when it reaches the liquid sulphur again. The sulphur dioxide may be purified from sulphur trioxide by passing it over carbon.

Diaminoanthraquinone. O. Y. Imray, London. (Soc. of Chemical Industry in Basle, Basle, Switzerland.) British Patent, **203,051,** of 1922.

2:3-Diaminoanthraquinone is obtained by heating 2-amino-3-bromanthraquinone in a closed vessel with ammonia or a liquid containing ammonia; aqueous and alcoholic solutions are mentioned; a catalyst such as a copper compound may be present.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Ammonia Synthesis. Norsk Hydro-Elektrisk Kvaelstofaktieselskab, Christiania. British Patent **205,477.** Convention date, October 12, 1922.

The mixture of hydrogen and nitrogen to be used in the catalytic synthesis of ammonia is freed from impurities by treatment with a solution of an alkali or alkaline earth metal in liquid ammonia. Oxygen, water vapour, carbon dioxide, carbon monoxide and the like are thereby eliminated. According to the examples, the mixture of hydrogen and nitrogen is passed at a temperature of −20° C. and a pressure of 100 atmospheres through a solution of sodium in liquid ammonia, or at a temperature of 20° C. and a pressure of 150 atmospheres over calcium ribbon kept moist with liquid ammonia.

Fire-Extinguishing Agents. J. L. Fohlen, Paris. British Patent **205,110.** Convention date, October 7, 1922.

Halogen hydrocarbons, as carbon tetrachloride or perchlorethylene, used for fire-extinguishing, have added to them ammonia, an amine, aniline, or an organic base, or a compound or derivative of these substances in order to prevent formation of poisonous gases as phosgene. Ammonia may serve also to project the liquid.

Pure Salt from Electrolysis of Brine. E. G. R. Angel, Hudiksvall, Sweden. British Patent **205,103.** Convention date, October 6, 1922.

In the separation of sodium chloride from the caustic soda lyes obtained by the electrolysis of brine by evaporation, the evaporation is interrupted when the specific gravity reaches 1.25—1.3 and the coarse crystals of salt are separated and washed. The evaporation is then continued to remove the remainder of the salt which is in the form of fine crystals that cannot be washed satisfactorily. These fine crystals, without washing, are added to fresh liquor to be evaporated, and dissolve in it so that the contained alkali is not lost, and coarse crystals are again separated during the evaporation of this liquor to a specific gravity of 1.25—1.3 as above described. Alternatively the alkali liquor is evaporated in the usual manner in one stage, and the fine crystals of salt which separate are added to pure saturated brine which is then slowly evaporated, when the small crystals grow to a larger size to ensure that the salt separated shall be pure, the brine used for the electrolysis should be purified by adding sodium carbonate (or caustic soda and carbonic acid) and then tri-sodium phosphate. One of the claims is for a process in which crude salt is used to prepare the electrolyte, and pure salt is separated by the evaporation of the alkali liquor.

Sulphur Dyestuffs. Soc. of Chemical Industry in Basle, Basle, Switzerland. British Patent, **201,540.** Convention date, July 28, 1922.

Monosulphonic acids of 1-monoalkylamino-4-p-oxyarylnaphthylamines are prepared by treating an indophenol from a monoalkyl-α-naphthylamine and *p*-aminophenol with a salt of sulphurous acid. Sulphuretted dyes which dye cotton in green shades are obtained by heating the above-described sulphonic acids with polysulphides in the presence of copper.

Distilling. A. Cabrier, Florence, Italy. British Patent, **201,935.** Convention date, August 5, 1922.

Liquors obtained in gas works, such as tar, oils, washing liquors, ammoniacal liquors, etc., are distilled in a long tubular retort placed either in the main flue leading from the furnaces of the gas producers to a stack or in a branch flue. The retort is of rectangular cross section and is formed preferably of two U-bars welded together. Liquid is supplied through a siphon tube and flows in a thin layer through the still. Residual liquid is withdrawn through another siphon tube. Vapours pass along a pipe of undulating form the lower points of the bends of which are connected by siphon discharges to receiving vessels in which the distillates collect.

Sulphonated Oils. P. L. Guilleminot, Chantilly, Seine-et-Oise, France. British Patent, **199,743.** Convention date, June 26, 1922.

Animal oils are sulphonated in the presence of a metal of the iron group or an alloy or compound thereof. According to the example, iron filings are suspended in fish oil and concentrated sulphuric acid added while stirring; when the reaction is complete, water is introduced and the product neutralised, if desired, and washed. The sulphonated animal oils are useful in tanning, dyeing and soap manufacture.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—Business has been very restricted during the past week. Prices, however, are being maintained, and the general tone of the market is quite steady. One or two items show a tendency to advance, particularly those usually imported from the Continent. **Acetic Acid,** 80% technical, £47.; 80% pure, £48. 10s. to £49.; 98% glacial, £60. in casks and about £73. in glass demijohns, ex wharf London; prices quoted by spot holders are kept very steady, and the market has a rising tendency; business has again been satisfactory. **Acetone,** British Government specification, about £124. per ton; this product keeps very steady on spot, with supplies always limited. **Alum,** lump, £10. to £10. 10s. per ton, in casks; prices are fully maintained, with business still slow. **Arsenic,** Cornish white powdered, £68. per ton, spot; prices are fully maintained on a firm market; supplies are scarce, while there is good inquiry from America, but they have not reached our price. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; at this time of year the demand is slow. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; there is only a small call for this product, and prices are steady. **Barium Chloride,** 98—100%, £14. 10s. to £15. per ton; buying is restricted to small quantities; prices are firm as quoted. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P. crystals, about 1s. 4½d. per lb., less 5%; the demand for the spot supplies offering remains very poor; market weak. **Cream of Tartar,** B.P., 99—100%, 86s. to 87s. 6d. per cwt., less 2½%; dealers are quoting at about these figures, and slightly less for good quantities; the demand is limited. **Epsom Salts,** commercial quality, about £4. 15s. per ton, in bags; dealers continue to quote close up to this figure, but business is not at all brisk. **Formaldehyde,** 40% volume, £64. to £65. per ton; spot supplies are quoted at about these figures, but any business would probably be at slightly cheaper rates. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; business remains slow and small; dealers quoting at these unchanged rates. **Lead Acetate,** brown, about £43.; white, £44. per ton; spot supplies are perhaps a little freer, but are still restricted; demand limited; market firm; Continental rates dearer. **Litharge,** imported, about £37. 10s. per ton, on spot; dealers are finding a little business at about this figure. **Lithopone,** 30% Continental red seal, £23. to £24. per ton; dealers offering spot supplies are finding a fair volume of business; the market is very steady. **Ammonium Chloride,** grey galvanising, £31. to £31. 10s. per ton; as the spot supplies are cleared prices are gradually hardening here, with the market very firm. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at these figures. **Oxalic Acid,** about 5¾d. per lb.; dealers' prices are unchanged on the week, and market remains dull. **Carbonate of Potash,** 90—92%, about £25. to £26.; 96—98%, £28. to £28. 10s. per ton; dealers' prices are firmer this week, and tend to advance to the higher figures quoted; supplies are now limited. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; this market is very steady, although there is little doing. **Caustic Potash,** 88—92%, solid, fully £33. per ton; prices have advanced here, and the market tends to go still higher in values; spot supplies appear to be limited. **Permanganate of Potash,** commercial quality, about 9d. per lb.; dealers' prices are firm at this figure; the demand has been fairly good. **Prussiate of Potash,** yellow, about 10¼d. per lb.; dealers offering British material continue to quote at this figure, but the demand is only for

small quantities. **Sulphate of Potash,** 90%, £11. per ton; the market shows no change on the week. **Mercury,** about £9. 17s. 6d. to £10. per bottle of 75—76lb.; dealers are quoting at about these figures, but business has not been of any great volume. **Red Lead,** imported, about £37. 10s. per ton, on spot; dealers are offering at about this figure, with some little business being done. **Salammoniac,** dog-tooth crystals, fully £50.; medium, £44. to £45.; fine white crystals, £28. to £29. per ton; spot supplies are offering at about these figures, and a fair volume of business has been done; the market is firm. **Saltcake,** ground and unground, about £4. 10s. per ton, delivered, for home trade; this price is likely to be maintained up to the end of the year. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; merchants are offering at about these prices, with still but small inquiry. British makers' prices for domestic consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; British makers continue to quote at this figure for home trade only, carriage paid. **Bichromate of Soda,** home trade, about 4½d. per lb.; British makers' offering at this figure; dealers are offering foreign material at slightly easier rates. **Cyanide of Soda,** export, about 8d. to 8½d. per lb.; British makers' prices are unchanged on the week. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in bags; British makers continue to quote at this price for home home trade only, packages free, carriage paid to destination; their prices for export vary as to destination. **Hyposulphite of Soda,** pea crystals, about £15. to £15. 10s. per ton; commercial quality, £10. to £10. 10s. per ton, in casks; dealers' prices are firm at these rates, and the market tends to harden. **Nitrate of Soda,** 96%, £13. 5s. per ton, f.o.r. or f.o.b.; this market is steadily maintained at unchanged values. **Nitrite of Soda,** 100%, £28. 10s. per ton; the higher prices quoted last week are steadily maintained. **Prussiate of Soda,** about 5½d. per lb.; dealers offering British material continue to quote at about this figure, with business slow. **Sodium Sulphide,** 60—62%, solid, £14. 10s.; broken, £15. 10s. per ton, in drums; dealers' prices are at about these figures, with the market dull. **Tin Crystals,** about 1s. 3½d. per lb.; prices quoted are level on the week. **Tartaric Acid,** B.P. crystals, about 1s. 1½d. per lb., less 5%; there is still but little demand for the spot supplies offering, the market remains weak. **White Lead,** imported, about £41. to £42. per ton, in spot; dealers are doing a little business at about these figures. **Zinc Oxide,** B.P., £52.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers continue to quote at about these figures.

Pharmaceutical Chemicals.—The few alterations in prices are all moves to still higher spot values. Throughout this market is very firm, and there is no sign of a break. Supplies in some items are now at a low level. Business continues to be quite satisfactory. Except for further advances in spot values, no material change is looked for up to the end of the year. **Acetanilid,** crystals and powder, 3s. 3d. to 3s. 6d. per lb.; the spot position stands firm, and prices are moving up to the higher prices quoted; supplies are very short. **Acetyl-Salicylic Acid,** B.P., 3s. 9d. to 3s. 11d. per lb.; business is well sustained, and prices as quoted govern a firm market. **Benzoic Acid,** B.P., 4s. to 4s. 3d. per lb.; owing to acute shortage and continued refusal of the Board of Trade to grant import permits, the price of this product is being forced up. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. 9d. to 19s. per lb.; although in but little demand, prices are firmer here. **Salicylic Acid,** B.P., 2s. 6d. per lb.; at unchanged values on the week, this market keeps very steady. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; inquiry is limited, and the market is steady. **Amidopyrin,** about 15s. per lb.; there is still little doing here, but values are steady. **Ammonium Bromide,** B.P., 9d. to 10d. per lb.; this market is irregular on spot quotations. **Benzonaphthol,** about 5s. per lb.; the market is neglected; dealers quote at unchanged rates. **Betanaphthol,** resublimed, about 2s. 6d. per lb.; this figure is quoted on a steady but quiet market. **Benzaldehyde 03,** 3s. to 3s. 3d. per lb.; prices are gradually firming up to the higher figure quoted. **Calcium Lactate,** about 2s. 6d. per lb.; the market is quite steady, but remains quiet. **Chloral Hydrate,** duty paid, 4s. 3d. per lb.; very little spot material is offering below this figure; the tendency is for higher prices. **Creosote,** B.P., about 2s. 6d. per lb.; dealers continue to quote at this figure, but business is only occasional. **Creosote Carbonate,** about 8s. 3d. per lb.; the call for this product keeps very small. **Guaiacol Carbonate,** about 14s. per lb.; the spot position is fully maintained at this value, with material offering limited. **Hexamine,** fully 4s. 6d. per lb.; spot values are well maintained here, and inquiry has again been good. **Hydroquinone,** 4s. to 4s. 3d. per lb.; the market is now steady at these values, but business is slow. **Methyl Salicylate,** 3s. to 3s. 3d. per lb.; there is a firmer tone here, and spot values are moving up to the higher figure quoted. **Methyl Sulphonal,** about 25s. per lb.; dealers are quoting close up to this figure. **Paraformaldehyde,** about 3s. 9d. per lb.; the spot position is very steady at this figure, and business has been fair. **Paraldehyde,** 1s. 7d. to 1s. 8d. per lb.; dealers are offering at these prices, with occasional business passing. **Phenacetin,** about 8s. per lb.; holders of spot supplies are looking for this figure; market steady. **Phenazone,** fully 8s. 9d. per lb.; supplies offering on spot are not large; demand is fairly brisk; market firm. **Phenolphthalein,** 8s. 6d. to 8s. 9d. per lb.; the little material available is fully worth the figure mentioned. **Potassium Bromide,** B.P. crystals and granular, about 8d. per lb.; prices are a little easier this week, but the market is now very firm, and may advance. **Potassium Permanganate,** B.P., about 9½d. to 9¾d. per lb.; a good deal of inquiry has been dealt with, and at the prices quoted the market is very steady. **Potassium Sulphoguaiacolate,** about 7s. per lb.; business remains quiet, with quoted values unchanged. **Resorcin,** about 6s. 6d. per lb.; spot offers are close up to this figure, with a fair inquiry on hand. **Salol,** 4s. 3d. to 4s. 6d. per lb.; this item keeps very steady, and good business has been done. **Sodium Benzoate,** 3s. 3d. to 3s. 6d. per lb.; nominal; it is difficult to any spot supplies. **Sodium Bromide,** B.P., crystals and granular, 9d. to 9½d. per lb.; the spot position has steadied up at this slightly easier figure, and the market is now firm, with a rising tendency. **Sodium Diethylbarbiturate,** about 20s. per lb.; higher prices are being quoted this week, and any business passing is close up to this figure. **Sodium Salicylate,** B.P., crystals, 3s. to 3s. 1d.; powder, about 2s. 11d. per lb.; dealers holding spot supplies are firm at these rates, with a fair volume of business passing. **Sulphonal,** about 20s. per lb.; the spot position shows no change on the week; business has been slow. **Terpin Hydrate,** about 1s. 9d. per lb.; this item keeps very steady, with business fairly good. **Vanillin,** 100%, about 26s. 6d. to 27s. per lb.; rather higher prices are being quoted here, with the market steady.

Coal-tar Products, Etc.—Pitch continues to fall in value, with the market still very quiet. Carbolic-acid crystals are also on the downward grade. Other products show little or no change. Business throughout has been limited in volume. **Anilin Oil,** 9d. to 9½d. per lb., naked, ex works; this item is steady, with the demand slow. **Aniline Salt,** 9½d. to 10d. per lb., naked, at works; prices show no change on the week; market quiet. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; prices are rather unsteady, with demand poor. **Benzol,** crude 65's, 8d. to 10d. per gallon; standard motor, 1s. 1d. to 1s. 4d.; pure, 1s. 6½d. to 1s. 8d. per gallon, in tank wagons; British makers continue to quote at these prices. **Carbolic Acid,** crystals, 11½d. per lb.; a further reduction in price is recorded this week, with the market still neglected. **Cresylic Acid,** 97—99%, 2s. per gallon; makers are offering at about these figures, but business is still quiet. **Toluol,** 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; the little business about would probably be at slightly easier rates than that quoted. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon; this item is unchanged in value on the week, with the market quiet. **Creosote Oil,** 9¼d. per gallon, f.o.b.; dealers are offering at this figure, with the demand only occasional, and limited in volume. **Naphtha,** crude, 8½d. to 8¾d. per gallon; there has been little doing here, and quoted rates are unchanged. **Solvent Naphtha,** 90/160, 1s. 2d. to 1s. 3d. per gallon; inquiry has been moderate, and prices are steady. **Heavy Solvent Naphtha,** 90/190, 1s. 2d. per gallon; there has been but small inquiry here; market rather unsteady. **Naphthalene,** £19. 10s. per ton; dealers are quoting at this figure on a dull market; values are not firm. **Pyridine,** 22s. to 23s. per gallon; owing to scarcity of supplies values tend to move up to the higher figure quoted. **Hexamethylene,** 3s. 9d. to 4s. per gallon; dealers holding spot supplies are firm at these rates. **Pure Methyl Alcohol,** £90. per ton in drums, ex wharf London; this article is fully maintained on spot, and the market tends to advance. **Pitch,** about 110s. per ton, f.o.b. East Coast; a further big decline in value is recorded, and as quoted the market is far from steady; business has again been very

poor indeed. **Wood Tar**, £4. 15s. to £6. per ton, according to quality; values are level on the week.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £62. 5s. to £62. 7s. 6d., cash; £63. to £63. 2s. 6d., three months; electrolytic, £67. 10s. to £68. **Tin**: Standard, £237. 5s. to £237. 10s., cash; £238. 10s. to £238. 15s., three months; Straits, £239. 5s.; English, £238. 5s. **Lead**, soft foreign, £31. 7s. 6d., prompt; English, £32. 10s.; chemical sheet, 37s. per cwt. for 2-ton lots, delivered. **Spelter**, prompt £32. 7s. 6d.; hard, £27. **Antimony**, English regulus, 99%, £36.; special brands, £44. to £44. 10s. **Aluminium**, 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel**, £130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 12s. 6d. to £9. 17s. 6d. **Bismuth**, 10s. **Platinum**, £29. per oz.; scrap, £27. **Wolfram**, spot, 12s. per unit, c.i.f. U.K. or Continent. **Zinc Dust** has shown much increased activity; Beaver brand, 90—92%, £48.; American, 92—94%, £48.; Continental, 83—88%, £42. to £46. per ton, delivered.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand for heavy chemicals during the past week has again been on the dull side, and values all round are easy. For alkali products the prices have now been fixed for 1924 contracts on the same basis as this year, with the exception of 58 **Alkali**, which is not yet settled. **Bleaching Powder** is reduced by 5s. per ton to £10. per ton, carriage paid 4-ton lots. Roasted **Saltcake** remains at £4. 10s. per ton, carriage paid. **Chlorates** are firm at 3d. per lb. **Bichromates** unaltered. **Sulphate of Copper** only moves off slowly, and quotation nominal at £25., f.o.b. Imported **Sulphur**, steady at £5. 5s. on rails. **Phosphate of Soda**, £14. 10s. per ton. Commercial **Hyposulphite of Soda**, £9. 10s. on rails. **Nitrite of Soda**, higher at £28. 10s., ex store. **Glauber's Salt**, weak at 70s. per ton, carriage paid. White powdered Cornish **Arsenic**, firm at £69. per ton, delivered. Yellow **Prussiates** are weak; **Potash** at 9½d., and **Soda** 5¼d., per lb., delivered Prices for **Carbonate** and **Caustic Potash** are well maintained at recent advance. **Barium Chloride**, steady at £14. 10s. per ton **Acetic Acid**, in steady inquiry. **Acetate of Soda**, quiet at £24., delivered. Grey and brown **Acetate of Lime** continue in short supply. Miscible Wood **Naphtha**, lower at 5s. 6d. per gallon. **Acetone**, unchanged at £124. per ton. **Formaldehyde**, 40%, easy at £63. per ton. **Lead Salts** are scarce, and quotations firm: White **Acetate** £46., brown £45.; **Nitrate**, £44., delivered. Green **Copperas** in good inquiry, and stocks are low. **Oxalic Acid**, dull at 5¾d. per lb. **Permanganate of Potash**, commercial, 8½d. to 9d. per lb., delivered

SWANSEA MARKET REPORT. Wednesday.

Tinplate prices were very firm on the basis of £1. 3s. 6d. per standard box, f.o.b. **Galvanised Sheets**, in fair demand at £19. 2s. 6d. **Copper**, firmer at £62. 7s. 6d. per ton cash, and £63. 2s. 6d. three months. **Tin**, easier at £230. 7s. 6d. per ton prompt, and £231. 7s. 6d. three months. **Lead** very firm. with soft prompt at £31. 2s. 6d., and forward £30. 7s. 6d. per ton; English, £32. 2s. 6d. **Spelter**, easier at £32. 7s. 6d. prompt and £32. 12s. 6d. per ton three months. **Zinc Sheets** in fair demand at £39. 7s. 6d. per ton. **Pitch** better sought after, and small business transacted at £5. 17s. 6d. up to £6. 2s. 6d. per ton, delivered docks. **Creosote** very active; 9¼d. per gallon, on rail at works. **Tar** in good call at about £1. 13s. 6d. per 40-gallon cask for refined, and crude £4. to £4. 12s. 6d. per ton, f.o.r., at ovens. **Sulphate of Ammonia** very steady, with home prices at £14. 16s. per ton. **Sulphate of Copper**, dull at £25. 7s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda** quiet, with prompt at £13. 7s. 6d., and forward £13. 12s. 6d. per ton. **Bone Meal** met with poor demand, with Indian at £9. 2s. 6d. per ton. **Seed Oils** not so active, with raw **Linseed**, prompt, at £2. 5s. 3d., and boiled £2. 7s. 3d. per cwt., in barrels, net. **Cottonseed Oil** firm, common edible £2. 5s. 3d., and deodorised £2. 7s. 3d. per cwt., ex ship. **Rape Oil** firm, with prompt refined at £2. 7s. 3d. per cwt., net, in barrels. **Cod Oil**, better inquiry; Newfoundland, £2. 5s. 4½d., and English £1. 13s. 3d. per cwt. **Castor Oil** scarce and dearer, with best at £3. 1s. 6d., and seconds at £3. 0s. 6d., per cwt., in barrels, prompt, and slight advances on these quotations for forward business. **Coconut Oil** in good demand, with prompt Ceylon at £2. 7s. 6d. per cwt., and forward £2. 7s. 4½d. **Olive Oil** in better demand at £66. 7s. 6d. per ton, net, ex ship. **Palm Oil**, steady demand; Lagos, £38. 2s. 6d. prompt, and £38. 7s. 6d. forward; softs, £38. 5s. 3d.; mediums, £38. 2s. 6d.; and hards, £38. 2s. 9d., all per ton at docks. **Oxalic Acid**, in little demand at 6½d. per lb., f.o.r. at works. **Arsenic** quiet, with firm quotations at £67. 17s. 6d. per ton for white powdered. **Sulphuric Acid** in good demand, with unaltered prices. **Copperas** dull at £2. 2s. 6d. per ton for 4-ton consignments, delivered London or equal. **Turpentine** quiet, with American prompt at £3. 13s. 6d. per cwt. **Coal** prices were firmly maintained, with upward tendency: Best Admiralty smokeless, £1. 9s. 6d. to £1. 10s. 6d.; seconds, £1. 8s. 6d. to £1. 9s. 6d.; ordinaries, £1. 7s.; Monmouthshire black vein, £1. 8s. 6d. per ton, f.o.b. **Anthracite**: Best large £2., seconds £1. 15s.; Paris and French nuts, £2. 12s. 6d. per ton, all f.o.b. **Patent Fuel** in good demand from £1. 9s. to £1. 11s. 9d. per ton, f.o.b. **Cokes** active at £2. 10s. per ton for export, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton, in trucks, at ovens.

LIVERPOOL CHEMICAL MARKET. Wednesday.

The demand for chemicals of the heavier class for use by the British home trade has improved slightly, the requirements from some trades, of late working on a restricted scale, having increased through the more settled labour conditions. Shipments to overseas ports have been fairly active, and continue so at date. **Bleaching Powder** has had a steady and fair inquiry for use by the home trade, and has had a moderate shipment on foreign account; it is £11. 5s. per ton for spot lots and for export; special quotations are given for contracts. **Chloride of Calcium** has been rather more in request, with a fair inquiry on export account; it is £5. 12s. 6d. per ton. **Caustic Soda** has again been in very fair demand for use in the U.K., and has had a heavy shipment; it is £19. 7s. 6d. per ton, carriage paid in Great Britain; in contracts special prices are quoted, according to requirements. **Bicarbonate of Soda** has been in good request for home-trade use, and has had a moderate shipment on export account; it is £10. 10s. per ton, in bags, carriage paid in Great Britain. **Soda Crystals** have had a steady inquiry for use in the U.K., but have been quiet in the export branch; they are £5. 5s. per ton, carriage paid, for home-trade use. **Nitrate of Soda** has been quiet, and is £13. 5s. to £13. 10s. per ton. **Borax** continues to sell steadily for use by the home trade; commercial crystals are £25. per ton, and powdered is £26; higher grades are—crystals £29. per ton, powdered £30. per ton, and superfine £31. per ton, in 2cwt. bags, carriage paid for use in Great Britain. **Saltcake** has been in rather good request, and stocks for early delivery are small; the price is £4. 10s. to £5. per ton for the home trade, and £5. to £6. per ton for export. **Bichromate of Soda** has been in slightly better request, and is 4½d. to 4¾d. per lb. **Ammonia Alkali** has been in very fair demand for home-trade use, and has had an active shipment for export; it is £7. 10s. per ton for use in Great Britain, and £8. per ton for export, varying according to destination; special prices are quoted in contracts, according to requirements. **Hyposulphite of Soda** has had a steady sale, and is £10. per ton, in 2cwt. bags, for commercial, and £15. per ton for photographic. **Sulphide of Soda** continues quiet; it is £14. 15s. to £15. 15s. per ton for solid, and £9. 2s. 6d. to £9. 17s. 6d. per ton for crystals. **Chlorate of Soda** has been very quiet, and is 3d. per lb. **Phosphate of Soda** has been inactive, and is £14. 10s. to £15. per ton. **Prussiate of Soda** has been neglected, and is 6d. per lb. **Yellow Prussiate of Potash** has been quiet, and is 10½d. to 11d. per lb. **Red Prussiate** has had a moderate sale, and is 2s. 9d. per lb. **Carbonate of Potash** has been rather more in demand, and is £25. 10s. to £28. per ton, according to test. **Nitrate of Potash** has had a steady inquiry, and is £29. to £30. per ton. **Chlorate of Potash** has been but little in demand, and is 3½d to 4d. per lb. **Caustic Potash** has had a rather good inquiry, and is £32. to £35. per ton. **Permanganate of Potash** has been quieter, and is 9d. to 9½d. per lb. **Bichromate of Potash** has been in fair demand, and is 5¼d. to 5½d. per lb. **Salammoniac** has been more inquired for, and the price has been very firm; it may be given as £56. per ton for first quality, and £53. per ton for second quality. **Sulphate of Ammonia** has had a moderate sale for use in the United Kingdom, but has had a large shipment on foreign account; prices are—neutral of 25¾% for

December, £14. 16s. per ton, and ordinary of 25¼% £13. 13s. per ton; for January neutral is £15. 2s. per ton, for February £15. 3s., and for March to May £15. 5s. per ton, ordinary being increased proportionately for use in Great Britain. **Carbonate of Ammonia** has been in good request, and is 4d. per lb. **Muriate of Ammonia** has been, but little called for; grey is £32. per ton. **Magnesia** has sold with some freedom; **Carbonate** is £2. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been in fair demand; it is £11. per ton for use by the home trade, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been rather more in request, and is £8. to £11. per ton, according to quality. **Sulphur** continues in very fair demand; flowers are £10. per ton, roll is £8. 10s. per ton, rock £8. to £8. 10s. per ton, and American £5. 10s. per ton. **Tartaric Acid** has been in moderate demand, and is 1s. 0½d. to 1s. 1d. per lb. **Cream of Tartar** has sold somewhat freely, and is £4. 6s. to £4. 8s. per cwt. **Boric Acid** has had a very fair inquiry; commercial is £48. per ton, and powdered £51.; B.P. grades are £54. to £60. per ton, carriage paid in Great Britain. **Citric Acid** has had a slow sale, and the price has shown a tendency to ease; it may be given as 1s. 5d. per lb. **Oxalic Acid** has moved but slowly, and the price has been fractionally lower; it is 6d. per lb. **White Acetate of Lead** has had a quietly steady sale; it is £44. to £44. 10s. per ton. **Sulphate of Copper** has been very quiet both for home-trade use and for export; it is £25. to £25. 10s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been more in demand; white powdered is £66. to £68. per ton.

WEST OF SCOTLAND CHEMICALS. WEDNESDAY.

The demand for chemicals has been rather quiet during the week both on home and export account. A weakening of price is to be noted in the case of copper sulphate, but brown acetate of lead has strengthened, while tartaric acid is firmer and dearer. Prices otherwise are steady at about previous figures. **Alum,** lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic,** white powdered, scarce at £70. 10s. per ton on spot; an improving market. **Barium Chloride,** £15. per ton; at this price the market remains steady; foreign imported material offered round £14. to £14. 5s. **Bleaching Powder,** quiet at £11. 5s. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid,** crystals, £48. per ton, carriage paid in the U.K., makers' prices. **Borax,** crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities competing strongly. **Calcium Chloride,** 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted below this figure. **Citric Acid,** 1s. 5d. per lb., less 5%; business a little firmer at this figure. **Copper Sulphate,** £35. 15s. per ton, less 5%; a rather neglected market. **Cream of Tartar,** £4. 1s. per cwt. for 99% at Glasgow, quotation steady, and inquiry small. **Lead Acetate,** white, dearer at £43. 15s. per ton on spot; brown, good inquiry at £45. per ton; Continental material offering at slightly cheaper rates. **Magnesium Chloride,** £3. 5s. per ton, ex store; foreign material quoted at much under this figure. **Oxalic Acid,** quiet at about 6d. per lb.; little doing at this figure. **Paraffin Wax,** 2½d. per lb.; a steady export trade. **Potassium Bichromate,** 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate,** crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate,** crystals, 1s. per lb.; at this price there is a rather better inquiry, with some export business. **Salammoniac,** first and second lump, £55. and £52. 10s. per ton respectively; crystals, £48. 10s. per ton; at these reduced quotations the market is rather inactive. **Saltpetre,** £1. 12s. 6d. per cwt., net; a better market, with price unaltered; fresh arrivals are cheaper. **Sodium Bichromate,** 4½d. per lb.; unchanged. **Sodium Chlorate,** 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate,** 7d. per lb., ex store; the spot market remains fairly steady, with but little demand. **Sodium Bicarbonate,** £9. 15s. per ton, in 2cwt. bags; £11. 5s. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic,** 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid,** 1s. 1d. per lb., less 5%, at Glasgow; the market is much firmer, with price slightly higher.

IMPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending December 8.

ALBUMEN—
Shanghai, 435 cs.

ALUMINA—
Gothenburg, 50 cks.

AMMONIA (ANHYDROUS)—
Philadelphia, 20 cylds.

AMMONIUM SULPHATE—
Marseilles, 100 bgs.

BARIUM SULPHATE (BLANC FIXE)—
Hamburg, 19 cks.

BARYTES—
Barcelona, 120 pkgs.
Bremen, 150 bgs.
Hamburg, 210 pkgs., 300 bgs.

BORON MINERAL—
Los Angeles, 6,835 sks.

CARBON BLACK—
Gothenburg, 16 cs.

CHEMICALS (*otherwise undescribed*)
Bremen, 1 ck.
Hamburg, 85 cks., 388 pkgs.

COAL TAR PRODUCTS—
Tar
Nantes, 56 cks.

CREAM OF TARTAR—
Barcelona, 19 cks.
Seville, 12 brls.

DEXTRINE—
Hamburg, 100 bgs.

DYESTUFFS (NATURAL)—
Cutch
Rangoon, 300 bxs.
Fustic
Philadelphia, 3 brls.

GLUCOSE—
Hamburg, 20 cks.

GLUE—
Antwerp, 130 pkgs.; New York, 1 cs.; Trieste, 200 bgs.

KIESELGUHR—
Valencia, 418 cs.

PARAFFIN WAX—
Philadelphia, 200 brls.

PYRITES—
Huelva, 3,300 t.

ROSIN—
Jacksonville, 3,600 brls.; Lisbon, 398 cks., 587 brls.; Savannah, 1,600 brls.; Valencia, 100 brls.

SALT—
Bremen, 1,950 bgs.
Hamburg, 1,200 bgs.

SIZE (ROSIN)—
New York, 150 brls.

SOAP—
Genoa, 247 cs.; Marseilles, 28 cs.; New York, 200 pkgs., 750 cs.; Philadelphia, 14 brls., 660 bxs.; Seville, 20 cs.

SODIUM CHLORATE—
Barcelona, 50 brls.

STEARINE—
New York, 176 brls.

SUPERPHOSPHATE—
Antwerp, 2,000 pkgs.

TALLOW—
Wellington, 3 cks.

TANNING MATERIALS—
Myrabolans
Bombay, 742 pkts.

TARTARIC ACID—
Bari, 10 brls.

TURPENTINE—
Jacksonville, 200 brls.
Savannah, 350 brls.

WAX (MINERAL)—
New York, 3 bgs.

WAX (*otherwise undescribed*)—
Hamburg, 100 bls.

WHITE LEAD—
Antwerp, 11 kgs.

ZINC OXIDE—
Antwerp, 56 brls.

GOOLE.

Week ending December 8.

BARYTES—
Antwerp, 100 bgs.

CHEMICALS (*otherwise undescribed*)
Antwerp, 4 cs.

FERRO CHROME—
Dunkirk, 21 cks.

GLUE—
Antwerp, 11 pkgs.

HYDROGEN PEROXIDE—
Ghent, 80 crbys.

POTASSIUM NITRATE—
Antwerp, 10 bgs.

GRANGEMOUTH.

Week ending December 8.

CALCIUM CARBIDE—
Christiansand, 2,320 drms.

CREAM OF TARTAR—
Rotterdam, 121 kgs.

FERRO SILICON—
Antwerp, 145 brls.
Christiansand, 63 brls.

FERTILISER (BONE)—
Antwerp, 67 bgs.

SALTPETRE—
Rotterdam, 100 kgs.

GRIMSBY.

Week ending December 8.

CHEMICALS (*otherwise undescribed*)
Hamburg, 4 cs.

KAINIT—
Antwerp, 55 t.
Hamburg, 206 t.

HULL.

Week ending December 8.

ACETIC ACID—
Rotterdam, 22 brls.

ARSENIC—
Melbourne, 100 cks.

BARYTES—
Antwerp, 50 bgs.
Bremen, 147 cks.
Hamburg, 250 pkgs.

BORAX—
Antwerp, 250 bgs.

CALCIUM CARBIDE—
Christiania, 500 drms., 80 bxs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 20 drms.

COAL TAR PRODUCTS—
Tar Oil
Kotka, 8 brls.

DEXTRINE—
Amsterdam, 20 bgs.

FERRO CHROME—
Gothenburg, 41 cks.
Hamburg, 10 brls.

GELATINE—
Rotterdam, 3 cs.

GLUCOSE—
New York, 1,080 brls.
Rotterdam, 60 cks.

KAINIT—
Antwerp, 500 bgs.
Bremen, 240 bgs.

LEAD ACETATE—
Rotterdam, 6 brls.

LITHARGE—
Rotterdam, 1 cs.

LITHOPONE—
Rotterdam, 66 cks.

OXALIC ACID—
Rotterdam, 12 brls.

PARAFFIN SCALE—
New York, 288 brls.

PARAFFIN WAX—
Baltimore, 216 bgs.

PLUMBAGO—
Bremen, 9 cks.

ROSIN—
Gothenburg, 363 brls.
Hamburg, 1 ck.

SALT—
Bremen, 100 bgs.
Hamburg, 100 bgs.

SALTPETRE—
Rotterdam, 28 bgs., 7 cks.

SOAP—
Helsingfors, 3 cs.

SODA CRYSTALS—
Baltimore, 81 cks.

SODIUM ACETATE—
Antwerp, 60 cks.

STEARINE—
Antwerp, 27 bgs.

TANNIC ACID—
Bombay, 5 cs.

TANNING MATERIALS—
Myrabolans
Bombay, 3,508 bgs.
Valonia
Smyrna, 2,312 bgs.

TARTARIC ACID—
Amsterdam, 40 kgs.

TURPENTINE—
Roga, 20 cks.

WHITE LEAD—
Amsterdam, 47 cks.
Rotterdam, 14 cks.

LEITH.

Week ending December 8.

BARIUM SULPHATE (BLANC FINE)—
Hamburg, 50 cks.

CASEIN—
Dunkirk and Rouen, 250 bgs.

CREAM OF TARTAR—
Rotterdam, 118 pkgs.

CRYOLITE—
Copenhagen, 50 bgs.

MAGNESITE—
Amsterdam, 200 bgs.

SALTPETRE—
Rotterdam, 10 kgs.

SOAP—
Copenhagen, 23 cs.
Rotterdam, 13 cs.

STEARINE—
Montreal, 5 pkgs.

TAR (WOOD)—
Rotterdam, 50 brls.

LIVERPOOL.

Week ending December 8.

ACETATE OF LIME—
Germany, 1,444 bgs.
U.S.A., 2,425 bgs.

ACETIC ACID—
Holland, 4 cks.

ALUMINIUM SULPHATE—
France, 100 sks.

ARSENIC—
France, 50 cks.
Japan, 397 cs.

BARYTES—
Germany, 34 cks.

BISMUTH ORE—
Peru, 9 t.

BONE BLACK—
U.S.A., 100 bgs.

BORAX—
U.S.A., 2,000 bgs.

CALCIUM CHLORIDE—
Germany, 125 drms.

CARBON (DECOLOURISING)—
Holland, 10 bgs.

CHROMIUM ORE—
India, 690 t.

COAL TAR PRODUCTS—
Naphthalene
Belgium, 31 bgs.

CREAM OF TARTAR—
France, 40 kgs.
Holland, 95 kgs.
Spain, 5 cks., 5 kgs., 10 brls.

DIPHENYLGUANIDINE—
U.S.A., 22 cs.

DYESTUFFS (NATURAL)—
Cochineal
Canaries, 13 bgs.
Cutch
Borneo, 500 cs.
F.M.S., 100 bxs.
Straits, 1,000 bgs.
Fustic
France, 18 cks.
Logwood
France, 70 cks.
Unspecified
France, 20 cs., 2 cks.

FERRO SILICON—
Norway, 32 t.

FERTILISER (BONE)—
India, 1,000 bgs.

FORMALDEHYDE—
Canada, 56 brls.
U.S.A., 100 cks.

GELATINE—
Belgium, 30 bls.

GLUE—
France, 20 bls.; Italy, 10 bls.

GLYCERINE—
Belgium, 168 drms.
France, 283 drms.

KAINIT—
Germany, 7,500 bgs.

KIESELGUHR—
Norway, 818 bgs.

LITHOPONE—
Holland, 24 cks.

MAGNESITE—
Greece, 600 t.

MAGNESIUM CHLORIDE—
Germany, 73 drms.

MANGANESE ORE—
India, 2,291 t.

MANGANESE OXIDE—
Germany, 1 brl.

NAPHTHA (WOOD)—
Germany, 18 drms.

OCHRE—
France, 18 cks.; India, 100 bgs.; Italy, 7 cs.: Spain, 16 cks.

PARAFFIN SCALE—
U.S.A., 1,211 brls.

PARAFFIN WAX—
U.S.A., 100 brls.

PITCH (*otherwise undescribed*)—
U.S.A., 214 drms.

POTASSIUM CHLORIDE—
Germany, 700 bgs.
U.S.A., 800 bgs.

POTASSIUM NITRATE—
Belgium, 20 bgs.

POTASSIUM SULPHATE—
Germany, 750 bgs.

PYRITES—
Spain, 1,149 t.

PYRITES (COPPER)—
Spain, 927 t.

RED LEAD—
Germany, 4 cks.

ROSIN—
France, 40 cks.
U.S.A., 1,150 brls.

SALTPETRE—
Holland, 50 kgs., 6 cks.

SIZE (ROSIN)—
U.S.A., 100 cks.

SOAP—
Canada, £169.; France, £1,300.; U.S.A., 600 brls. and £91.

SODIUM (METALLIC)—
Norway, 212 cs.

SODIUM CHLORATE—
Spain, 10 cks., 20 brls.

STEARINE—
Argentine, 69 tres.

SULPHUR—
Italy, 1,025 bgs., 20 cs.; Sicily, 200 bgs.; Spain, 1,794 t.

TALLOW—
Argentine, 781 pkgs., 297 cks.

TANNING MATERIALS—
Chestnut
France, 10 cs., 51 pkgs., 375 cks., 1,070 bgs.; Italy, 52 cs., 125 cks.
Gambier
F.M.S., 1,161 cs., 160 bgs.
Straits, 17 cs., 340 cks.
Myrabolans
India, 3,782 pkts., 2,670 bgs.
Quebracho
Argentine, 2,049 bgs.
Valonia
Smyrna, 848 bgs.
Wattle
South Africa, 35 bgs.

TAR (ARCHANGEL)—
Russia, 600 brls.

TAR (WOOD)—
Sweden, 59 brls.

TARTARIC ACID—
Holland, 10 kgs.; Italy, 50 brls.

TIN ORE—
W.C. Africa, 2 t.

VANADIUM ORE—
South Africa, 97 t.

WAX (VEGETABLE)—
Japan, 50 cs.

WHITE LEAD—
Germany, 99 cks.
Holland, 3 cks., 50 drms.

ZINC ASHES—
Spain, 5 t.; U.S.A., 92 t. 15 c.

ZINC OXIDE—
Belgium, 40 cks.; Holland, 75 cks.

LONDON.

Week ending December 8.

ACETIC ACID—		
Germany,	40 pkgs.	V. Blagden
,,	2 crbys.	
ALBUMEN—		
China.	£9,260.	Baxter Hoare
,,	£1,800.	Fellows Morton
,,	£980.	W. M. Smith
,,	£2,340.	
,,	£1,527.	Litchfield
France,	£824	Slann & Davies
U.S.A.,	£20.	Sheldon & Co.
ALUM—		
Germany,	25 pkgs.	Petri
ALUMINIUM SULPHATE—		
France,	200 pkgs.	
AMMONIUM NITRATE—		
Norway,	20 pkgs.	Murray & Laker
ARGOLS—		
France,	1,121 pkgs.	
Italy,	44	
Portugal,	36 pkgs.	Morrison Pollexfen
Spain,	116	
ARSENIC—		
Germany,	10 c.	Chance & Hunt
ARSENIOUS ACID—		
Japan,	1,150 pkgs.	
Portugal,	44 pkgs.	T. Swan
BARIUM PEROXIDE—		
France,	£790.	Symons
BARYTES—		
Belgium,	484 bgs.	Felton & Crepin
Germany,	295 cks.	Beck & Pollitzer
,,	144	Burrell
,,	72 brls.	Elliott & Sons
,,	64 cks.	Felton & Crepin
,,	66 cks.	W. Harrison
,,	266	Pallister
,,	14 brls.	Luck Taylor Bros.
BEESWAX—		
B.W.I.,	1 pkg.	Weber Smith
Fr. Somali'd	39 pkgs.	Baxter Hoare
,,	19	London C. & H. Co.
France,	10 cs.	
Nyasaland,	262 pkgs.	
Port E. Africa,	3 pkgs.	Weber Smith
Straits,	13 bgs.	
BLEACHING POWDER—		
Germany,	65 t.	Steel & Co.
BORATE OF LIME—		
Chile,	41 t.	Borax Con.
CALCIUM CHLORIDE—		
Germany,	10 t. 18 c.	H. Battin
CARBON BLACK—		
Holland,	10 pkgs.	
,,	560 cs.	Beck & Pollitzer
,,	125	Brotchil & Co.
U.S.A.,	150	Chance & Hunt
,,	50	Peabody
,,	266	B. & F. Metal
CASEIN—		
Brit. India,	£400.	J. Nathan
Germany,	£369.	Lewis Hawkins
U.S.A.,	£35.	Gerhard & Hey
CERESINE WAX—		
U.S.A.,	330 bgs.	Mawson Clarke
CHEMICALS (*otherwise undescribed*)		
Germany,	£40.	
,,	£54.	Bailey
,,	£9.	J. Griffin
,,	£7.	Miller
,,	£17.	Mayer
,,	£53.	Rousheim & Moore
,,	£360.	Winter & Co.
,,	£257.	V. Blagden

CHEMICALS (*otherwise undescribed*)
Belgium, £106. Typke King
France, £65. Johnson Sons
Java, £9. Weisberger
U.S.A., £378.

CHROMIUM OXIDE—
Germany, 7 cks. Taylor

CITRATE OF LIME—
Greece, £1,637.

COAL TAR PRODUCTS—
Tar Oil
Germany, 1 drm. Reitmeyer Calburn
Unspecified
Switzerland, £200.

DEXTRINE—
Holland, 17 t. 10 c. Braithwaite
,, 25 Mulder
,, 2
,, 2 Windmuller
,, 10 Spurling
U.S.A., 26 17 P. Winn

DYESTUFFS (ARTIFICIAL)—
Unspecified
France, £34. Symons
,, £95. Mory & Co.
Germany, 61 pkgs. R. W. Greeff
Switzerland, £69.
U.S.A., 1 pkg. W. J. Bush

DYESTUFFS (NATURAL)—
Annatto
B.W.I., 3 pkgs. Weber Smith
Brit. India, 30 pkgs. Litchfield & Saundy
Denmark, 20
Cochineal
Canary Is., 12 pkgs.
Indigo
Brit. India, 3 chts.

FERTILISERS (*otherwise undes.*)—
Brit. India, 50 t. Hollinghurst
,, 18 Wills
U.S.A., 2 c. Elmore, Cooke

FORMALDEHYDE—
Germany, 255 pkgs. R. W. Greeff
U.S.A., 52 pkgs. Zimmermann
,, 100 V. Blagden

FULLER'S EARTH—
U.S.A., 23 t.

GELATINE—
Belgium, £170. Duche & Son
,, £87. Poole & Co.
France, £60. Union Glue Co.
,, £930. Symons
Germany, £11.
,, £110. Behrens
,, £310. Crowe
,, £63. Tilleray
Holland, £25. Stancourt Muir

GLUE—
Austria, £219. Stancourt Muir
Belgium, £40.
,, £221. P. Ingenlath
,, £1,545 Gazaly Mills
,, £12. Murray
Canada, £150. ,,
France, £149. Park
,, £90. Gazaly Mills
,, £38. Mory
,, £70. Stancourt Muir
,, £17. Murray.
,, £346. Symons
Holland, £165. P. Ingenlath
,, £18. Stancourt Muir
Italy, £220. Union Glue Co.
Roumania, £165. ,,
U.S.A., £880. Wheatley & Co.
,, £19. Gerhard & Hey
,, £154. Hackney

GLYCERINE—
Holland, £78.

ISINGLASS—
China, 4 bls. W. M. Smith
Germany, 1 cs. Stallman
Straits Setts., 15 cs. Boustead

KIESELGUHR—
Algeria, 50 t. Stephenson
France, 4 t. 18 c. Le Brun
Spain, 10 McLaren

LEAD ARSENATE—
U.S.A., £2,800. Escombe McGrath

LITHARGE—
France, 24 cks. Symons & Co.
Germany, 4 Fenner & Alder

LITHOPONE—
Germany, 280 cks. Taylor & Co.
,, 1 ck.
,, 2 brls. Hall & Co.
Holland, 48 cks. Ashby Ltd.
,, 140 Nye

MAGNESITE—
Brit. India, £70. Morgan Crucible
Holland, £280. Johnson Sons

MAGNESIUM (METALLIC)—
France, £183. Davies Turner

MANGANESE ORE—
Brit. India, 1,000 t.

METHYL ALCOHOL—
Brit. India, £541.

MINERAL COLOURS (*otherwise undescribed*)—
Italy, 28 brls.

OCHRE—
France, 42 cks. Nye

PARAFFIN WAX—
Austria, 29 t. 11 c. Garnham
Burmah, 25 Hill & Sons
Germany, 50 Holroyds Oil Co.
Poland, 9 5 Garnham
U.S.A., 50
,, 114 Anglo-Amer. Oil
,, 54 3 H. Hill
,, 53 3 Chiesman & Co.
,, 50
,, 75 Bramwell & Co.

PARISIAN BLUE—
Germany, 10 cks. Stancourt Muir
Holland, 18

PHOSPHATE OF LIME—
Holland, 5 t. Muller & Co.

PITCH (*otherwise undescribed*)—
Belgium, 6 brls.
Germany, 8 cks. White Sea & Baltic

PLUMBAGO—
Madagascar, 748 bgs. Bramwell & Co.

POTASH ALUM—
Germany, 16 pkgs. J. Bailey

POTASSIUM CARBONATE—
Germany, 33 pkgs. Thornett & Fehr
,, 9
,, 32 Steel & Co.

POTASSIUM CHLORIDE—
France, 55 pkgs. Poole & Co.
,, 45 Harrison

POTASSIUM PERMANGANATE—
Germany, 50 pkgs. Reitmeyer Calburn

PRUSSIAN BLUE—
France, 20 cks. Poole & Co

RED LEAD—
Belgium, 10 cks. Farmiloe & Sons

ROSIN—
France, 31 cks. Gardiner & Co.
,, 6 Jensen & Nicholson
,, 50 Lowden Connell
U.S.A., 125 brls.
,, 200 Bowring Jones
,, 200 Lowden Connell
,, 700 Winkley

SALAMMONIAC—
Germany, 4 pkgs. J. Bailey

SALTPETRE—
Belgium, £92. Sabulite Ltd.

SOAP—
Belgium, £12.
Canada, £4,576. Gerhard & Hey
Denmark, £64.
,, £89. Beck & Pollitzer
,, £10. United Baltic
France, £157. Kalisky
,, £45.
,, £12. Munzi & Co.
,, £5. Symons & Co.
Germany, £124.
,, £12. Hartrodt
,, £59. Kalisky
,, £25. Weiss Biheller
Holland, £4. G. S. N. Co.
Italy, £180. Isaacs & Sons
Norway, £360. Austreng
Switzerland, £250. Channell Chem. Co.
U.S.A., £1,219. Hackney
,, £515.
,, 1 brl. Pronk Davis
,, £1,669. Knight & Morris
Victoria, £3,600. L. F. Smith
,, £500.

SODIUM ACETATE—
Germany, 10 t. V. Blagden

SODIUM SILICATE—
U.S.A., 1 t. Allison Bros.

SULPHUR—
Italy, £127. Ferguson
,, £34. Morrison & Blair
,, £35. Rubeck Thew

TALLOW—
Argentine, 25 t. Co-op W'sale
N.S.W., 11 t. Cooke & Co.
,, 51 Anning & Cobb
,, 10 H. Hill
N.Z., 15 10
Queenisland, 2 16
,, 26 15 Thornett & Fehr
W. Australia, 97 14

TANNING MATERIALS—
Chestnut
France, 270 pkgs.
Gambier
Straits, 80 pkgs.
Myrabolans
Brit. India, 616 pkgs. Humphreys Ellis
,, 600
Sumac
Italy, 600 pkgs. Williamson
Unspecified
A. Turkey, 159 pkgs. Perkins & Homer
Germany, 240 Payne Bros.
Switzerland, 13

TAR (*otherwise undescribed*)—
France, 50 brls. White Sea Co.

TARTARIC ACID—
Holland, 40 pkgs. J. Knill

TIN ORE—
Spain, 6 t.

TURPENTINE—
Russia, 125 brls. Chiesman
U.S.A., 8 Goodlake & Nutter

ULTRAMARINE—
Belgium, 9 cks.
Germany, 11 Stancourt & Muir

WAX (MINERAL)—
Austria, 135 bgs. Mims
Germany, 180 bgs. Holroyds Oil Co.
Holland, 83 Harrison Clark

WAX (*otherwise undescribed*)—
Germany, £8. Rosenberg Loewe

WHITE LEAD—
Belgium, 54 cks. Farmiloe & Sons
France, 21 brls.
Germany, 28 cks.
,, 4 Stancourt & Muir
U.S.A., 22 cks. R. W. Greeff

ZINC OXIDE—
Belgium, 180 cks. Ashby Ltd.
Czecho-Slovakia, 100 R. W. Greeff
Holland, 50 brls. Ashby Ltd.
,, 75 cks. ,,
Germany, 55 R. W. Greeff

MANCHESTER.

Week ending December 8.

ALUM—
Rotterdam, 98 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
Hamburg, 260 cks.

BARIUM SULPHATE (BLANC FIXE)—
Bremen, 28 cks.

BARYTES—
Bremen, 33 cks., 150 bgs.

CALCIUM CARBIDE—
Christiania, 160 drms.

CARBON BLACK—
Antwerp, 40 cks.
New York, 1,530 cs.

CHEMICALS (*otherwise undescribed*)
Antwerp, 2 cs.
Hamburg, 6 brls., 42 cks.

COAL TAR PRODUCTS—
Creosote
Rotterdam, 1,870 t.

DEXTRINE—
Amsterdam, 525 bgs., 270 bls.
Newport News, 440 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 7 brls.
Unspecified
Amsterdam, 4 cks.; Hamburg, 112 pcls., 151 cks., 10 crts., 3 cs.; Rotterdam, 6 brls., 2 cks., 1 cs.

FERRO SILICON—
Sarpsborg, 160 brls.

FORMALDEHYDE—
Bremen, 424 crbys.
Rotterdam, 38 cks.

GLUE AND GELATINE—
Amsterdam, 20 cks.; Antwerp, 60 bgs.; Bremen, 10 cs.; Rotterdam, 38 pkgs.

IRON OXIDE—
Malaga, 400 bxs.

LEAD ACETATE—
Hamburg, 100 bgs.

LEAD NITRATE—
Genoa, 55 cs.

LITHOPONE—
Danzig, 40 cks.
Rotterdam, 200 cks.

MAGNESITE—
Rotterdam, 237 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 150 brls.

MINERAL COLOURS (*otherwise undescribed*)—
Bremen, 100 bgs.

OXALIC ACID—
Hamburg, 4 cks.
Rotterdam, 37 cks.

PARAFFIN WAX—
Baltimore, 432 brls.

PHOSPHORUS—
Montreal, 94 drms.

POTASH (*otherwise undescribed*)—
Bremen, 10 cs.
Hamburg, 5 kgs., 40 cks.

POTASSIUM NITRATE—
Antwerp, 40 sks.

POTASSIUM PERMANGANATE—
Hamburg, 39 cks.

POTASSIUM PRUSSIATE—
Rotterdam, 8 cks., 8 brls.

SALTPETRE—
Rotterdam, 20 kgs.

SOAP—
Catania, 50 cs.
Philadelphia, 600 bxs.

SODA—
Bremen, 10 cs.

SODIUM CHLORATE—
Rouen, 170 cks,

SODIUM NITRITE—
Hamburg, 70 cks.

SODIUM PHOSPHATE—
Antwerp, 13 cks.
Hamburg, 101 cks.

STEARINE—
Antwerp, 52 bgs.

SULPHUR—
Catania, 20 bgs.
Galveston, 2,005 t.

TALLOW—
Fredriksstad, 540 brls.

TANNING MATERIALS—
Sumac
Palermo, 20 bls., 550 bgs.
Unspecified
Baltimore, 55 brls.

TARTARIC ACID—
Amsterdam, 16 cks., 45 kgs.

TIN OXIDE—
Hamburg, 10 cks.

ULTRAMARINE—
Hamburg, 7 pcls.

WAX (*otherwise undescribed*)—
New Orleans, 3,167 brls., 156 bgs.
Norfolk and Newport News, 200 brls.
Philadelphia, 1,778 brls.

ZINC DUST—
Antwerp, 224 cs.
Galveston, 300 containers.

ZINC OXIDE—
Antwerp, 43 cks.
Rotterdam, 10 cks.

NEWCASTLE-ON-TYNE

Week ending December 8.

ACETIC ACID—
Rotterdam, 8 cks.

AMMONIA—
Hamburg, 40 cks.

BARYTES—
Hamburg, 76 cks.

CALCIUM CARBIDE—
Christiania, 410 drms.

MAGNESIUM (METALLIC)—
Hamburg, 36 drms.

SALTPETRE—
Rotterdam, 20 cks.

SOAP—
Montreal, 50 bxs.

SODA—
Bergen, 7 brls.

SODIUM ACETATE—
Antwerp, 20 kgs.

SODIUM HYPOSULPHITE—
Antwerp, 100 bgs.

SODIUM NITRATE—
Christiania, 103 bgs.

TURPENTINE—
Bremen, 2 cs.

WHITE LEAD—
Rotterdam, 20 cks.

ZINC OXIDE—
Rotterdam, 10 cks.

N. & S. SHIELDS.

Week ending December 8.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending December 8.

BOILER COMPOSITION—
Gothenburg, 5 t.
Rangoon, £18.

CHEMICALS (*otherwise undescribed*)
Bangkok, 30 cs.; Boston, 250 pkgs.; Buenos Ayres, 10 pkgs.; Calcutta, 60 drms.; Delagoa Bay, 2,127 pkgs.; Helsingfors, 10 pkgs.; Mauritius, 50 pkgs.; Montreal, 226 pkgs.; Natal, 31 pkgs.; Rangoon, 55 pkgs.; Rio de Janeiro, 150 pkgs.; Shanghai, 610 pkgs.; Singapore, 330 pkgs.; Sumatra, 310 pkgs.; Vera Cruz, 500 pkgs.

COAL TAR PRODUCTS—
Creosote
Boston, 8 t. 10 c.
Durban, 13 t. 2 c.
Pitch
Antwerp, £1,430.
Tar
Durban, 4 t.; Gothenburg, 50 t.; Java, 6 t. 6 c.; Kingston (Ja.), £12.; Mauritius, 3 t.; Mombasa, 1 t.; Penang, 10 t. 4 c.; Rangoon, £423.; Singapore, £46.
Unspecified
Antwerp, £190.; Durban, 3 t. 10 c.; Helsingfors, 58 t. 8 c.; Madras, £490.; Mauritius, 2 t. 12 c.

FERRO CHROME—
Hamburg, 120 t.

GELATINE—
Montreal, 2 t.

LITHARGE—
Kingston (Ja.), 80 t.

PARAFFIN WAX—
Barcelona, £162.
Constantinople, 5 t.

PITCH (*otherwise undescribed*)—
Hamburg, £6.

POTASSIUM BICHROMATE—
Gothenburg, 16 c.
Rangoon, 1 t. 2 c.
Rio de Janeiro, 1 t. 14 c.

RED LEAD—
Balik Pappan, 9 t. 16 c.

SHEEP DIP—
Buenos Ayres, 58 t. 4 c.
Falmouth, £59.
Kingston (Ja.), £21.
Rio de Janeiro, £88.

SOAP—
Gothenburg, 2 t. 6 c.
Kingston (Ja.), 1 c.
Montreal, 1 t.

SODIUM BICHROMATE—
Marseilles, 10 t.

TANNING MATERIALS—
Unspecified
Boston (Mass.), 8 t. 1 c.
Gothenburg, 1 t. 3 c.

TAR (ARCHANGEL)—
Calcutta, £48.

GRANGEMOUTH.

Week ending December 8.

AMMONIUM CARBONATE—
Antwerp, 100 kgs.
Christiania, 20 kgs.

COAL TAR PRODUCTS—
Naphtha
Christiania, 12 drms.

MAGNESIA (CALCINED)—
Rotterdam, 242 bgs.

PARAFFIN WAX—
Dunkirk, 96 bgs.
Rouen, 80 bgs.

POTASSIUM BICHROMATE—
Antwerp, 26 cks.; Dunkirk, 14 cks.; Rotterdam, 63 cks.; Rouen, 10 cks.

SODIUM BICHROMATE—
Dunkirk, 16 cks.; Rouen, 16 cks.

WAX (*otherwise undescribed*)—
Christiania, 240 bgs.

HULL.

Week ending December 1.

CAUSTIC SODA—
Helsingfors, 485 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 20 kgs.; Helsingfors, 1 cs., 18 cks.; Hamburg, 2 cs., 172 drms.; Malmo, 13 cs., 2 cks.; Newfairwater, 4 cks.; Riga, 91 bgs., 8 drms.; Rotterdam, 10 cks.; Stockholm, 5 cs.

COAL TAR PRODUCTS—
Naphtha
Rouen, 28 drms.
Tar
Rotterdam, 15 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Norrkoping, 1 cs.
Stockholm, 2 cs.

GLUE—
Gothenburg, 100 bgs.
Helsingfors, 40 bgs.

GLYCERINE—
New York, 100 drms.

MINERAL WHITE—
New York, 1,200 bgs.

PITCH (*otherwise undescribed*)—
New York, 119 brls.; Riga, 1 ck.

STEARINE—
Stockholm, 1 cs.

SOAP—
Gothenburg, 1 cs.; Hamburg, 2 drms.; Malmo, 3 cs., 2 cks.

TALLOW—
Gibraltar, 4 frkns.; Riga, 30 brls.

TAR (*otherwise undescribed*)—
Riga, 1 ck.

LEITH.

Week ending December 8.

ALBUMEN—
Copenhagen, 10 cs.

DISINFECTANTS (*otherwise undes.*)
Seville, 3 cks.

ROSIN—
Reykjavik, 12 brls.

ROSIN OIL—
Amsterdam, 6 brls.

SHEEP DIP—
Dalvik, 100 drms.

SOAP—
Reykjavik, 70 pkgs.

LIVERPOOL.

Week ending December 6.

ACETIC ANHYDRIDE—
New York, 1 t., £145.

ALUM—
Brisbane, 1 t. 1 c., £12.; Christiania, 1 t. 1 c., £23.; Calcutta, 1 t. 2 c., £11.; Dunedin, 2 t. 1 c., £21.; Gothenburg, 6 t. 9 c., £125.; Hamburg, 9 t. 18 c., £179.; Norrkoping, 10 t. 3 c., £180.

ALUMINIUM SULPHATE—
Alexandria, 2 t. 1 c., £21.; Adelaide, 2 t., £32.; Beira, 5 t., £15.; Calcutta, 20 t., £129.; Delagoa Bay, 1 t., £10.; Drammen, 5 t., £34.; Rotterdam, 5 t., £49.

ALUMINOFERRIC—
Calcutta, 5 t. 1 c., £25.

AMMONIA—
Bombay, 1 t. 4 c., £28.

AMMONIUM CARBONATE—
Alexandria, 1 t., £35.; Amsterdam, 1 t., £26.; Antwerp, 1 t. 19 c., £51.; Buenos Ayres, 8 t. 18 c., £277.; Bari, 1 t. 19 c., £52.; Bilbao, 19 c., £24.; Cape Town, 6 c., £11.; Danzig, 1 t. 19 c., £50.; Genoa, 15 c., £19.; Galatz, 1 t. 4 c., £29.; Manila, 5 t., £139.; Marseilles, 1 t., £28.; New York, 1 t., £28.; Pernambuco, 2 t. 5 c., £92.; Trieste, 9 t. 17 c., £235.; Valencia, 19 c., £35.

AMMONIUM SULPHATE—
Kobe, 800 t., £12,151.; Las Palmas, 167 t. 14 c., £2,350.; Naples, 138 t. 12 c., £1,975.; Tarragona, 197 t. 12 c., £2,718.; Teneriffe, 25 t., £350.

ANTIFOULING COMPOSITION—
Gibraltar, 2 t., £207.; Havana, 2 t. 2 c., £230.; Malta, 6 c., £25.; Valparaiso, 1 t., £79.

ARSENIC—
New York, 40 t. 3 c., £2,390.
Valencia, 2 t. 14 c., £164.

BITUMEN—
Buenos Ayres, 32 t. 12 c., £435.
Santos, 1 t. 5 c., £100.

BLEACHING POWDER—
Bombay, 31 t., £380.; Christiania, 45 t. 5 c., £400.; Calcutta, 42 t. 12 c., £415.; Callao, 1 t., £12.; New Orleans, 10 t. 14 c., £260.; Oporto, 9 t. 13 c., £109.; Otago, N.Z., 1 t. 2 c., £14.; Piraeus, 1 t., £12.; Santos, 9 t. 19 c., £120.

BOILER COMPOSITION—
Bombay, 1 t., £25.; Calicut, 1 t., £10.; Christiania, 3 t. 11 c., £140.

BORAX—
Adelaide, 3 c., £8. Genoa, 9 t. 17 c., £250.; Kingston, 1 c., £2.; Oporto, 11 t. 16 c., £300.

CALCIUM CHLORIDE—
Barcelona, 7 t. 17 c., £45.
Wellington, 6 t. 5 c., £40.

CAUSTIC POTASH—
Smyrna, 18 c., £24.

CHEMICALS (*otherwise undescribed*)
Auckland, 1 t., £27.; Adelaide, 5 t., £130.; Bluff, 1 t., £26.; Bombay, 6 t. 5 c., £156.; Calcutta, 28 t. 13 c., £642.; Durban, 20 t., £125.; Dunedin, 1 t., £26.; Fremantle, 1 t., £27.; Hong Kong, 14 t. 9 c., £154.; Hobart, 1 t., £40.; Lisbon, 2 t., £50.; Monte Video, 50 t. 6 c., £352.; Melbourne, 3 t., £519.; Patras, 1 t., £25.; Sydney, 5 t. 14 c., £268.; Santos, 6 t. 4 c., £85.; Shanghai, 15 c., £11.; Tiflis, 3 t., £75.; Townsville, 1 t. 1 c., £33.

CITRIC ACID—
Adelaide, 10 c., £70.; Durban, 2 c., £14.; Havana, 5 c., £47.

COAL TAR PRODUCTS—
Carbolic Acid
Bombay, 5 c., £47.; Calcutta, 9 c., £81.; Durban, 1 t. 11 c., £43.; Genoa, 4 t., £532.; Hamburg, 8 t. 5 c., £908.; Kobe, 10 t. 2 c., £1,189.; New York, 4 t. 14 c., £140.; Tientsin, 5 c., £39.
Creosote
New York, 2 t., £60.
San Francisco, 7 t., £934.
Switzerland, 1 t. 1 c., £95.
Orthonitrochlorbenzol
Rotterdam, 9 c., £113.
Pitch
Fiume, 7 t. 2 c., £34.; Lagos, 1 t. 7 c., £13.; Rotterdam, 5 t. 8 c., £54.; Rouen, 3 t. 3 c., £25.
Pyridine
New York, 22 t. 8 c., £5,414.
Tar
Alexandria, 2 t. 8 c., £26.; Accra, 18 c., £13.; Durban, 2 t. 1 c., £20.; Monrovia, 1 t. 9 c., £16.; Pt. Swettenham, 17 t., £184.
Unspecified
Genoa, 5 t., £1,168.

COBALT SULPHATE—
Santos, 1 c., £20.

COPPER OXIDE—
Melbourne, 1 t., £71.

COPPER SULPHATE—
Alleppey, 2 t., £51.; Auckland, 1 t., £26.; Funchal, 1 t., £24.; Lagos, 10 c., £12.; Melbourne, 13 t., £335.; San Francisco, 18 t., £421.; Sydney, 5 t., £132.

COPPERAS—
Karachi, 17 t. 12 c., £44.

CREAM OF TARTAR—
Adelaide, 10 c., £43. ; Durban, 7 c., £25. ; Singapore, 2 c., £11. ; Sydney, 9 t., £785.

DISINFECTANTS (*otherwise undes.*)
Algoa Bay, 3 c., £27. ; Bombay, 24 t. 9 c., £353. ; Copenhagen, 4 t. 18 c., £270. ; Constantinople, 3 c., £10. ; Colombo, 9 c., £20. ; Guayaquil, 1 c. 2 qr., £12. ; Havre, 9 c., £106. ; Kuala Lumpur, 1 t. 12 c., £15. ; Lagos, 11 c., £39. ; New York, 118 t. 15 c., £4,449. ; Pt. Swettenham, 1 t. 5 c., £60. ; Sourabaya, 1 t. 2 c., £57.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Boston, 1 c., £25. ; Oamaru, 1 c., £28.
Unspecified
Bombay, 1 qr., £18. ; Barcelona, 3 c. 2 qr., £123. ; Durban, 10 c., £12. ; Lyttleton, 12 c., £190. ; Melbourne, 1 t., £261. ; Montreal, 5 t. 19 c., £1,290.

DYESTUFFS (NATURAL)—
Fustic
Montreal, 1 t. 3 c., £43.
Orchil
New York, 5 t. 7 c., £327.

ESSENTIAL OILS (SYNTHETIC)—
Durban, 7 c., £609.

FERTILISERS (NITROGENOUS)—
Charleston (S.C.), 1,100 t. 4 c., £11,050.

FERTILISERS (*otherwise undes.*)—
Bombay, 10 t., £177. ; Kingston, 9 t. 18 c., £94. ; Stockholm, 20 t. 15 c., £230. ; Savannah, 604 t., £3,420.

GLYCERINE—
Antwerp, 3 t. 8 c., £230. ; Batavia, 10 c., £39. ; Bombay, 1 t., £94. ; Christiania, 20 t. 7 c., £967. ; Callao, 1 t., £90. ; Durban, 5 t., £439. ; Karachi, 1 t., £94. ; Kobe, 100 t., £3,597. ; Madras, 11 c., £54. ; Singapore, 1 t., £90. ; Salaverry, 8 c., £36. ; Teneriffe, 3 c., £13. ; Valparaiso, 1 t., £84.

GUANO (FISH)—
Teneriffe, 15 t., £200.

HYDROCHLORIC ACID—
Safaga, 4 c., £108.

LEAD ARSENATE—
Sandakan, 6 t., £633.

MAGNESIA—
Montreal, 5 c. 2 qr., £15.
Sydney, 6 t., £193.

MAGNESIUM CARBONATE—
Adelaide, 4 c. 2 qr., £16.
Karachi, 7 c. 2 qr., £21.

MAGNESIUM SULPHATE—
Limon, 6 c., £3.

MANGANESE BORATE—
Dunedin, 6 c., £20.

PHOSPHORIC ACID—
Rotterdam, 4 c., £17.

PHOSPHORUS (AMORPHOUS)—
Durban, 1 t. 7 c., £318. ; Gothenburg, 4 t. 18 c., £1,100. ; Melbourne, 1 t., £30. ; Rangoon, 19 c., £234. ; Santos, 10 c., £116. ; Talcahuano, 19 c., £234.

PHOSPHORUS SESQUISULPHIDE
Arica, 10 c., £108.
Gothenburg, 7 t. 17 c., £1,613.

PITCH (*otherwise undescribed*)—
Newcastle, 5 t. 12 c., £86.
Rouen, 8 t. 11 c., £125.

POTASSIUM BICARBONATE—
Constantinople, 10 c., £24.

POTASSIUM BICHROMATE—
Alexandria, 18 t. 19 c., £912.
Norrkoping, 18 c., £41.

POTASSIUM PRUSSIATE—
Kobe, 5 t., £445.

SHEEP DIP—
Buenos Ayres, 31 t. 10 c., £1,177. ; Durban, 3 t. 4 c., £276. ; Oran, 1 t. 18 c., £100. ; Patagonia, 9 t. 7 c., £350. ; Punta Arenas, 23 t. 9 c., £875. ; Rio Gallegos, 9 t. 9 c., £592. ; San Antonio, 24 t. 11 c., £1,719. ; San Juan del Sur, 12 c., £34.

SILICON CARBIDE
Gefle, 9 c., £87.

SODIUM PERBORATE—
Melbourne, 5 c., £31.
Sydney, 5 c., £31.

SULPHUR—
Helsingfors, 5 t., £56.

SULPHURIC ACID—
Accra, 8 c., £32.
Durban, 1 t. 3 c., £87.

TANNING MATERIALS—
Wattle
Auckland, 5 t. 18 c., £87.
Unspecified
Brisbane, 2 t. 7 c., £42. ; Christiania, 8 t. 17 c., £169. ; Drammen, 5 t. 10 c., £69. ; Gothenburg, 5 t. 2 c., £82. ; Melbourne, 5 t. 16 c., £107. ; Pt. Elizabeth, 1 t., £21. ; Rotterdam, 12 t. 13 c., £179. ; Sydney, 15 c., £11. ; Wellington, 15 c., £11.

TARTARIC ACID—
Adelaide, 1 t., £121. ; Chiclayo, 2 c., £13. ; Durban, 1 t. 2 c., £121. ; Havana, 2 c., £15. ; Melbourne, 2 t., £213. ; Sydney, 3 t., £373.

VANADIC ACID—
Dunkirk, 1 t. 4 c., £1,018.

VANILLIN—
Christiania, 1 c., £92. ; Copenhagen, 1 c., £102. ; Genoa, 1 c. 2 qr., £145. ; Switzerland, 1 c. 3 qr., £160.

WOOD PRESERVATIVE—
Batavia, 2 t., £58.
Lyttleton, 4 t. 4 c., £94.
Penang, 1 t. 10 c., £39.

ZINC CHLORIDE—
Adelaide, 1 t., £27. ; Calcutta, 2 t., £52. ; Cape Town, 2 t., £51. ; Durban, 3 t., £77. ; Melbourne, 2 t., £55. ; Pernambuco, 9 c., £13. ; Rotterdam, 4 t. 15 c., £107. ; Sydney, 2 t., £55.

Week ending December 7.

ALBUMEN—
Barcelona, 2 brls.

BASIC SLAG—
St. John (N.B.), 20 t.

CALCIUM CHLORATE—
Brisbane, 20 pkgs.

CAUSTIC SODA—
Abo, 30 cs. ; Acapulco, 100 drms. ; Adelaide, 152 drms. ; Algoa Bay, 65 drms. ; Amsterdam, 34 pkgs. ; Auckland, 118 drms. ; Bahia, 200 drms. ; Bari, 17 drms. ; Batavia, 80 drms. ; Bombay, 679 drms. ; Bremen, 80 drms. ; Buenos Ayres, 343 drms. ; Cape Town, 108 drms. ; Callao, 25 drms. ; Catania, 30 drms. ; Constantinople, 16 drms. ; Cheribon, 25 drms. ; Copenhagen, 205 drms. ; Corral, 30 cs. ; Delagoa Bay, 275 pkgs. ; Dunedin, 10 drms. ; Durban, 778 drms. ; East London, 168 drms. ; Fremantle, 85 drms. ; Geelong, 10 drms. ; Genoa, 100 drms. ; Gothenburg, 50 pkgs. ; Hamburg, 570 drms. ; Helsingfors, 120 drms. ; Karachi, 560 drms. ; Kilindini, 18 cs. ; Kobe, 217 drms. ; Lagos, 30 drms. ; Lyttleton, 9 drms. ; Maracaibo, 50 drms. ; Melbourne, 376 pkgs., 240 drms. ; Monte Video, 195 drms. ; Naples, 85 drms. ; Parahyba, 15 drms. ; Pt. Said, 35 pkgs. ; Pisco, 20 drms. ; Pt. Swettenham, 100 drms. ; Rangoon, 60 drms. ; Rotterdam, 7 drms. ; Rio de Janeiro, 1,012 drms. ; Santos, 229 drms. ; Shanghai, 252 drms. ; Sherbro, 15 pkgs. ; Sourabaya, 552 drms. ; Stockholm, 45 drms. ; Sydney, 104 drms. ; Trieste, 29 drms.

FERRO MANGANESE—
Antwerp, 260 t. ; Baltimore, 120 t. ; Gefle, 75 t. ; Gothenburg, 30 t. ; New Orleans, 200 t. ; Santos, 25 t. ; Singapore, 10 t. ; St. John (N.B.), 25 t. ; Sourabaya, 4 t. ; Stockholm, 60 t.

FERRO VANADIUM—
Bilbao, 3 c.

GLUE, SIZE, AND GELATINE—
Barcelona, 30 cks. ; Batavia, 25 cs. Boston, 100 pkgs. ; Cape Town, 4 pkgs. ; Durban, 32 pkgs. ; Manila, 70 bgs. ; Shanghai, 40 t., 10 bgs.

MANGANESE OXIDE
B. Ayres, 1 t. (HYDRATED)

MANGANESE ORE—
Antwerp, 5 t.

PARAFFIN WAX—
Puerto Barrios, 160 bgs.

SALT—
Aarhus, 35 t. ; Antwerp, 315 t. ; Auckland, 123 t. ; Axim, 9 t. ; Beira, 5 t. ; Bluff, 25 t. ; Black River, 10 t. ; Bluff, 222 t. ; Bombay, 5 t. ; Buenos Ayres, 2 t. ; Burutu, 269 t. ; Cape Town, 5 t. ; Eket, 8 t. ; Gefle, 10 t. ; Gothenburg, 50 t. ; Kingston (Ja.), 65 t. ; New Orleans, 150 t. ; New York, 100 t. ; Odense, 150 t. ; Pt. Antonio, 5 t. ; Quebec, 150 t. ; Rangoon, 25 t. ; Rio de Janeiro, 9 t. ; Rotterdam, 1 t. ; Sav-la-Mar, 20 t. ; Rouen, 6 t. ; Shanghai, 2 t. ; Sherbro, 115 t. ; Sierra Leone, 147 t. ; Stockholm, 600 t. ; Sundsvall, 80 t. ; Wellington, 1 t.

SOAP—
Accra, 1,024 bxs. ; Alexandria, 311 pkgs. ; Ampenam, 100 pkgs. ; Amboina, 800 pkgs. ; Amsterdam, 12 pkgs. ; Assinie, 20 pkgs. ; Auckland, 20 bxs. ; Axim, 50 bxs. ; Balik Pappan, 100 bxs. ; Band Neira, 10 bxs. ; Bandjermassie, 2,000 bxs. ; Bangkok, 710 pkgs. ; Barbados, 622 cs. ; Barranquilla, 50 cs. ; Batavia, 2,052 bxs. ; Bathurst, 267 cs. ; Beira, 361 pkgs. ; Belawan, 200 bxs. ; Beo, 20 bxs. ; Blinjoe, 25 bxs. ; Bluff, 10 cs. ; Bolivia, 615 bxs. ; Bombay, 1,414 pkgs. ; Bourgas, 730 cs. ; Callao, 160 pkgs. ; Cape Palmas, 20 pkgs. ; Calcutta, 1,371 pkgs. ; Christchurch, 17 pkgs. ; Cheribon, 150 pkgs. ; Colombo, 283 pkgs. ; Constantinople, 5 pkgs. ; Copenhagen, 32 pkgs. ; Curacao, 160 pkgs. ; Djeboes, 50 pkgs. ; Dunedin, 17 pkgs. ; Grand Bassam, 25 pkgs. ; Gibraltar, 5 pkgs. ; Gorontalo, 225 pkgs. ; Guayaquil, 112 bxs. ; Hong Kong, 56 pkgs. ; Invercargill, 655 pkgs. ; Ipoh, 6 pkgs. ; Karachi, 172 pkgs. ; Kilindini, 9 cs. ; Kingston (Ja.), 3,078 pkgs. ; Kota Baroe, 25 bxs. ; Kuala Lumpur, 200 bxs. ; Langsa, 100 bxs. ; Las Palmas, 235 pkgs. ; Lirveng, 20 bxs. ; Madras, 524 cs. ; Malta, 94 pkgs. ; Matadi, 6 bxs. ; Melbourne, 21 cs. ; Menado, 360 bxs. ; Mombasa, 1,263 pkgs. ; Monrovia, 43 bxs. ; Montreal, 4 cs. ; Opobo, 500 cs. ; Padang, 100 bxs. ; Padang Baai, 15 bxs. ; Palembang, 200 cs. ; Panama, 750 cs. ; Panarockan, 100 cs. ; Pasages, 14 pkgs. ; Penang, 301 bxs. ; Petta, 25 bxs. ; Pontianak, 300 bxs. ; Puerto Barrios, 500 bxs. ; Pt. Harcourt, 180 cs. ; Pt. Said, 321 pkgs. ; Pt. Sudan, 110 pkgs. ; Quebec, 19 cs. ; Rangoon, 1,796 pkgs. ; Rotterdam, 655 pkgs. ; Samarang, 54 pkgs. ; Sancarinda, 301 bxs. ; San Julian, 2 cs. ; Santos, 20 bxs. ; Sarawak, 2 cs. ; Sav-la-Mar, 123 bxs. ; Sekondi, 78 pkgs. ; Shanghai, 2,000 bxs. ; Sherbro, 40 bxs. ; Sibolga, 45 bxs. ; Sierra Leone, 104 pkgs. ; Singapore, 2,867 pkgs. ; St. Johns (N.F.), 40 cs. ; St. Lucia, 60 cs. ; Sourabaya, 465 bxs. ; Suez, 150 cs. ; Tagoelandang, 25 bxs. ; Talcahuano, 2 cs. ; Tamako, 25 bxs. ; Tandjong Balei, 459 bxs. ; Taroena, 25 bxs. ; Teneriffe, 433 bxs. ; Ternate, 150 bxs. ; Trieste, 12 bxs. ; Trinidad, 700 cs. ; Uganda, 63 bxs. ; Varna, 100 cs. ; Volo, 1 cs. ; Wellington, 211 pkgs. ; Yokohama, 5 cs.

SODA ASH—
Abo, 485 pkgs. ; Adelaide, 535 pkgs. ; Algoa Bay, 200 pkgs. ; Auckland, 168 pkgs. ; Batavia, 29 cks., 100 bgs.

SODA ASH—
Bombay, 6,000 bgs. ; B. Ayres, 571 cks. ; Brisbane, 34 pkgs. ; Calcutta, 3,650 pkgs. ; C. Town, 66 bgs., 10 pkgs. ; Colombo, 800 bgs., 200 pkgs. ; Copenhagen, 250 pkgs. ; Dalny, 5,594 pkgs. ; Delagoa Bay, 50 pkgs. ; Dunedin, 9 bgs., 100 pkgs. ; Durban, 56 pkgs. ; East London, 150 pkgs. ; Fremantle, 826 pkgs. ; Geelong, 37 pkgs., 100 bgs. ; Gefle, 50 bgs. ; Gothenburg, 450 pkgs. ; Helsingfors, 1,400 pkgs. ; Karachi, 541 pkgs. ; Kobe, 11,365 pkgs. ; Lagos, 50 pkgs. ; Melbourne, 941 pkgs., 1,403 bgs. ; Lyttleton, 43 pkgs. ; Medellin, 45 bgs. ; Moji, 5,400 bgs. ; Monte Video, 590 pkgs. ; Newcastle, 118 pkgs. ; Norrkoping, 330 bgs. ; Portland (Ore.), 357 bgs. ; Rangoon, 3,000 pkgs. ; Rio de Janeiro, 142 pkgs. ; Rotterdam, 5,100 pkgs. ; Shanghai, 560 bgs. ; Sourabaya, 200 pkgs. ; Stockholm, 550 bgs. ; Sundsvall, 300 kgs. ; Suva, 20 cks. ; Sydney, 625 pkgs., 358 cks. ; Tuticorin, 400 bgs. ; Wellington, 152 pkgs. ; Wiborg, 550 bgs.

SODA CRYSTALS—
Algoa Bay, 25 pkgs. ; Batavia, 40 kgs. ; Bombay, 100 drms. ; Buenos Ayres, 125 drms. ; Durban, 10 pkgs. ; Malta, 75 bgs. ; Penang, 60 pkgs. ; Pimental, 50 pkgs. ; Pt. Said, 11 pkgs. ; Rangoon, 40 pkgs. ; Sourabaya, 20 kgs. ; St. John's (N.F.), 50 pkgs.

SODIUM ARSENITE—
Durban, 30 pkgs.

SODIUM BICARBONATE—
Adelaide, 119 pkgs. ; Aden, 20 pkgs. ; Algoa Bay, 17 cs. ; Alexandria, 270 kgs. ; Auckland, 228 pkgs. ; Bangkok, 20 kgs. ; Bari, 63 pkgs. ; Bombay, 1,200 bgs. ; Bourgas, 150 kgs. ; Cape Town, 30 pkgs. ; Catania, 174 pkgs. ; Colombo, 100 pkgs. ; Constantinople, 50 pkgs. ; Copenhagen, 10 pkgs. ; Dunedin, 20 kgs., 20 pkgs. ; Durban, 20 pkgs. ; East London, 70 pkgs. ; Fremantle, 84 pkgs. ; Galatz, 460 pkgs. ; Geelong, 142 pkgs. ; Genoa, 174 pkgs. ; Havana, 1,680 pkgs. ; Horsens, 100 pkgs. ; Kilindini, 20 pkgs. ; Kalmar, 100 pkgs. ; Karachi, 800 pkgs. ; Kobe, 10,186 pkgs. ; Lagos, 10 pkgs. ; Malta, 30 pkgs. ; Melbourne, 40 kgs., 194 pkgs. ; Messina, 75 kgs. ; Moji, 1,077 bgs. ; Naples, 60 kgs. ; Palermo, 40 kgs. ; Piraeus, 120 pkgs. ; Pt. Swettenham, 20 pkgs. ; Rangoon, 1,000 pkgs. ; St. John's (N.F.), 100 pkgs. ; Singapore, 20 kgs. ; Stockholm, 60 kgs. ; Sydney, 60 kgs. ; Varna, 100 kgs. ; Venice, 150 pkgs. ; Yokohama, 2,369 bgs.

SODIUM CYANIDE—
Cartagena (Col.), 77 cs.

SODIUM HYDROSULPHITE—
Rouen, 2 kgs.

SODIUM PRUSSIATE—
Genoa, 4 pkgs. ; Kobe, 102 pkgs.

SODIUM SILICATE—
Adelaide, 182 pkgs. ; Buenos Ayres, 153 pkgs., 227 cks. ; Catania, 33 pkgs. ; Durban, 158 pkgs. ; East London, 14 pkgs. ; Fremantle, 65 pkgs. ; Helsingfors, 5 pkgs. ; Lyttleton, 26 pkgs. ; Madras, 26 pkgs. ; Pt. Said, 20 pkgs. ; Shanghai, 50 cks. ; Sourabaya, 20 pkgs. ; Sydney, 16 cks. ; Zanzibar, 11 drms.

SODIUM SULPHIDE—
Alexandria, 21 drms. ; Genoa, 171 pkgs. ; Pt. Elizabeth, 6 drms. ; Rio de Janeiro, 24 pkgs.

STEARINE—
Cape Town, 38 pkgs.
Rouen, 7 bgs.

TALLOW—
Antwerp, 120 bxs.
Hamburg, 5 trcs.

ZINC ASHES—
Antwerp, 15 t.

LONDON.

OFFICIAL AMENDMENT.

From return for week ending Sept. 12, Deduct—

MAGNESIUM SULPHATE—
Auckland, 10 c., £13.

Week ending December 5.

ACETIC ACID—
Calcutta, 1 cs., £8.
Toronto, 1 cs., £6.

ACETONE—
Sydney, 2 cs., £16.

ACETYL SALICYLIC ACID—
Adelaide, 1 cs., £19.; Bombay, 3 cs. (pt.), £10.; Cape Town, 2 cs. (pt.), £11.; Irish Free State, 1 cs. (pt.), £7.; Launceston (F.), 1 cs. (pt.), £5.; Melbourne (F.), 1 cs. (pt.), £8.

ALUM—
Durban, 20 cs., £9.
Pt. Elizabeth, 25 cs., £11.

ALUMINIUM HYDRATE—
Sydney, 1 ck., £25.

AMMONIA—
Accra, 5 cs., £9.; Beira, 9 cs., £16.; Bombay, 5 cs., £9.; Calcutta, 37 cs., £73.; Delagoa Bay, 19 cs., £33.; Demerara, 8 cs., £14.; Durban, 15 cs., £30.; Hong Kong, 15 cs., £28.; Irish Free State, 24 cs., £44.; Jamaica, 4 cs., £7.; Karachi, 25 cs., £43.; Malta, 8 cs., £14.; Puerto Colombia, 2 cs., £6.; Tientsin, 5 cs., £17.; Trinidad, 5 cs., £9.

AMMONIA (ANHYDROUS)—
Durban, 3 cs., £5.; Gibraltar, 3 cs., £30.; Irish Free State, 6 cylds., £13.; Irish Free State, 1 cyld. (F.), £6.

AMMONIUM BROMIDE—
Melbourne, 1 cs. (pt.), £6.

AMMONIUM CARBONATE—
Antwerp, 1 t. 19 c., £67.; Bahia, 1 t. 16 c., £75.; Colombo, 2 c., £7.; Hamburg, 2 t. 19 c., £71.; Hong Kong, 16 c., £45.; Jaffa, 5 c., £15.; Melbourne, 11 c., £18.; Paris, 1 t. 19 c., £50.; Penang, 9 c., £22.; Singapore, 2 c., £6.; Sydney, 5 c., £9.; Trinidad, 2 c., £5.; Vera Cruz, 10 c., £12.; Yokohama, 6 t., £188.

AMMONIUM CHLORIDE—
Antwerp, 13 cks., £187.
Calcutta, 3 kgs., £6.
Sydney, 5 cks., £10.

AMMONIUM PHOSPHATE—
Pt. Swettenham, 1 cs., £6.

ANTIMONY NITRATE—
Sydney, 1 ck., £5.

ANTIMONY OXIDE—
Sao Paulo (F.), 55 pkgs., £222.

ANTIMONY SULPHIDE—
Bahia, 40 kgs., £56.; Budapest, 9 cks., £212.; Callao (F.), 5 kgs., £16.; Copenhagen, 4 cks., £83.; Melbourne, 7 cks., £156.; Portland, 5 cks., £36.

ARSENIC—
Alexandria, 8 drms., £38.; Antwerp, 28 cks., £310.; Antwerp, 115 pkgs. (F.), £858.; Cape Town, 2 cs., £10.; Rotterdam, 109 cks., £1,312.; Santos, 20 drms., £65.; Venice (F.), 2 cs., £170.

BARIUM CHLORIDE—
Rio de Janeiro, 6 cs., £23.

BASIC SLAG—
Channel Islands, 30 t., £54.

BISMUTH CARBONATE—
Melbourne, 2 cs. (pt.), £83.
Wellington, 1 cs. (pt.), £9.

BISMUTH CITRATE—
Melbourne, 1 cs. (pt.), £8.

BISMUTH SALTS (*otherwise undes.*)
Beyrout, 1 cs. (pt.), £7.
Brussels, 2 cs., £118.

BISMUTH SUBNITRATE—
Calcutta, 1 cs. (pt.), £16.

BISULPHITE OF LIME—
Colombo, 2 hhds., £7.

BITUMEN—
Gothenburg, 18 pkgs., £9.

BONE FERTILISER—
Channel Islands, 2 t., £15.

BORAX—
Cape Town, 2 c., £6.; Colombo, 5 c., £8.; Delagoa Bay, 6 c., £15.; Durban, 2 c., £5.; Genoa 3 t. 10 c. (F.), £77.; Melbourne, 3 c., £17.; Rotterdam, 1 t., £78.

BORIC ACID—
Acajutla, 1 c., £5.; Bangkok, 3 c., £31.; Bombay, 1 t. 10 c., £88.; Calcutta, 11 c., £43.; Colombo, 4 t. 5 c., £267.; Cuidad Bolivar, 4 c., £10.; Hong Kong, 3 c., £11.; Irish Free State, 2 c., £6.; Petrograd, 2 t. 5 c., £114.

BUTYRIC ACID—
Sydney, 5 cks., £126.

CADMIUM SULPHIDE—
Gothenburg, 1 cs., £20.

CALCIUM CARBIDE—
Calcutta, 5 c., £14.; Colombo, 5 c. (F.), £9.; Iddo, 5 c., £5.; Sekondi, 8 c., £8.

CALCIUM CARBONATE—
Calcutta, 8 cks., £36.
Perth, 2 cs., £11.

CALCIUM CHLORIDE—
Perth, 8 kgs., £9.

CALCIUM PHOSPHATE—
Sydney, 1 ck., £17.

CARBON TETRACHLORIDE—
Sydney, 3 drms., £18.

CARBONATE OF LIME—
Paris, 10 bgs., £11.

CAUSTIC SODA—
Shanghai, 6 c., £25.
Townsville, 10 t. 5 c., £192.

CHEMICALS (*otherwise undescribed*)
Acajutla, 2 cs., £6.; Adelaide, 5 cs., £83.; Alexandria, 4 cs., £437.; Amsterdam (F.), 5 pkgs., £25.; Amsterdam, 1 cs., £12.; Auckland, 66 pkgs., £223.; Bangkok, 9 cs., £15.; Barbados, 8 pkgs. (pt.), £18.; Barcelona, 1 bx., £10.; Batavia, 23 pkgs., £37.; Beyrout, 2 cs. (pt.), £5.; Bilbao, 20 pkgs., £50.; Bombay, 17 cs. (pt.), £92.; Buenos Ayres, 3 pkgs., £7.; Calcutta, 23 pkgs. (pt.), £86.; Callao, 3 cs., £8.; Cape Town, 4 cs. (pt.), £22.; Colombo, 8 cs., £231.; Cuidad Bolivar, 6 pkgs., £9.; Dalny, 8 pkgs. (pt.), £6.; Delagoa Bay, 8 cs., £5.; Demerara, 10 cs. (pt.), £24.; Dunedin, 16 pkgs., £40.; Durban, 5 cs., £12.; Durban, 11 pkgs. (F.), £32.; East London, 15 pkgs. (F.), £42.; East London, 3 cs., £5.; Gothenburg (F.), 2 pkgs., £10.; Gothenburg, 30 pkgs., £71.; Hamburg, 22 pkgs., (F.), £56.; Hamburg, 12 pkgs., £26.; Hong Kong, 17 pkgs., £154.; Irish Free State, 13 pkgs., £23.; Jamaica, 11 pkgs., £8.; Karachi, 10 pkgs. (pt.), £54.; Kilindini, 4 pkgs., £10.; Ludwigshafen, 130 pkgs., £318.; Ludwigshafen (F.), 30 pkgs., £144.; Madras, 9 cs. (pt.), £69.; Malmo, 5 pkgs., £6.; Malta, 6 pkgs., £12.; Melbourne (F.), 2 cs. (pt.), £7.; Melbourne, 37 pkgs. (pt.), £276.; Montreal, 4 cs., £36.; Napier, 1 cs., £10.; New York, 3 cs. (pt.), £15.; Panama, 9 pkgs., £12.; Perth, 1 cs., £8.; Petrograd, 31 pkgs. (F.), £208.; Pt. Elizabeth, 18 pkgs., £21.; Rangoon, 1 pkgs. (pt.), £7.; Ronneby, 100 pkgs., £250.; Rotterdam, 10 pkgs., £26.; Rotterdam, 1 t., £78.; Sandakan, 2 cs., £7.; San Jose, 2 cs., £6.; Santos, 400 pkgs., £1,019.; Sekondi, 10 pkgs., £37.; Shanghai, 5 pkgs., £6.; Singapore, 4 brls., £29.; Sydney (F.), 1 cs. (pt.), £7.; Sydney, 13 cs. (pt.), £49.; Tangiers, 7 pkgs. (pt.), £14.; Trinidad, 2 pkgs. (pt.), £22.; Valparaiso, 5 cs. (pt.), £20.; Vancouver, 2 cs., £6.; Wellington, 4 cs., £90.

CHROMIUM OXIDE—
Melbourne, 2 cks., £35.

CITRIC ACID—
Adelaide, 5 c., £35.; Calcutta, 11 c., £81.; Cartagena, 5 c., £36.; Delagoa Bay (F.), 1 c., £6.; Durban (F.), 3 c., £33.; Durban, 5 c., £36.; Malta, 2 c., £14.; Melbourne, 10 c., £69.; Pt. Said, 1 c., £8.; Rotterdam, 2 t., £302.; Seville, 5 c., £36.; Sydney, 1 t., £139.

COAL TAR PRODUCTS—
Carbolic Acid
Amsterdam, 10 brls., £50.; Bangkok, 2 cs., £5.; Barbados, 2 cs., £9.; Demerara, 1 drm., £8.; Genoa, 30 cks., £210.; Sandakan, 2 cs., £16.; Sydney, 1 cs., £60.
Creosote
Durban, 2 cks., £9.
Hong Kong, 1 cs., £7.
Naphthalene
East London (F.), 20 cs., £7.; Las Palmas, 2 cs., £7.; Rangoon, 10 cs., £12.; Sydney, 2 cks., £7.
Pitch
Cette, 990 t., £7,425.
Christchurch, 1 ck., £5.
Dunkirk, 252 t. 11 c., £1,740.
Tar
Alexandria, 92 cks., £200.; Beira, 30 drms., £23.; Chinde, 6 brls., £14.; Delagoa Bay, 305 drms., £44.; Durban, 200 drms., £19.; Durban (F.), 100 drms., £11.; East London, 100 drms., £11.

COPPER OXIDE—
Paris, 2 cks., £55.

COPPER SALTS (*otherwise undes.*)
Adelaide, 1 cs. (pt.), £9.

COPPER SULPHATE—
Cape Town, 10 cs., £7.; Durban, 9 cs., £14.; East London, 1 t. 2 c., £36.; Pt. Elizabeth, 11 c., £17.

CREAM OF TARTAR—
Bombay (F.), 1 c., £8.; Delagoa Bay (F.), 5 c., £32.; Delagoa Bay, 1 c., £5.; East London, 2 c., £12.; Hango (F.), 4 c., £18.; Hobart, 1 t. 10 c., £126.; Hong Kong (F.), 1 c., £6.; Launceston, 1 t., £86.; Pt. Elizabeth, 1 c., £6.; Pt. Elizabeth (F.), 5 c., £21.

DISINFECTANTS (*otherwise undes.*)
Antwerp, 4 c., £9.; Barranquilla, 10 c., £19.; Bombay, 1 t. 12 c., £86.; Calcutta, 3 c., £42.; Cape Town, 6 t. 2 c., £145.; Colombo, 12 t. 3 c., £444.; Corinto, 9 c., £13.; Curacao, 9 c., £17.; Durban, 9 t. 2 c., £340.; Hong Kong, 1 c., £12.; Irish Free State, 6 t. 6 c., £102.; Jamaica, 6 t. 16 c., £176.; Karachi, 1 t. 3 c., £35.; Kobe, 11 c., £29.; Lagos, 16 c., £60.; Las Palmas, 1 t. 14 c., £54.; Matadi, 1 t. 4 c., £66.; Paris, 3 c., £10.; Penang, 1 t. 1 c., £33.; Puerto Colombia, 6 c., £26.; Santa Cruz, 1 c., £5.; Singapore, 1 c., £7.; Tangiers, 3 c., £11.; Toronto, 3 c., £38.

DYESTUFFS (ARTIFICIAL)—
Nigrosine
Adelaide, 4 cs., £60.
Unspecified
Bombay, 7 cs. (pt.), £26.; Canton, 1 cs. (pt.), £10.; Cochin, 1 brl., £37.; Comodoro Rivadavia, 1 cs. (pt.), £6.; Iquique, 1 cs., £11.; Melbourne, 1 cs., £6.; New York, 1 cs. (pt.), £8.; Sydney, 9 pkgs., 6 cs. (pt.), £170.

ETHER—
Demerara, 3 cs., £11.
Jamaica, 1 cs., £20.

ETHER (BUTYRIC)—
Melbourne, 1 cs. (pt.), £10.

ETHYL CHLORIDE—
Cape Town, 1 cs., £16.
Durban, 1 cs., £21.

ETHYL IODIDE—
Santander, 1 cs. (pt.), £6.

FERTILISERS (*otherwise undes.*)—
Barbados, 20 t., £197.; Boston, 1 t. 2 c., £29.; Cape Town, 12 c., £24.; Gothenburg, 1 t., £25.
Irish Free State, 5 c., £14.
San Jose, 1 t., £17.

FORMALDEHYDE—
Jamaica, 4 pkgs., £16.
Paris, 10 cks., £119.

GLYCERINE—
Bombay, 2 cs., £7.
New York, 51 t. 6 c., £2,600.
Sandakan, 1 c., £6.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
New York, 1 cs. (pt.), £12.
Sydney, 1 cs. (pt.), £8.

HYDROBROMIC ACID—
Melbourne, 1 cs., £7.

HYDROCHLORIC ACID—
Demerara, 1 c., £6.
Trinidad, 2 t. 2 c., £61.
Jamaica, 1 t., £48.

HYDROGEN PEROXIDE—
Alexandria, 8 cs. (pt.), £56.
Colombo, 10 cs., £68.
Jamaica, 3 cs., £18.

HYPOPHOSPHITE OF LIME—
Milan, 2 cs., £39.

IODIDES (*otherwise undescribed*)—
Bombay, 1 cs., £56.
Calcutta, 1 ck., £114
Naples, 4 cs., £284.

IODINE—
Bombay, 2 cs. (pt.), £26.
Buenos Ayres, 2 cs., £207.
Paris (F.), 20 kgs., £2,000.

IODINE (RESUBLIMED)—
Alexandria, 10 pkgs. (pt.), £67.
Bilbao, 1 cs. (pt.), £21.
Melbourne, 1 cs. (pt.), £14.

IRON AMMONIUM CITRATE—
Alexandria, 10 pkgs. (pt.), £25.
Bombay, 12 cs. (pt.), £46.
Calcutta, 2 cs., £38.

IRON PERCHLORIDE—
Canton, 1 cs., £6.
Madras, 5 cs., £9.

IRON SULPHATE—
Calcutta, 3 cks., £14.

LACTIC ACID—
Mossel Bay (F.), 13 cks., £99.
Rotterdam (F.), 2 brls., £13.

LEAD ACETATE—
Bangkok, 1 cs., £6.; Beira (F.), 40 kgs., £86.; Boulogne, 15 brls., £160.; Delagoa Bay (F.), 60 kgs., £129.; Fremantle, 4 cks., £16.

LEAD ARSENATE—
Melbourne, 30 drms., £143.
Supe, 50 drms., £240.

LEAD CHROMATE—
Melbourne, 10 cks., £30.

LEAD HYPOSULPHITE—
Kuala Lumpur, 3 brls., £24.
Melbourne, 4 cks., £86.

LEAD NITRATE—
Rouen, 8 cks., £81.

LEAD SULPHATE—
Paris, 6 cks., £73.

MAGNESIA—
Beira, 2 cs., £5.; Calcutta, 1 cs., £6.; Sydney, 10 cs., £24.; Wellington, 30 cs., £72.

MAGNESIA (CALCINED)—
Vera Cruz, 1 cs., £15.

MAGNESIA (HYDRATED)—
Alexandria, 5 cs. (pt.), £12.

MAGNESIUM CARBONATE—
Beira, 2 cs., £13.
Vera, 5 cs., £21.

MAGNESIUM CHLORIDE—
Irish Free State, 58 bgs., £100.

MAGNESIUM CITRATE—
Calcutta, 2 cs. (pt.), £13.
Las Palmas, 1 cs., £6.
San Jose, 2 cs., £10.

MAGNESIUM SULPHATE—
Acajutla, 10 c., £11.; Accra, 10 c., £13.; Aden, 4 c., £5.; Beyrout, 4 c., £5.; Bombay, 13 c., £23.; Colon, 10 c., £14.; Cuidad Bolivar, 12 c., £10.; Delagoa Bay, 6 c., £8.; Durban, 14 c., £18.; East London, 1 t. 9 c., £42.; Jaffa, 10 c., £13.; Melbourne, 1 t. 2 c., £26.; Monte Video, 3 c., £9.; Mormugao, 11 c., £14.; Panama, 11 c., £20.; Pt. Elizabeth, 11 c., £24.; Puerto Colombia, 5 c., £7.

MANGANESE BORATE—
Paris, 7 c., £30.

MANGANESE HYPOPHOSPHITE
Melbourne, 4 cs. (pt.), £20.

MANGANESE SULPHATE—
Sydney, 4 cks., £57.

MERCURIALS—
Bombay, 2 cs. (pt.), £27.
Calcutta, 2 cs., £25.

MERCURY BICHLORIDE—
New York, 4 cs., £32.

MERCURY CHLORIDE—
Sydney, 5 cs., £200.

MERCURY OXIDE—
Sydney, 4 cs., £43.

METHYL SALICYLATE—
Auckland, 1 cs. (pt.), £8.
Sydney, 2 cs., £18.

NITRIC ACID—
Bombay, 3 c., £15. ; Shanghai, 7 c., £38. ; Smyrna, 2 c., £9.

OXALIC ACID—
Piraeus, 2 cks., £35.

PHOSPHORIC ACID—
Fremantle, 4 cs., £11.
Melbourne, 4 cs., £10.
Shanghai, 1 cs., £5.

POTASSIUM ACID PHTHALATE—
Calcutta, 1 cs., £7.

POTASSIUM BICARBONATE—
Colombo, 15 cks., £63.

POTASSIUM BROMIDE—
Melbourne, 1 kg., £6.

POTASSIUM CITRATE—
Alexandria, 10 pkgs. (pt.), £28. ; Bombay, 10 cs. (pt.), £50. ; Calcutta, 4 cs., £31. ; Melbourne, 1 cs. (pt.), £6.

POTASSIUM CYANIDE—
Calcutta, 3 cs., £45.

POTASSIUM HYDRATE—
Sydney (F.), 1 cs., £14.

POTASSIUM IODIDE—
Bombay, 4 cs. (pt.), £356. ; Brussels, 1 cs., £74. ; Calcutta, 3 cs., £263. ; Durban, 1 cs. (pt.), £6. ; Melbourne, 3 cs. (pt.), £202. ; Naples, 2 cs., £86. ; Sydney, 1 cs., £90. ; Tangier, 6 cs. (pt.), £5.

POTASSIUM NITRITE—
Sydney, 1 cs., £6.

POTASSIUM PERMANGANATE—
Colombo, 1 drm., £5.

POTASSIUM PRUSSIATE—
Antwerp, 5 cks., £95. ; Bilbao, 2 kgs., £32. ; Hamburg, 122 cks., £2,125. ; Paris, 5 kgs., £49. ; Piraeus, 3 cks., £58.

PRUSSIAN BLUE—
Irish Free State, 4 drms. (pt.), £6.

ROCHELLE SALTS—
Acajutla, 1 kg., £5.
Bangkok, 1 cs., £8.

SALAMMONIAC—
Hong Kong, 5 cks., £8.

SALICYLATES (*otherwise undes.*)—
Sydney, 6 cs. (pt.), £116.

SALICYLIC ACID—
Shanghai, 1 cs., £11.

SALTPETRE—
Beira, 6 c., £13. ; Colombo, 3 c., £6. ; Delagoa Bay, 3 c., £7. ; Durban, 5 c., £10. ; Fremantle, 1 t., £41. ; Irish Free State, 2 t. 6 c., £91. ; Rio de Janeiro, 2 t. 5 c., £99. ; Sydney, 7 t., £285.

SHEEP DIP—
Buenos Ayres, 23 t. 2 c., £800.
Irish Free State, 1 t. 4 c., £54.

SODA—
Mauritius, 15 c., £7.

SODA ASH—
Limbe, 9 c., £10.
Townsville, 20 t. 4 c., £162.

SODIUM ACID PYROPHOSPHATE
Fremantle, 2 t., £154.

SODIUM ARSENITE—
Durban, 4 t. 19 c., £343.

SODIUM BENZOATE—
Calcutta, 9 c., £117.
Paris, 10 c., £127.

SODIUM BICARBONATE—
Acajutla, 10 c., £15. ; Alexandria, 1 t. 13 c., £64. ; Bombay, 2 c., £6. ; Colombo, 2 c., £6. ; Cuidad Bolivar, 1 t., £11. ; Delagoa Bay, 8 c., £12. ; Durban, 18 c., £25. ; Monte Video, 3 c., £11. ; Panama, 5 c., £8. ; Pt. Elizabeth, 1 t. 10 c., £45. ; Puerto Colombia, 5 c., £7.

SODIUM BISULPHITE—
Monte Video, 1 t., £20.
Paris, 10 c., £10.

SODIUM BROMIDE—
Melbourne, 3 c., £15.

SODIUM CARBONATE—
Copenhagen, 1 t. 1 c., £20.
Hong Kong, 2 c., £8.
Osaka, 1 t., £18.

SODIUM CITRATE—
Bombay, 2 c., £20. ; Calcutta, 2 c., £16. ; Melbourne, 2 c., £19.

SODIUM FLUORIDE—
Durban, 2 c., £6.

SODIUM HYPOPHOSPHITE—
Milan, 2 c., £45.

SODIUM HYPOSULPHITE—
Irish Free State, 5 cs., £40.

SODIUM IODIDE—
Bilbao, 1 cs. (pt.), £29.
Naples, 3 c., £295.

SODIUM PRUSSIATE—
Antwerp, 1 t., £50.
New York, 10 t., £466.

SODIUM SALICYLATE—
Colombo, 2 t. 5 c., £221.

SODIUM SALTS (*otherwise undes.*)
Beyrout, 1 cs. (pt.), £9.
Perth, 10 c., £12.

SODIUM SILICATE—
Townsville, 3 t., £29.

SODIUM SULPHATE—
Barbados, 17 kgs., £6. ; Bombay, 6 cs., £8. ; Cuidad Bolivar, 10 kgs., £9. ; Colombo, qnty. ; Irish Free State, 9 pkgs., £45. ; Perth, 10 c., £9.

SODIUM SULPHIDE—
Brisbane, 5 t. 10 c., £74. ; Hobart, 2 t. 3 c., £30. ; Lyttleton, 4 t. 10 c., £60. ; Rotterdam, 5 t. 4 c., £78.

SODIUM SULPHITE—
Hong Kong, 3 c., £15. ; Norrkoping, 5 t., £123. ; Pt. Elizabeth, 10 c., £8. ; Sydney, 1 t., £26. ; Adelaide, 5 c., £17. Bombay, 4 c., £20.

SULPHUR—
Durban (F.), 2 c., £7. ; Irish Free State, 8 c., £7. ; New York, 2 t., £70. ; Puerto Colombia (F.), 8 c., £11.

SULPHUR (FLOWERS)—
Jamaica (F.), 5 c., £6.

SULPHURIC ACID—
Accra, 4 c., £12. ; Beira, 1 t., £21. ; Colombo, 7 c., £28. ; Demerara, 12 t. 4 c., £234. ; Gibraltar, 1 t., £17. ; Pt. Sudan, 1 t. 5 c., £25. ; Sekondi, 1 t. 18 c., £38.

SUPERPHOSPHATE—
Channel Islands, 115 t., £446.

TARTARIC ACID—
Acajutla, 1 c., £8. ; Aden (F.), 1 c., £6. ; Brisbane, 1 t. 10 c., £180. ; Delagoa Bay (F.), 2 c., £17. ; Demerara, 1 cs., £6. ; Hango (F.), 4 c., £28. ; Hobart, 1 t. 5 c., £150. ; Hong Kong, 1 c., £10. ; Irish Free State, 5 c., £29. ; Melbourne, 2 t. 10 c., £300. ; Pt. Elizabeth, 1 c., £8. ; Puerto Colombia, 1 c., £9. ; Shanghai, 3 c., £18. ; Sydney, 1 t. 10 c., £180. ; Yokohama, 5 t., £600.

ZINC OXIDE—
Hong Kong, 2 kgs., £6.
Petrograd, 10 t. 13 c., £444.

Week ending December 8.

BEESWAX—
Buenos Ayres, 1 t.
Montreal, 1 t. 10 c.

FERTILISER (DRIED BLOOD)—
Canary Islands, £238.

FULLER'S EARTH—
Christiania, 50 t. ; Danzig, 10 t. ; New Orleans, 425 t.

GELATINE—
Delagoa Bay, 1 c. ; Durban, 2 c. ; Karachi, 1 t. 1 c. ; Limon, 1 c. ; Madras, 15 c. ; New Plymouth, 1 c. ; Pt. Elizabeth, 1 c. ; Toronto, 1 t. ; Yokohama, 2 t. ;

GLUE AND SIZE—
Calcutta, 4 t. ; Copenhagen, 1 t. 10 c. ; Dar-es-Salaam, 5 c. ; Durban, 6 c. ; Helsingfors, 50 t. ; Irish Free State, 5 c. ; Karachi, 4 c. ; Lagos, 1 c. ; Lisbon, 3 c. ; Madras, 2 c. ; Mauritius, 1 c. ; Montreal, 5 t. ; Melbourne, 2 t. ; Nelson, 2 c. ; New York, 5 t. ; Paris, 53 t. 15 c. ; Pt. Elizabeth, 12 c. ; Riga, 1 t. ; Rotterdam, 11 c. ; Shanghai, 4 t. ; Sydney, 5 t. 6 c.

PITCH (STOCKHOLM)—
Durban, 10 c.

PLUMBAGO—
Abo, 1 t. ; Bombay, 4 c. ; Buenos Ayres, 11 c. ; Calcutta, 1 t. ; Gothenburg, 10 c. ; Iquique, 9 c. ; Madras, 15 c. ; Malaga, 14 c. ; Mauritius, 2 c. ; Naples, 6 c. ; Valencia, 1 t. 15 c.

QUININE—
Beyrout, 1,126 oz. ; Bombay, 3,715 oz. ; Calcutta, 1,000 oz. ; Melbourne, 200 oz. ; Rangoon, 104 oz. ; Sydney, 3,400 oz. ; East London, 1 t. 10 c. ; Hong Kong, 6 c. ; Jaffa, 3 c. ; Madras, 1 t. 2 c. ; Matadi, 6 c. ; Rangoon, 10 c.

SOAP—
Alexandria, 1 t. 11 c. ; Amsterdam, 6 c. ; Bilbao, 3 c. ; Brussels, 1 t. 3 c. ; Bombay, 16 t. 17 c. ; Buenos Ayres, 13 c. ; Calcutta, 14 t. 5 c. ; Colombo, 11 c. ; Cape Town, 6 c. ; Christiania, 2 c. ; Irish Free State, 1 c. ; Delagoa Bay, 4 c. ; Durban, 16 c. ; East London, 15 c. ; Italy, 2 c. ; Hong Kong, 6 c. ; Jamaica, 9 t. 11 c. ; Kilindini, 1 t. 9 c. ; Libau, 1 c. ; Madras, 13 c. ; Malta, 2 c. ; Mauritius, 5 t. 12 c. ; Melbourne, 10 c. ; Mahanoro, 5 c. ; Montreal, 3 c. ; Paris, 1 t. ; Pasages, 1 c. ; Penang, 2 c. ; Philadelphia, 1 c. ; Pt. Elizabeth, 2 t. ; Pt. Said, 4 c. ; Rangoon, 8 c. ; Riga, 3 c. ; Rotterdam, 6 c. ; St. John (N.B.), 1 c. ; Stockholm, 1 c. ; Shanghai, 17 c. ; Singapore, 16 c. ; Sydney, 2 t. ; Talcahuano, 11 c. ; Timaru, 1 t. 1 c. ; Toronto, 1 t. 6 c. ; Trinidad, 14 t. 4 c. ; Valparaiso, 9 c. ; Vancouver, 2 c. ; Victoria (B.C.), 1 c. ; Wellington, 19 c.

SUPERPHOSPHATE—
Canary Islands, 5 t.

TALLOW—
Genoa, 57 t. 11 c. ; Paris, 10 t. 3 c. ; Rotterdam, 87 t. 11 c.

WHITE LEAD—
Auckland, £272. ; Calcutta, £620. ; Colombo, £120. ; Dunedin, £407. ; Durban, £134. ; Irish Free State, £14. ; East London, £63. ; Lyttleton, £218. ; Manila, £14. ; Melbourne, £860. ; Napier, £84. ; Pt. Elizabeth, £120. ; New Plymouth, £137. ; Shanghai, £78. ; Sydney, £636. ; Timaru, £98. ; Wellington, £2,060.

WAX (MINERAL)—
Antwerp, 1 t. ; Sydney, 2 t.

WAX (VEGETABLE)—
Boulogne, 2 c. ; Valencia, 12 c.

WAX (*otherwise undescribed*)—
Petrograd, 5 t.

MANCHESTER.

Week ending December 6.

AMMONIUM SALTS (*otherwise undescribed*)—
Helsingborg, 24 pkgs.

AMMONIUM SULPHATE—
France, 3,859 bgs.

CHEMICALS (*otherwise undescribed*)
Abadan, 789 drms.
Bombay, 5 drms.
Copenhagen, 1 kg.

COAL TAR PRODUCTS—
Carbolic Acid
Denmark, 30 drms.
Mirbane Oil
Hamburg, 2 drms.
Pitch
St. Nazaire, 1,216 t.
Tar
Alexandria, 31 drms.

DYESTUFFS (ARTIFICIAL)—
Alizarine
France, 18 cks.

GELATINE—
Toronto, 20 bgs.

GLUE AND SIZE—
Alexandria, 100 bgs.
Gothenburg, 1 ck.
Haifa, 10 bgs.

MAGNESIUM SALTS (*otherwise undescribed*)—
France, 202 bgs.

SALT—
Gothenburg, 1,018 sks.
Helsingborg, 3,692 sks.
Malmo, 25 t., 35 brls., 2,800 sks.

SOAP—
Abadan, 28 cs. ; Baghdad, 169 cs. ; Basrah, 20 cs. ; Bushire, 10 cs. ; Holland, 25 cs. ; Jaffa, 25 bxs.

SODIUM SALTS (*otherwise undes.*)
Italy, 100 bgs.

TALLOW—
Holland, 4 cks., 1 brl.

NEWCASTLE-ON-TYNE

Week ending December 8.

AMMONIA—
San Francisco, 250 bgs.

BARYTES—
New York, 100 t.

BLEACHING POWDER—
Copenhagen, 3 cks. ; Gothenburg, 68 cks. ; Gothenburg, 97 cks. ; Rotterdam, 90 cks.

CAUSTIC SODA—
Bergen, 104 drms. ; Copenhagen, 147 drms. ; Christiania, 113 drms. Gothenburg, 94 drms.

CHEMICALS (*otherwise undescribed*)
Christiania, 1 cs.

COAL TAR PRODUCTS—
Tar
Bergen, 1,607 bgs.

GLUE—
Copenhagen, 10 bgs.

LITHARGE—
Antwerp, 10 cks. ; Christiania, 44 cks. ; Gothenburg, 1 ck. ; Hamburg, 200 kgs., 1 bx.

MAGNESIA—
Antwerp, 60 cs., 100 bgs.
Hamburg, 1 cs.
New York, 17 cs.

PITCH (*otherwise undescribed*)
Christiania, 3 cks.

RED LEAD—
Antwerp, 140 kgs. ; Christiania, 17 cks. ; Copenhagen, 24 cks. ; Gothenburg, 8 cks. ; Hamburg, 160 kgs. ; Rotterdam, 134 cks.

SOAP—
Christiania, 1 ck.

SODIUM HYPOSULPHITE—
Copenahgen, 10 bgs.

TALLOW—
Pomaron, 6 brls.

ULTRAMARINE—
Hamburg, 1 cs.

WHITE LEAD—
Antwerp, 100 kgs., 15 cks.
Rotterdam, 84 cks.

ZINC ASHES—
Antwerp, 230 bgs.

N. & S. SHIELDS.

Week ending December 8.

NIL.

PRICES CURRENT.

WEDNESDAY, DEC. 12, 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23- / &	46/-	
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	90	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	5
Formic, 80/85%	*ton	51	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	3	6
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tartaric (crystals)	lb.	0	1	1½
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	9
Aniline Salt	*lb.	0	0	9
Anthracene, 40/45% "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	3
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	0
Creosote	*gallon	0	0	9¼
Cresylic Acid, 97/99%	*gallon	0	2	0
Naphtha, crude, 30%	*gallon	0	0	8½
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	5	15	0
Pyridin	gallon	1	2	6
Tar, crude	ton	4	10	0
Tar, refined	barrel	2	0	0
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	10	10	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	16	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	69	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	10	0	0
Bleaching Liquor, 7%	*ton	4	10	0
Calcium Chloride	†ton	5	10	0
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	81	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	0	0
Formaldehyde, 40%	ton	63	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	2	6
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	46	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	47	0	0
Lead Nitrate	ton	44	0	0
Lime Acetate (brown)	*ton	14	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	5	0
Litharge (British)	ton	45	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	1	16	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	10	0
Magnesium Sulphate, B.P.	ton	6	10	0
Manganese Borate, 85%	ton	105	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	3	1
Naphtha (Wood), Solvent	*gallon	0	5	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	5	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	30	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	34	0	0
Potassium Hydrate (Caustic Potash), 75/80%	ton	30	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	19	0	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8½
Potassium Prussiate (yellow)	lb.	0	0	9½
Potassium Prussiate (red)	lb.	0	2	6
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	55/-	&	52/3
Sodium Acetate	ton	24	0	0
Sodium Arsenate, 45%	ton	47	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	3
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d.
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	15	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	28	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	14	10	0
Sodium Prussiate	lb.	0	0	5¼
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	10	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	0	0
Sulphur (Roll Brimstone)	ton	8	0	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	1
Tin Crystals	lb.	0	1	3½
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	44	10	0
Copper	ton	62	7	6
Lead (Chemical Sheet), delivered	cwt.	1	17	6
Lead (Foreign Pig)	ton	31	5	0
Nickel	ton	130	0	0
Silver	oz.	0	2	9 7/16
Tin, English Ingots	ton	231	0	0
Zinc (Spelter)	ton	32	6	3
Zinc Dust, 90/92%	ton	46	0	0
OILS.				
Cottonseed	*ton	45	0	0
Linseed, Raw	*ton	45	0	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	40	0	0
Turpentine	cwt.	3	14	0

* *Packages extra or returnable*; otherwise prices usually include

† Makers' prices for home consumption only (packing

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
Platinum in the Transvaal	729
Road Transport of Dangerous Chemicals	730
Overseas Trade in November	730
Bankruptcy Law Reform	730
Progress of the Opium Industry	731
The History of Fermentation	732
The Manufacture of Vinegar	733
The Law of Workmen's Compensation	734
Corrosion of Iron and Steel	734
The Vegetable-oil Extraction Industry	735
The Manufacture of Mustard Gas	735
Japan's Chemical Industry	736
The Study of Corrosion	736
Acid Pumping and Elevating Plant	737
Presentation to Mr A. Campbell	737
Items of Interest	738
British Overseas Chemical Trade	739
Midland Chemists' Dinner	740
A Neglected Point in Modern Patent Practice	740
Legal Intelligence	741
Cumberland Coking and By-product Industries	741
Reports of Companies	742
Canadian Arsenic Production	742A
"Permutit" in Analysis	742A
The Identification of Amines	742A
Fertiliser News	743
South Wales Notes	743
New Companies	743
Imports of Chemicals and Allied Products in November	744
Exports of Chemical and Allied Products in November	745
Gazette News	746
Trade Inquiries	746
The Patent List:—	
Applications for British Letters Patent	746
Complete Specifications Accepted	746
Complete Specifications Open to Public Inspection before Acceptance	746
Abstracts of Latest Complete Specifications	746
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	747
Publications Received	748
Market Reports	
London "Open Market" Report	748
London Metal Market	750
Manchester Chemical Market	750
Swansea Market Report	750
Liverpool Chemical Market	750
West of Scotland Chemicals	751
Imports of Chemical Products	751
Exports of Chemical Products	754
Prices Current	758

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CHRISTMAS HOLIDAYS.—Owing to the incidence of the Christmas holidays, the "Chemical Trade Journal and Chemical Engineer" will next week be published a day later.

CURRENT TOPICS.

PLATINUM IN THE TRANSVAAL.

THE recent discovery of platinum in lode form in the Waterberg district of the Transvaal has aroused a great deal of interest, both on account of the unique nature of the find and of the great economic possibilities that are opened up to the Union and to the British Empire in general. Ninety-nine per cent. of the world's output of platinum metals has in the past been recovered from alluvial placer deposits, and the occurrence of the metals in quartz lode, as is now found to be the case in the Transvaal, has not hitherto been recognised. Two principal lodes have been discovered, running, roughly, parallel, and at an average distance apart of 150ft. These lodes vary in width from 2ft. to 20ft., and intensive sampling of the outcrop has proved them to be continuous for a distance of 3,000yds. The first figures, showing the remarkable richness of the samples as given in the assayer's reports, were, naturally, received with scepticism. Repeated sampling at all parts of the outcrop has, however, proved the constant occurrence of platinum in varying, but always in commercially attractive amounts, and there is little doubt from the keen interest many of the Rand gold-mining houses are showing in the work, that capital for the development of the field will be forthcoming. Before the war the average annual production of platinum metals was 176,000 ounces, of which amount Russia was responsible for 89 per cent., and Colombia for 9 per cent. During the war, and mainly owing to the political state of Russia, the output dropped markedly, and in 1920 the world's total output was 73,435 ounces, to which Russia and Colombia each contributed 47½ per cent. The total output of the British Empire in 1920 was only 2,822 ounces, but since that date a small amount of by-product osmiridium has come from the Witwatersrand. The efforts that have been made during the past year to revive the Russian platinum industry have not led to any definite results, and recent information shows that considerable extension in Russian output can hardly be expected in the near future. Consequently, the prices of platinum and its allied metals remain very high. Thus, platinum itself, the price of which before the war averaged about 185s. per ounce, is now quoted at £29.

per ounce. If continued investigation and working confirm the results obtained in the Transvaal outcrop, an annual production of at least 100,000 ounces of the metal may be expected, and it is obvious that present prices cannot be maintained. One authority predicts a drop to the neighbourhood of £10. per ounce, and also states that even if the price fell to £5. per ounce there would still remain a high percentage of profit over mining costs. The exploitation of the Transvaal deposits will be followed with the greatest interest by the chemical industry, to which the prospects of cheaper and more plentiful platinum supplies are particularly important.

ROAD TRANSPORT OF DANGEROUS CHEMICALS.

In January of this year we directed attention in these columns to the necessity for the formulation of a code of regulations to govern the transport of dangerous chemicals by road, in a manner similar to that adopted for the rail transport of such goods. The matter arose in connection with a fire which broke out on a motor-lorry conveying a number of drums of carbon bisulphide from London to Manchester. Fortunately, the conflagration occurred in the open country, and the damage was confined to the destruction of the lorry and its contents; but, as we pointed out at the time, it is very probable that had the accident occurred in the streets of a town, the damage would have been very much greater. A sequel to this fire transpired in Manchester this week, when Mr. Commissioner Radcliffe, K.C., heard the claim of T. Paulding, Ltd., the owners of the bisulphide, against the Talbot Clearing House, the contractors to whom they entrusted the carriage of the bisulphide, for £260. damages for breach of contract and negligence. Judgment was given for the plaintiffs, and from the evidence brought forward at the hearing it is difficult to quarrel with the judgment. It appears that the plaintiffs instructed the defendants that the goods were of a dangerous nature, that the drums should be securely fastened, and that no drums should be accepted which showed any signs of leakage. It was then shown by the evidence that the defendants, although they may have given a similar warning to the sub-contractors they employed, did not take adequate measures to ensure the instructions being carried out, for on the day the bisulphide was loaded on the lorry two of the drums were leaking. The whole matter possesses a far wider interest, however, than the mere settlement of the differences between the litigants, and the fact that the issue in this instance was not complicated by extensive third-party claims must not be allowed to obscure the public-safety aspect of the incident. It is not sufficient that regulations for the road transport of such highly inflammable and toxic materials as carbon-bisulphide be left to the discretion of the consignors—although in this case it must be stated the latter did stipulate reasonable precautions,—but it is essential that official regulations, applicable to every case where dangerous chemicals have to be transported any distance by road, be promulgated without delay.

OVERSEAS TRADE IN NOVEMBER.

The outstanding feature of the Board of Trade returns for November is that the value of imports is the highest monthly figure since January, 1921. Compared with October, the increase amounts to less than £1,000,000., but analysis of the figures reveals that whereas imports of manufactured goods were lower, raw materials and food products increased. Total exports, on the other hand, fell from £82,470,000. in October to £75,939,000. in November, increasing the trade balance to £25,646,000., the highest "adverse" figure for the past twelve months. Many factors have contributed to the erratic nature of the returns for this year—the return to normal after the depression and succeeding activity due to the dockers' strike, the unsettling effects of the possibilities contained in the recent general election, the continued political unrest in Europe and the Far East, all have affected the flow of British foreign trade. Comparison with last year is somewhat difficult in view of the change in the status of Ireland, which places that state in the list of foreign countries. Unfavourable though the position is so far as it is indicated by the November statistics, a review of the trade during the year shows that the improvement observed during 1922, as compared with 1921, is not maintained. For the eleven months of 1923, imports increased by 8.8 per cent., compared with the corresponding period of 1922, while exports of British goods increased only by 6.3 per cent. Total exports, which includes transhipments of foreign and colonial merchandise, rose by 7.2 per cent. in the same period. The fact that we are exporting a greater percentage of raw materials than in former years appears to indicate that foreign countries are purchasing these materials in order to manufacture goods which could be produced in this country. Such a policy steadily pursued is bound ultimately to reduce us to the position of merely exporting capital, in the form of coal, etc., and of acting as merchants only in other branches of the world's commerce.

BANKRUPTCY LAW REFORM

For many years the conviction has been steadily growing among business men that the Bankruptcy Acts are in need of considerable amendment, and that the losses sustained by the trading community in connection with bankruptcy and other insolvency are swollen by fraudulent, hazardous, and speculative trading. Concrete expression has been given to this general opinion by the findings of a sub-committee of the executive council of the Association of British Chambers of Commerce. The members of this committee include many well-known leaders in the business world, and it is the intention of the body to draw up a case to be presented to the President of the Board of Trade. The principal alterations in the 1914 Act that the committee propose are the extension from 6 months to 12 months of the period within which a person, if he commits the offences set out in the sub-section of section 154 of the Act, shall be guilty of a misdemeanour, and the addition of a further number of misdemeanours under the section.

THE PROGRESS OF THE OPIUM INDUSTRY.

MODERN CONDITIONS AND NEW SOURCES OF SUPPLY.

By John Missenden.

POST-WAR statistics and investigations do not show any decline in the manufacture and quality of opium; on the contrary, there seems to be a general uplift for which it would be difficult readily to account. Not only has the industry improved on the points mentioned, but the sciences of growing, extraction, and preparation have, in the main, reached a higher degree.

The facts contained in this article are correlated from industrially recognised sources—home and foreign—and it will be seen that prominence has been accorded to those newer spheres of production whose finished results seem to supersede, in many respects, the materials which are now purchased for pharmacological manufacture at home.

Grading in the Indian Opium Trade.

These data are based upon the percentage of morphine contained in the raw product. Three grades of opium are recognised:—*prime*, which represents the high-grade substances used in medicinal preparations; *current*, which forms the greatest bulk of export qualities; and *chiqinti*, which is the cheapest grade, and which is almost confined to the manufacture of smoking opium.[1] The prime and the more important classes of current (*i.e.*, those suitable for pharmacy) will be dealt with here.

The "Malwa" Varieties.—Opium being one of India's most important products is now of fairly high grade. The two classes of poppy chiefly cultivated are the "Malwa" (purple flower) and the "Bengal" (white flower). The former is grown mainly on the slopes of the Vindhya Hills, in the Malwa district, and in Rajputana, where the climate is fairly uniform. The industry has developed greatly during the last few years owing to the recent establishment of railway communications between the markets of Indore, Bhopal, and Jodhpur, and the distributing firms in Karachi and Bombay. The latter class is grown in North Bengal and the Bautan district.

The main exports to England are of the "Malwa" class, and take the form of balls, each six inches in diameter and containing 30 per cent. of moisture. These balls are covered with prepared poppy-leaves made to adhere to the ball by an opium-containing liquid which is easily removed. A case consists of 40 balls with a net weight of 160lb., the whole being well packed in poppy waste. The other class which is exported from the Allahabad region ("Benares") is packed in paper bags, with a moisture content of 13.5 per cent. The cases, which contain 80 cakes, have also a net weight of 160lb. Discrimination should always be made between the standard product examined by Government officials and the poor-quality product manufactured in certain uncontrolled factories—the latter not being uniform, containing only 5 to 6 per cent. of moisture, and having an extremely low morphine value. This latter substance is known as "native Malwa," and really belongs to the chiqinti class. The morphine content for "Government Malwa" should be at least 7 per cent., while a fair average is 8 per cent. The official laboratories export small quantities of high-grade morphine salts at quite reasonable prices: the hydrochloride and sulphate at 4 rupees and the tartrate at 4¼ rupees per 10 grammes. Developments in this branch are anticipated.

Akmim Product.—This quality is somewhat inferior, and it is questionable whether even the lower price is sufficient to make its purchase profitable. Experts believe, however, that were the regulations now ruling in India generally adopted and were more earnest measures taken to render production truly scientific, considerable improvements would result. The poppy grown is of the white variety, and the districts under cultivation are Assiout, Akmim, and Kenneh. Undoubtedly the best grade is produced in the Akmim region, about 300 miles south of Cairo. Some idea of the possibilities of development may be gathered from the fact that an experimental crop grown in the neighbourhood of Assiout showed a morphine content of 13.3 per cent., while the usual commercial averages are: Assiout, 0.5 to 1.0 per cent.; Kenneh, 3.3 to 3.9 per cent.; and Akmim, 7.0 to 7.4 per cent.

Australian Opium.

The general tone of opium production in Australia is quite sound, and a wide range of specimens provided promising results. The oldest district is that of Bacchus Marsh (Victoria), which yields three successive crops each season. There is much room for improvement, however, as the output is comparatively low,[2] while the chemical analysis shows: morphine, 2.7 per cent.; and narcotine, 10.3 per cent. The commercial material from Queensland contains 11.2 per cent. of morphine, 2 per cent. of meconic acid, and 2.3 per cent. of narcotine.[3] An experimental crop gave 13 per cent. of morphine. Export is in balls, 35 to a case of 120lb., the packing being similar to the Indian Government "Malwa."

The Smyrna and Constantinople Markets.

From a commercial viewpoint the substance obtained from Asia Minor is probably the richest in the world, but its one great drawback is that there is little or no uniformity in the trade. Small areas of land are cultivated independently by thousands of the peasant population. Their open market is at Constantinople, and no attempt at co-ordination between the producers is made nor has any standard been fixed. The proposal has been put forward to form a trading-market at Tarsus (the one at Smyrna not now being used for heavy traffic), but no definite plans have been made.[4]

The product obtained from Smyrna and Constantinople is the familiar "Turkey opium," and is derived from a purplish-white flower which Boissier named *glabrum*[5]—which of all the opium poppies is probably the species demanding the greatest attention and skill in manipulation. The trading procedure in the Konia district may be of interest as illustrating the lack of organisation throughout the States. After the hardened juice has been scraped from the flowers, it is dried, and then made up into masses of any convenient size and shape for transport to the dealers. These people reduce the product and put it into bags for the market. At the market a public examiner is supposed to scrutinise the pieces carefully to give them their grading, but it is known that much of the opium does not come under the notice of these men; this accounts for the large number of complaints made both before and since the war.

The export product is generally made up into spheres of anything from ¼lb. to 4lb., and may be covered by poppy-leaves, a form of cheap absorbent paper, or chaff of extremely doubtful origin. Also, now that Constantinople has to deal with the bulk of the Smyrna trade, the less valuable products of Karahissar, Konia, Bulladan, and Afium often pass with the good. "Current Angora" and the old "prime Smyrna" (now called "prime Insparta," I understand) are good grades to purchase for medicinal purposes, although original "Tikvish and Yerli primes" are better if they can be obtained at a reasonable price. Tikvish contains 13.7 per cent. of morphine; Yerli, 13.4 per cent.; Konia, 10.5 per cent.; while the moisture varies from 10 to 25 per cent. Should any one specimen contain less than 9.5 per cent. of morphine adulteration may be suspected; in fact, it is wiser to suspect every piece until it has been proved genuine. One very reputable manufacturer—a man who has been in the trade over thirty years—once sent a consignment to England, each cake of which contained 15 per cent. of sand. The products from these districts must always be looked upon with suspicion.

Opium from China and Persia.

The opium production of China is wholly absorbed by the Chinese population, and export is practically nil as far as England is concerned. The opium is of low grade, containing 5.5 per cent of morphine and 20 per cent. of moisture.

Although Persia's reputation as an opium manufacturing country has not been a very good one, the quality of the drug has, in recent years, improved enormously. In the old days a considerable amount of adulteration took place, while cultivation was careless and generally unsatisfactory. Now, however, the industry has been put on a firmer basis, inasmuch as cultivation is along recognised scientific lines, adulteration is decreasing, and greater care is being exercised in the packing for export. On the subject of adulteration, it may be stated that quantities of the Persian drug sent to England were found to have a heavy content of grape-juice, and, in some cases, of tragacanth. It cannot be over-emphasised, therefore, that business should be solely confined to those exporters whose reputations are unquestionable.

If the "Kupa opium" can be obtained in sufficient quantities, so much the better, as it has an excellent name; but if this is found too scarce (the price is sure to be high, in any case), the "Balfarush" and "South Kerman" are quite good varieties, although the latter sometimes has an

admixture of *Penæa mucronata* resin and crushed poppy capsules. Some specimens from Kermanshah showed a grape-juice content of 53.6 per cent. The amount of moisture is remarkably uniform at 10 per cent., while morphine is usually present from 7.5 per cent. to 12.5 per cent. The original *Teriak-e-Arabistani* is now seldom heard of, although the name still covers most of the product from Persia.

European Efforts.

Production of opium in Europe has hardly passed the experimental stage as yet; but at the same time, some astonishingly good results have been obtained, especially in France and Germany. In England, there are hardly any manufactories and very few experimental stations, although the soil and weather conditions are good in some places. The experimental products of France compete most favourably with those of Asia Minor in morphine; the "affium" of Clermont-Ferrand being said to contain 10 per cent. morphine in the amorphous product.[6] A specimen examined by Gulborte[7] contained as much as 22.8 per cent., while averages as high as 17 per cent. are common. There seems to be great promise in this direction. The German specimens showed the following results: Wurtemburg, 12 to 15 per cent. morphine; Erfurt, 16 to 20 per cent. Some attention should be paid, also, to the possibilities in Russia. Specimens show a morphine content of about 8.2 per cent. (amorphous), produced in the Ssemiretschinsky district. Activities in other quarters are producing similar favourable results.

It should be added that as the poppy is a plant which does not manufacture either tannin or starch, the presence of these in an opium sample makes adulteration an established fact.

Practical Tests for Morphine.

Since the morphine content invariably exists in the form of morphine sulphate and morphine meconate, the usual practice is to extract these salts with water, the residue being the "opium dirt" recognised in China. A method described by Gregory is, perhaps, the best for purposes of separation, it being extraordinarily simple and certainly the cheapest for commercial purposes. The raw product is broken down as much as possible and mixed with water at a temperature of about 60° C. (the best proportions are: 6 pints of water to 4lb. of raw opium) and 1½lb. of precipitated chalk is added. The whole should now be violently agitated for a short time and evaporated until it becomes appreciably viscous. Calcium chloride to the extent, say, of 5 or 6 oz. can be added, and the whole is diluted with water until a temperature of 60° C. is again reached. Filtration will separate calcium meconate, "dross," and any adulterants, either as resins or calcium salts. Particular notice should be taken of the "dross," as this also may contain some impurities.

The concentrated filtrate will show morphine and codeine hydrochloride crystals, from which a mixture of morphine and codeine may be obtained by subsequent treatment with "ammoniated charcoal." Final separation may be effected by ether, codeine being more soluble therein than morphine. The residue so precipitated can be examined, and some idea of the raw product content be obtained. It is essential, however, that care be taken to remove *all* the codeine, while the "dross" should be subjected to expert analysis when a new batch of raw product is being broken down.

Several fluids can be used for the testing of samples. One is a solution of *pure* sulphuric acid, a little of which is added to about an ounce of the raw material. The mixture should then be warmed very gently, and a brownish liquid will result, the intensity of which (providing standard solutions are used) gives ample indication of the percentage morphine content. The author has used a card so coloured in sections that it corresponds to 2.5 per cent. increases, using one ounce of raw product and six ounces of five per cent. sulphuric acid solution (chemically pure), at a maximum temperature of 50° C. The error is seldom above one per cent., and, providing care has been taken, accuracy to within 0.5 per cent. is usual.

Similar results can be obtained by using C.P. nitric acid solution (ruby colouration which is not so easy to read, the colour having a narrow range), and C.P. ferric chloride solution (blue colouration which is generally too deep to be effective, even with artificial light). The iodine test which is so often used cannot be recommended for the joint purposes of detection and estimation.

Occasionally, owing to the liberation of hydrochloric acid through some cause, apomorphine (emetic) is produced. Should this be suspected, a small quantity of the material should be exposed to the air for a day or so, and then subjected to the fumes of ammonia. The presence of the emetic will be apparent upon the appearance of a green colouration which changes to red upon exposure to air. Pseudomorphine (inactive) is identified in a similar way.

Tincture of Opium and Codeine.

Where import is in liquid form, the morphine content may be obtained in the following way: Add five grammes of calcium hydroxide to 45 c.c. of concentrated tincture, and dilute to 20 c.c. with pure water. Filter, and add 100 c.c. of ether, 30 c.c. of 85-per-cent. alcohol, and 12 grammes of sal ammoniac (C.P.). Agitate the mixture for an hour or so, and allow to stand for several days. The morphine crystals can then be collected. Providing no losses have occurred, a good tincture would yield 1 gramme per 100 c.c. of resulting liquid after test. This method of import is not, however, to be recommended.

Codeine.

The preparation of codeine has been explained *ut sup.* A rough estimation of the codeine content may be made by a similar method to that applying to morphine. But whereas, in the morphine test, the colouration produced by ferric chloride is destroyed by the addition of sulphuric acid, a solution of codeine and sulphuric acid will give a medium blue colouration when a trace of ferric chloride is added. This is the only satisfactory test yet devised.

References:—

[1] These terms correspond with the "shipping," "druggists," and "manufacturing" grades respectively.

[2] Official estimates (for raw products) are as follows:—

Australia	15—25lb. per acre.
China	22—24lb. per acre.
India	30—40lb. per acre.
Europe	25—30lb. per acre.

[3] This is an improvement on the results shown in 1900, when the content was 1.9 per cent. of morphine and 9.3 per cent. of narcotine.

[4] A British firm advanced the idea last May, but certain Turkish industrialists opposed it, eventually causing their Government to withdraw a half-given consent.

[5] *Flor. Orient.*; 1867, i, 116.

[6] *Aub. Pharm. J.*; 15, iii, 693.

[7] *Journ. Pharm. Chim.*; 6, iv, 222.

THE HISTORY OF FERMENTATION.

S.C.I. DISCUSSION AT NOTTINGHAM.

At a meeting of the Nottingham Section of the Society of Chemical Industry on December 12, Professor A. R. Ling gave a lecture entitled "Some Points in the History of Fermentation, particularly as applied to the Brewing Industry."

Three Main Epochs.

It was shown that certain fermentations, such as the making of wine from rice and bread from wheat in China (2,000 B.C.), and the preparation of beer from barley in Egypt (4th Dynasty), had been known since the earliest times. The lecturer then dealt with the modern history of fermentation, and indicated three epochs, commencing with the chemical epoch in which Stahl propounded the theory that a ferment was a body in an active state of motion which it was capable of communicating to other bodies. Lavoisier, Gay Lussac, Leeuwenhoek, Schwann, Berzelius, Wöhler, and Liebig all made contributions to the theoretical and practical sides of fermentation. The three last-named chemists ridiculed the idea that yeast was a living organism, but were forced to admit this fact after Pasteur began his work. With Pasteur's classical researches commenced the second or biological epoch, and these showed that alcoholic fermentation was concerned with the life and not the death of yeast.

The third or biochemical epoch was opened in 1897 by the discovery by E. Buchner, who demonstrated that the alcoholic fermentation of sugar was brought about by the enzyme zymase present in the yeast. Professor Ling then described the essential features of malting and brewing; he mentioned that the finished malt contained very little maltose, but chiefly starch with some saccharose. Aeration of both steeping liquor and wort was important, and the fermentation of

wort by yeast proceeded in two stages—aerobic, followed by anaerobic fermentations.

Yeasts and the Brewing Industry.

In the discussion which followed, Professor Kipping inquired as to the cause of the production of saccharose in the finished malt; also as to the power of one yeast to take on the function of another species. Mr. Pentecost asked if there was any method for regulating the action of diastase on thick starch in the production of thin starch used in textile stiffening.

In reply, Professor Ling stated that as yet no chemical explanation had been found to account for the presence of saccharose in malt. In the case of the intraconvertibility of different yeasts, really every yeast was a product of its environment, and in the course of time could acquire different characteristics and functions. It should not be difficult to regulate the action of diastase on starch by making use of the polarimeter, Fehling's and iodine reactions. All enzymes in starch solution were destroyed at 212° F. (best by rapid heating), and also by addition of alkali.

THE MANUFACTURE OF VINEGAR.

TECHNOLOGY OF THE FERMENTATION PROCESSES.

By "Biochemist."

(*Continued from page 700.*)

CORRECT aeration is essential to efficient acetification, as losses as high as 40 per cent. have been incurred through non-uniform air supply. One result of under-aeration is the development of mother-of-vinegar ("tripe"), a growth which leads to channelling and so to irregular distribution and oxidation of the gyle with the formation of acetaldehyde and further oxidation of acetic acid in consequence. To avoid clogging, the shavings may advantageously be replaced by wicker-work while a host of devices have been suggested to prevent defective aeration. Thus, the better to aerate the interior of the bacterial mass, the air-holes may be provided with glass tubes projecting into the interior; or a central tube through the floor of the vat may be used. Another method is to support the shavings on a conical false-bottom, but according to the results of Janke and Bauer (*Centr. Bakt.*, 1916), better aeration is obtained by the use of a central, hollow, perforated cylinder, provided with glass inlet tubes. The spent air leaving the generator may be cooled with the incoming cooled gyle, in order to recover its content of acetic acid (*Brit Pat.* 144,693, of 1920).

For the preparation of strong vinegars (more than 12 per cent. acid), the acetifiers may be operated in series. For instance, potato- or grain-spirit may be added to a 6 per cent. vinegar and the product then acetified in a second generator, the process being continued until vinegar of the required concentration is reached. In a modification of the generator process, suitable for small-scale operation, the gyle percolates through a vertical series of aerated wooden tubes, packed with shavings or charcoal, the whole being enclosed in a glass receptacle (Singer). One disadvantage of such an arrangement would be the frequent cleaning necessary. A similar drawback occurs with the apparatus due to Berseh, which consists of superposed glass plates with narrow spaces between. The quick process cannot be used with success for producing wine vinegar, owing to the clogging of the bacterial medium by tartar deposits.

Treatment of the Acetified Gyle.

After maturing for some weeks, the crude vinegar is clarified by filtration through beech chips or spent raisin skins used in conjunction with shingle, sand or kieselguhr. In the case of crudes which brighten only with difficulty, resort is had to treatment with isinglass ("finings"), kieselguhr or potassium ferrocyanide. Paper pulp constitutes an excellent filtering-medium, but it clogs rather easily. To prevent the growth of *Mycoderma aceti* and other organisms, it is usual to sterilise the clear vinegar, without loss of strength, by passing it first through a hot coil at 63° C. and then through a cooling-coil, a process which also accelerates ester formation.

"White vinegar," "distilled malt vinegar," and "white wine vinegar" are made by distilling ordinary vinegar under reduced pressure in tin-lined gunmetal stills of about 100 galls. capacity. A 6 per cent. vinegar thus fractionated, will give equal parts of 3, 5½ and 9-10 per cent. acids. "Vinegar essence" is a German product containing about 12 per cent. acid, prepared by acetifying potato-spirit.

Vinegars from Fruit Juices and Other Sources.

Cider or "apple" vinegar is made from the second pressing of the "pomace," to which water and sugar are added. The liquor is clarified by storage or filtration, and then fermented first with yeast, then with acetic bacteria. The product contains malic acid. Recently, Poore (*J. Ind. Eng. Chem.*, December, 1920), has described the manufacture of vinegar from the juice of both sound and frozen oranges. The juice is fermented with bakers' yeast at 30° C., centrifuged or filtered, and then acetified by both the barrel and generator processes. Beechwood shavings or corn-cobs saturated with unpasteurised vinegar constitute the acetifying medium. Citric acid is present in the product. Vinegar has also been prepared from dates. Whey vinegar is the product of the successive alcoholic and acetic fermentation of neutralised skim-milk containing added sugar. It contains both lactic acid and lactose. A cheap substitute for wine vinegar, known as spirit vinegar, consists of fermented dilute alcohol enriched with malt extract, while "wood" vinegar is substantially dilute acetic acid, coloured with caramel and flavoured with acetic ester or with brewed vinegar.

The Testing of Vinegars.

According to Mitchell (*J. Soc. Chem. Ind.*, No. 8, 1918), the Trade Numbers of vinegar—22, 20, 18, and 16—do not denote the number of grains of anhydrous sodium carbonate required to neutralise one fluid oz., as is generally supposed, but have their origin in the old retail prices. The acidity is usually determined by titrating with standard NaOH and phenolphthalein. In the case of dark-coloured products, the caramel should first be removed by precipitation with fuller's earth. To detect free mineral acid, methyl violet, Congo red paper or thymolsulphophthalein may be used; or the electrometric method for H-ion determination may be applied (Kling and Lasseur, *Comptes rend.*, 1922).

For the determination of free sulphuric acid, the method depends on estimating the alkalinity of the ash of the neutralised vinegar. The required result is arrived at by deducting this value from the total acidity, care being taken, in titrating, to allow for the disturbing effect of phosphates. According to an official recommendation, vinegar with less than 4 per cent. acetic acid should not be retailed.

Phosphoric acid may be estimated by the usual molybdate reagent, nitrogen by the Kjeldahl method on 10-25 c.c., while oxalic acid, which may result from over-oxidation, can be detected and estimated by adding a solution of calcium acetate (Bau, *Chem. Zentr.*, 1920). To estimate caramel, it may be precipitated by fuller's earth, tannin, or alcoholic paraldehyde. Adulteration can frequently be detected by means of the polarimeter. According to Balcom and Yanovsky (*J. Assoc. Offic. Agric. Chem.*, 1921), it is advisable to use decolourising carbons such as "Eponite" and "Norit" to clarify the vinegar, as lead salts affect the optical rotation. The usual tests for metallic contamination by arsenic, tin, lead, copper and iron, should be applied. To determine the total solids, 100 c.c. are evaporated on the water-bath with frequent shaking, and a deduction made for the acid retained by the solids.

In the following table are collated some of the more-important analytical data for vinegars from various sources:

	Barley Malt.	Wine.	Cider.	Orange.	Date.	Whey.	Spirit.	Wood.
Sp. Gr. (60° F.)	1·021	1·0213	—	1·0240	—	1·0184	—	1·009
	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Acetic acid ..	5·4	6·55	4·8	3·9	5·4	6·4	7·6	4·9
Total solids ..	3·84	1·93	2·44	4·40	2·63	2·10	0·22	0·52
Ash	0·39	0·32	0·33	0·63	0·49	0·11	0·04	0·03
P_2O_5	0·13	—	0·034	0·056	0·047	0·045	—	0·02
Protein (N × 6·25)..	0·87	—	—	0·60	0·17	0·17	—	0·06
Fixed acid ..	—	0·17 (pot. bi-tartrate)	0·10 (malic)	1·05 (citric)	—	0·18 (lactic)	0·08 (tartaric) and 0·03 (s'phuric)	—

The figures in the case of cider vinegar are the average values for 22 samples, those for date vinegar are the average of 3 analyses.

THE CORROSION OF IRON AND STEEL.*

DR. NEWTON FRIEND'S COLLOID THEORY.

IT is generally recognised that when iron (or steel), air, and water are brought into contact, corrosion takes place. The iron, by virtue of traces of impurity in itself, in the air or in the water, passes into solution in minute quantities, which are renewed as rapidly as they are thrown out of solution in the form of rust. Thus, for example, carbon dioxide being one of the most prevalent impurities, the scheme in most cases would appear to be as follows:—

$$\text{(i)}\quad Fe + 2H_2O + 2CO_2 = \underset{\text{Soluble ferrous bicarbonate.}}{FeH_2(CO_3)_2} + \underset{\text{Nascent hydrogen}}{2H}$$

The nascent hydrogen combines readily with dissolved oxygen to form water. The remaining reactions proceed as follows:—

$$\text{(ii)}\quad FeH_2(CO_3)_2Aq = FeO.Aq + H_2O + CO_2$$

$$\text{(iii)}\quad 4FeO.Aq + O = \underset{\text{Rust.}}{2Fe_2O_3Aq}$$

The carbonic acid liberated in accordance with equation (ii), through the hydrolysis of ferrous bicarbonate, is free to attack more metal, and so the cycle continues.

Phenomena Inexplicable by Current Theories.

There are, however, many phenomena attendant upon the corrosion of iron that cannot satisfactorily be explained in the above manner, and it becomes evident that another supplementary theory is necessary. When a piece of iron is laid in a tube and water caused to flow over it, the first effect of increasing the rate of flow is to enhance the corrosion of the metal. But a critical velocity is soon reached—namely, approximately one-tenth of a mile per hour, at which the corrosive effect attains a maximum, further increase in velocity resulting in a decrease of corrosion, until with a rate of flow of about four miles per hour, corrosion ceases. The metal under these conditions loses only very slightly in weight, probably in consequence of direct solvent action coupled with mechanical erosion. This interesting phenomenon can neither be anticipated nor explained by any recognised theory of corrosion. It appears as if the moving water washes away from the surface of the metal, something that is needful to induce corrosion. The author therefore suggests that:—

The Rôle of Colloidal Ferric Hydroxide.

1. On coming into contact with ordinary air and water, iron slowly dissolves in minute quantities, ultimately yielding ferrous hydroxide sol—that is, colloidal ferrous hydroxide.

2. This sol oxidises in excess of air to form colloidal ferric hydroxide $Fe_2O_3Aq.$; in less favourable circumstances colloidal ferrosoferric hydroxide, $Fe_3O_4Aq.$, is produced.

3. This higher colloidal hydroxide now acts catalytically, accelerating the oxidation of the iron and simultaneously undergoing reduction to a lower colloidal hydroxide. It re-oxidises as the air diffuses towards it, and the cycle continues.

4. Rust is formed when the colloidal hydroxide precipitates out or "flocculates."

In ordinary cases, therefore, corrosion may proceed in two ways simultaneously—namely:—(1) By direct solution—a process rendered possible by the presence of dissolved electrolytes. (ii) By catalysis, this reaction being superimposed on the other, the colloidal iron hydroxide functioning in the presence of air as the active catalyst. In acid solution the former of these reactions takes place almost exclusively. In neutral solution, the second reaction plays an important part. This colloidal theory may be represented briefly by the following scheme:—

$$2Fe + \left[\underset{\text{colloidal}}{2Fe_2O_3Aq}\right] + Aq = 2FeOAq + \left[\underset{\text{colloidal}}{4FeO.Aq.}\right]$$

$$\uparrow \qquad \downarrow + \text{Air} \qquad | + \text{Air}$$

$$\text{Rust}$$

The Effects of Chromates and Radium Rays.

This theory enables explanations to be offered for many interesting phenomena that are otherwise anomalous. Thus, for example, it is evident that any factor, whether mechanical, chemical, or electrical, that is capable of destroying the colloidal forms of iron hydroxide, will tend to retard corrosion. That is precisely what is found in practice to be the case. Experiment shows that the relative precipitating powers of chromates, sulphates, and chlorides upon ferric hydroxide sol are as follows:—

Chromates and dichromates	100.0
Sulphates	67.0
Chlorides and nitrates	0.3

In other words, large quantities of nitrates and chlorides are required to precipitate the colloids, but only small quantities of chromates and dichromates, the sulphates occupying an intermediate position. It is to be anticipated therefore that small quantities of chromates will inhibit corrosion. This is known to be the case, and the addition of chromates to boiler feed waters, and to paints destined for the preservation of iron, has frequently been recommended. Another interesting phenomenon is the behaviour of iron towards radium rays, which usually tend to accelerate oxidation processes. If the corrosion of iron is purely an ionic effect, exposure to radium rays should lead to enhanced corrosion. On the other hand, the rays tend to precipitate colloidal iron hydroxide, and will therefore, according to the colloidal theory, tend to retard corrosion. Experiment has shown that radium rays, springing from an exceedingly feeble source, exert a decided retarding action upon the corrosion of iron.

* Abstract of paper, entitled "Recent Advances in the Study of Corrosion," read by Dr. J. Newton Friend to the Hull Chemical and Engineering Society on December 11.

THE LAW OF WORKMEN'S COMPENSATION.

IMPORTANT CHANGES IN THE NEW ACT.

A NEW Act (the Workmen's Compensation Act, 1923) will come into operation on January 1, 1924. The Act repeals the temporary War Addition Acts of 1917 and 1919 as at December 31, 1923. On and after this date the law of workmen's compensation in Great Britain will be governed by the Acts of 1906 and 1923. The changes introduced will not apply automatically on January 1, 1924, in all cases. The application of some of them will depend on whether or not the accident occurred on or before December 31, 1923 (see Section 1). Certain sections institute new benefits, but only so far as new accidents are concerned

Increase in Employer's Liability.

On and after January 1, 1924, the position as to minimum and maximum benefits will be as under:—

Fatal Accidents.—At present the maximum compensation payable to dependents is £300., minimum £150. Under the new Act the maximum liability of an employer respecting an accident resulting in the death of a workman will be £300. if there be no children under the age of 15, and £600. where there are children under 15. Minimum liability £200.

Total Incapacity.—Benefits are based on average weekly earnings, with a maximum compensation of £1. 10s. per week. The present maximum of 35s. per week will be continued in respect of accidents which have already occurred or may occur before January 1 next.

Partial Incapacity.—Under the new Act the maximum weekly benefit will be 30s. Existing benefits and those in respect of accidents which occur on or before December 31, 1923, will be based on the present maximum of 20s. per week.

As the law at present stands, compensation is not payable for the first week unless the incapacity is of two weeks' duration, or longer. The new Act provides for the payment of compensation from the fourth day of inability in all cases, except that where the incapacity lasts for four weeks, or more, compensation is also payable for the first three days. In accidents occurring after December 31, 1923, a workman will be entitled to compensation even though he has been injured through his acting in contravention of any regulation applicable to his employment (see Section 7). At present compensation is not payable to non-manual workers whose remuneration exceeds £250. per annum. Under the new Act all such persons whose remuneration does not exceed £350. will be brought within the scope of the workmen's compensation.

Certain duties will also be placed on employers on and after January 1, 1924, which materially affect the liability of employers. Copies of the Act can be obtained from booksellers, or direct from H.M. Stationery Office, price 6d.

THE VEGETABLE-OIL EXTRACTION INDUSTRY.

RECENT CHANGES IN MATERIALS AND METHODS.

A JOINT meeting of the Liverpool Section of the Society of Chemical Industry and of the Engineering Group of the Society, took place at the club rooms of the Overseas League, Elliot Street, Liverpool, on Wednesday week, Mr. Edwin Thompson presiding over a large attendance.

The Chairman, in opening the meeting, very cordially welcomed the members of the Engineering Group on behalf of the members of the Liverpool Section. Mr. J. T. Brewis read a paper on "The Extraction of Oil from Seeds, Nuts, and Kernels," as under the joint auspices of the Liverpool Section of the Society, and the Engineering Group.

The Introduction of Rich Oil Seeds.

There were few mills in this country, the author said, in a position to concentrate on the extraction of oil from one or two particular seeds. It might be necessary to extract the oil from cotton, or rape seeds, soya beans, ground nuts, babassu kernels, copra, palm kernels, shea nuts, linseed or castor seed, and as practically each of these seeds and nuts possessed some distinct peculiarity calling for special treatment, few mills were in a position to handle the complete range in the most efficient manner. The introduction of rich oil seeds and the demands for crude edible oils, had revolutionised the oil milling. The pressure applied to cake had increased enormously; from 0.6 tons to 4 tons per sq. inch, with a consequent increase in the cost of pressing plant. There was now no difficulty in producing with the Anglo press, having a gross pressure of approximately 500 tons, palm kernel cake containing only 5½ per cent. of oil.

The highest possible yield of oil was not the only consideration in seed crushing. The production of cake that would satisfy the requirements of the farmer must be taken into account. Cakes were now sold guaranteed to contain a certain percentage of oil, and actually the oil content was higher than the guarantee.

Progress in Solvent-extraction Methods.

Dealing with the extraction of oils by means of solvents, the author said that the solvent system had developed rapidly since the war. There were now several plants each dealing with close on 1,500 tons of seed per week. Undoubtedly, allowing for wage fluctuations, the cost of extraction by the solvent methods had been considerably reduced during the past few years. This had been brought about by increased production per unit, usually considered as 4 pots; reduced solvent losses, cheaper solvent and less consumption of steam. For the extraction of oil from seeds, a solvent should contain no trace of any compound capable of undergoing chemical change during the extraction process. It should have a close range of distillation, not too low to encourage loss, nor so high as to require a final temperature of evaporation injurious to the oil. It should not be soluble in water, and it should have a distinctly different gravity from water. The characteristics of some available solvents appear in the following table, which was shown on the screen:—

Solvent.	B.P. °C.	Sp. Heat.	Latest Heat Cal./Gram.	Price per Gall. s. d.
Ether	34.6	0.53	90	4 6
Carbon bisulphide	46.2	0.24	83.8	3 7
Chloroform	61.2	0.23	58.5	25 2
Alcohol—Methylated spirit	78.1	0.6	205	3 1
Carbon tetrachloride	76.7	0.2	51	6 2
Benzol (pure)	80.3	0.41	93.4	1 7
,, (commercial)	79–125	0.408	95	1 3
Trichlorethylene	87	0.233	56.6	5 3
Petroleum spirit	100–120	0.425	73.5	1 6
Toluol (pure)	110.8	0.404	—	1 10
Turpentine	0.59	0.41	74	4 10

The Ideal Solvent, Benzine or Trichlorethylene?

For general suitability there had, up to quite recently, been nothing comparable to the specially prepared petroleum spirit. It had a satisfactory boiling-point and a sufficient close range to place it on an equivalent with the constant boiling solvent. Further, the standard grade which had been proved to be suitable for the extraction of edible oils, could be obtained at a reasonable price. Unfortunately, it was inflammable and its use added considerably to the insurance charge on plant and buildings, especially in a congested district, and owing to special precautions which had to be taken in the arrangement of artificial lights, it was difficult to obtain good plant illumination.

Within recent time, trichlorethylene had come into prominence for the extraction of oil from seeds, and it would now appear to be conclusively proved that in addition to being non-inflammable, it possessed in use the following advantages compared with petroleum spirit (benzine). It had greater penetration, less solvent losses, increased production per plant unit, and lower steam consumption. The high cost of trichlorethylene compared with that of benzine was against its coming into rapid general use for oil seeds. The cost of solvent with plants using benzine was not now such a serious matter as formerly, when losses were anything up to 7 gallons per ton of seed, and solvent at 2s. 6d. per gallon. The modern plant with a solvent loss of 3 gallons (benzine) per ton of seed, and obtaining solvent at 1s. 6d. per gallon, was not likely, on the face of it, to look very favourably on trichlorethylene at 5s. 3d. per gallon. To arrive at a fair comparison the conditions appertaining to the particular plant likely to use it, must be taken into account.

The type of extractor pot used appeared to be fairly common, and had a capacity of 2 to 2½ tons of seed. It was stationary and the meal was agitated by means of stirrers fixed to a vertical shaft. A discussion followed the reading of the paper, in which Professor J. W. Hinchley, Messrs. W. W. Austin, W. Ramsay Sibbald, J. Savage, J. Arthur Reavell, and Colonel Briggs took part.

THE MANUFACTURE OF MUSTARD GAS.

CLAIMS OF DR. LEVINSTEIN AND PROFESSOR GREEN.

DR. H. LEVINSTEIN gave further evidence on Monday when the hearing of the claim made by him and Professor A. G. Green in regard to the invention of a mustard-gas process (see this *Journal*, December 14, page 762) was resumed by the Royal Commission on Awards to Inventors, at the Law Courts, London. The claimants' contention is that they first discovered a method of producing mustard gas on a large scale without danger to the workpeople, and that the Ministry of Munitions adopted this method after many unsuccessful experiments at their own works.

Dr. Levinstein was cross-examined at considerable length by Mr. Hunter-Gray, for the Crown, on the point whether the claimants' mustard gas was different from that of Professor Pope.

"Our process is, in my own opinion, entirely new," said Dr. Levinstein. He disputed the suggestion that his product was old by reason of the work of Professor Pope in 1916

Experiments, said Dr. Levinstein, were first carried out under his direction at the works of the British Dyestuffs Corporation at Blackley, Manchester, in April, 1918, and in May they had decided what process to adopt. At the end of May Professor Pope and Professor Gibson, who had also been carrying out experiments, visited the Blackley Works.

Mr. Hunter-Gray: They went to give you such information as you required?

The Witness: Nothing of the kind.

Do you say that they came to be taught by you and Professor Green?—I do.

Casualties at Blackley Works.

Mr. Gray: Were the casualties at the works at Blackley so numerous that the record of them, which was kept in the first instance, was relinquished?

The witness: I should say that statement was entirely untrue.

Were there deaths?—There was one death which I think was caused by mustard gas. It was the case of a man who was subject to bronchitis and had a dose of mustard gas which proved fatal.

Professor A. G. Green described the experiments that he carried out in order to find a satisfactory method of production. In his opinion the Pope process was not practicable. When the witness spoke to Professor Pope about the results he had obtained, the Professor was distinctly sceptical about it, and his collaborator, Professor Gibson, came to the witness's laboratory at Blackley to investigate the results. The witness denied that Professor Gibson was sent down to teach them. Professor Pope also visited the laboratory, but would not entirely accept the results. The witness knew nothing about Professor Pope's patent until nearly two years after the war, and it came rather as a shock to him.

The hearing was adjourned.

JAPAN'S CHEMICAL INDUSTRY.

DETAILED ACCOUNT OF EARTHQUAKE DAMAGE.

WE have received from the Department of Overseas Trade a detailed report (translated from "Osaka Mainichi," October 3) of investigations by the Industrial Bureau of the Japanese Ministry of Agriculture and Commerce, into the damage to factories caused by the earthquake of September 1. Those portions of the report which relate to the chemical and allied industries are reproduced below. Although the report is dated October 3, its publication is deemed advisable as it is by far the most detailed account that has yet been made available in this country.

Damage to Sulphuric Acid Plants.

The Japan Artificial Fertiliser Company has many factories throughout the country, those located in the earthquake area being at Oji, Kamayabori, Komatsugawa, Kinoshitagawa, Koyasu, and Yokohama. At the Oji factory one-tenth of the sulphuric acid plant was destroyed, and one-quarter of the electrolysis plant. Entire reconstruction of the factory will need six months. There are ample stocks of fertiliser on hand. The factory at Kamayabori was demolished by the earthquake and gutted by fire, but it is expected that 70 per cent. of the stocks of fertiliser are commercially saleable. At the Komatsugawa works three of the retorts (?) for making sulphuric acid collapsed and the roof fell in. It is hoped that reconstruction will be completed in two or three months. The amount of damage at the Kinoshitagawa works was comparatively small. The works at Koyasu and Yokohama were burnt to the ground, but at the latter the phosphorite and another storehouse as well as the office and factory remain. The total losses occasioned by the earthquake amount to 4,650,000 yen.

The Tokyo Sulphuric Acid Company manufactures concentrated and fuming sulphuric acid by synthetic processes. The damage sustained is almost nil, and given a supply of motive power operations can be resumed immediately. About a month's supply of raw material is in stock.

General Chemicals.

The Asahi Electric Industries are manufacturers of bleaching powder, caustic soda, solidified oils, hydrochloric acid, soap, etc. Damage is slight. A boiler-room and one shed partly collapsed, and a quantity of manufactured salt was washed away. It is anticipated that there will be no reduction in output. The Kameido works of the Japan Chemical Manufacturing Company which manufactures barium sulphate, iodides, cosmetics, fertilisers, etc., suffered little damage other than the collapse of one building, a brick chimney, and a water tank.

The Iriye Chemical Manufacturing Company possesses a factory at Sendagaya, Tokyo, and manufactures acids, brewing materials, ethyls, etc. No damage other than collapse of a store. There is a shortage of certain raw materials and an entire lack of stocks. Repairs necessary to a portion of the works of the Imperial Alloy Refinery, which collapsed, will have no serious effect on the factory's activities, and it is proposed to resume work as soon as there is a demand. As regards raw materials there is a shortage of ferro-silicon. In the case of the Mukojima (Tokyo) Plating Co., who are makers of zinc plates, the damage is slight. There is a shortage of ammonium chloride, but work can be resumed on receipt of supplies.

At the Central Rubber Company's Honjo works there was damage to boilers and chimneys. Owing to complete lack of materials like calcium carbonate, litharge, carbon black, sulphur, petrol, grease, machine oil, etc., it is impossible to resume for the present. At the Fujikura Company's Osaki-cho works, where waterproof cloth, and aeroplane dope are manufactured, in addition to the destruction by fire of the laboratory, part of the works were damaged, but when motive power becomes available it will be possible to resume without a decrease in output. Part of the drying-room at the Sasazuke factory of the Japan High-class Paint Company collapsed, and some raw and manufactured materials were lost, but general damage was small. Two or three months are necessary for repairs, but work is not interfered with, and the middle of October should see a resumption of activity.

The Taisho Turpentine Company at Shinagawa, manufacture turpentine and preservative chemicals. Laboratories were demolished, and no stocks of raw materials or manufactured goods are on hand. Resumption is not yet decided upon. At the Takata factory of the Japan Printing Ink Company, offices and sheds were burned. A stock of one month's supply of raw material is available.

Matches, Scientific Instruments, and Glass.

At the Maruyama Match Factory at Shirokane (Tokyo) no damage was sustained other than that to part of the pans, and work can be resumed immediately raw materials are received. There were four factories in Tokyo, three of which were gutted by fire, leaving only the one at Shirokane. No stocks exist. The Takachiho works at Hatagaya manufacture microscopes, microscopic slides, spectroscopes, etc. There has been practically no damage, and the factory's activities can readily be resumed. The greater part of the Asahi Glass Co.'s Tsurumi factory suffered severe damage and will have to be entirely rebuilt. Reconstruction will take from six months to a year. The Tachibana Glass Company (Shinagawa) are manufacturers of table ware, glass for electric lamps, etc. Damage is slight and early resumption probable. There is, however, a shortage of soda ash.

Great Losses to Cement Industry.

The Fukagawa works of the Asano Cement Company were utterly destroyed by fire. One-third of the Kawasaki works was damaged. Reconstruction of the former will take one year and of the latter three months. The capacity of the Fukagawa works was 60,000 barrels per month and of the Kawasaki works 150,000 barrels, but in a few months a capacity of 100,000 barrels should be developed by new equipment at the Tsurumi works. The stocks at both factories cannot be used. The company has also factories at Moji with a capacity of 220,000 barrels, in Hokkaido 120,000 barrels, and in Formosa 60,000 barrels. The Hokkaido factory is to be enlarged in the near future so as to have a capacity of 220,000 barrels. It is anticipated that the total capacity will then be 710,000 barrels and there is no fear of shortage.

Shortage of Cylinders at Oxygen Factories.

The Oshima Clay factory of the Tokyo Gas Company manufactures benzol, toluol, creosote, sulphate of ammonia, naphthalene, etc. Little damage was suffered and early resumption is anticipated.

At the Osaki factory of the Oriental Oxygen Manufacturing Company there was no damage to buildings or machinery, but there was a great loss of cylinders, and about 700 pumps were destroyed by fire. Every effort is being made for speedy reconstruction with no diminution of output. The Tanabe Oxygen Manufacturing Company's factory at Oshima was not damaged, but a large number of cylinders were lost. With regard to the Japan Oxygen Manufacturing Company's factories at Osaki and Kameido, there was practically no damage at the former and there is a possibility of early restoration, but at the Kameido factory wooden sheds were destroyed and 1,200 cylinders were lost. As soon as motive power is available work can be restarted, but in view of the shortage of containers there must be a decreased output.

THE STUDY OF CORROSION.

COMPARISON OF LABORATORY AND EXPOSURE TESTS.

AT the monthly meeting of the Oil and Colour Chemists' Association on Friday, December 14, Dr. J. Newton Friend, the President, stepped into the breach caused by the inability of Dr. Middleton to give a paper that had been arranged for, and gave a general review of the position as regards the theory of corrosion.

It may be mentioned that the Association—whose scheme for joining up with the Paint and Varnish Society, has definitely fallen through—has appointed a part-time paid secretary, and the address of the Association in future will be at the Institute of Chemistry, Russell Square, London.

Dr. Newton Friend gave a brief outline of his colloidal theory (see page 734 of this issue), and remarked upon the manner in which recent work by Professor Adeney in Dublin in 1922 confirmed some of the results he himself had achieved.

In regard to work now being carried out, Dr. Friend showed a lantern slide of a frame containing 52 different pieces of metal exposed to atmospheric corrosion. This frame has already been exposed at the Municipal Technical School, Birmingham, for 18 months, and it will continue to

be exposed for a further 5 years. The series consists of 12 pieces of wrought iron, 7 or 8 carbon steels, 8 or 9 special steels, comprising stainless steel, chrome steel, nickel-chromes, etc. There is also a selection of non-ferrous metals, including copper, zinc, lead, tin, aluminium, lead and antimony together, and a whole series of brasses and bronzes, etc. Another series of metals is being exposed at Weston-super-Mare, under water, in such a position that they are exposed to the air on two days per month during low spring tide. In course of time, these bars will be removed and examined, and an endeavour made to see whether these tests follow the line of laboratory tests which are being carried out simultaneously in the Birmingham Municipal Technical School laboratories. If the result of these field experiments do not agree with the laboratory tests, they offered a reason why extensive field researches should be carried out both by private individuals and by research associations.

Mr. H. J. Vernon (School of Mines) commented on the extraordinary difference he had found in the corrosion of ferrous and non-ferrous metals.* The theories current to explain these differences, before Dr. Newton Friend formulated his colloid theory, were quite inadequate. It was interesting to notice how beautifully the colloid theory fitted in with the facts.

ACID PUMPING AND ELEVATING PLANT.

RECENT BRITISH PROGRESS.

CHEMICAL plant made from acid-resisting metal, such as high silicon iron, has now been on the British market for over ten years, and the very considerable initial difficulties resultant upon the extreme hardness of the metal can now be stated to have been completely surmounted. The first articles manufactured consisted of simple parts, such as cascade basins, pipes, bends, etc., and so valuable did the articles prove themselves that effort had to be made to meet the numerous demands from the chemical trade for more intricate and difficult castings and machine parts. How far this effort has met with success may be gauged by the progress which one of the British firms—Meldrums, Ltd., of Timperley, near Manchester—has made in the manufacture of acid-resisting pumps of "Meldrum" metal.

Improved Design of Acid Pump.

In their previous design of pump, which has been described in earlier issues of this journal, the castings were split down the centre of the volute, which resulted, of course, in the delivery branch being divided. In the new pattern, however, the volute and delivery branch are made in the same casting, and a separate cover carrying the suction branch is bolted to it.

In view of the searching nature of many of the acids and liquors dealt with, this is certainly a distinct advantage. It also enables the whirlpool chamber and volute to be made of a more uniform shape, and considerably higher lifts at a given speed and diameter of impellor to be obtained than with any previous design. We have examined a set of curves for such a pump having 1½in. delivery, 2in. suction, the diameter of the impellor being 7in. The curves show the characteristics of the machine at four different speeds, and, in spite of the difficulties of manufacture of pumps made in "Meldrum" metal, these results compare favourably with a pump made in cast iron or bronze.

The metal is entirely proof against sulphuric, nitric, and acetic acids of any strength or temperature, and has been used for very searching copper and chlorine liquors which no other metal or material is able to withstand. In the belt-driven pumps the countershafts are provided with fast and loose pulleys and belt-shifting gear running on ball bearings. A flexible coupling connects the belt countershaft or motor, as the case may be, to the pump. These pumps are manufactured in standard sizes up to 8in. delivery and 120ft. head, and special plant has been put down to enable the makers to deal with the larger sizes with rapidity and accuracy.

Automatic Compressed-air Elevator.

Another method of raising acids is by means of the automatic compressed air elevator. This type of apparatus finds favour in acid plants, as high lifts are obtainable by a corresponding increase in the air pressure. A type of elevator made by Messrs. Meldrum works automatically—*i.e.*, when there is no acid running into the vessel, no air is used. The vessel works on the following principle: As the acid rises in the vessel it lifts a float which operates the air valve. As soon as the air enters the vessel it closes the inlet valve and also closes the air-bend valve. The vessel is now sealed, and the air pressure forces the acid out through the delivery pipe at the bottom of the reservoir. The air follows the acid up the pipe, and the pressure is at once reduced, and the float drops, closing the air valve. The inlet valve again opens, and a fresh supply of acid enters the vessel. The acid can be allowed to trickle in quite slowly, and the apparatus works with certainty as soon as the definite level of the acid in relation to the float is reached. All internal parts of the vessel, valves, etc., are made of "Meldrum" acid-resisting metal.

Messrs. Meldrum are also developing a further improvement in compressed-air elevators. In this case the acid is operated by a plunger, and the air does not come in contact with the acid. This type has the advantage that it is economical in air, as no more air is used than displaces the acid from the vessel. It works automatically, but requires a reservoir from which to draw as it keeps in operation, whether the acid is being pumped or not; consequently it should be used where there is a continuous supply of acid to draw from.

As a cheap means of raising acids, the steam-jet apparatus is useful in many cases. In this apparatus the steam dilutes the acid to some extent, and this is frequently, of course, a disadvantage; in other cases it does not matter. Standard lines of these acid elevators in "Meldrum" acid-resisting metal are now made.

PRESENTATION TO MR. A. CAMPBELL.

AT the works of the Derby-Oxide and Colour Co., Ltd., Rugeley, on Thursday, December 13, a presentation from the employees was made to Mr. Archibald Campbell, who has retired from the managership of the company. Mr. Campbell is in his 83rd year, and has been manager of this old-established business for upwards of 25 years. The presentation was made by Mr. W. H. Giles, the Chairman and Managing Director of the Company, in the presence of Mr. Arthur Campbell and Mrs. Wootton (son and daughter of Mr. Campbell), Mr. H. A. Wilson, Mr. F. P. Evans, of Derby (travelling representative), Messrs. S. Staton, H. B. Watkiss, J. Edwards, and about fifty of the employees.

At the close of the proceedings, the Managing Director announced that Mr. H. A. Wilson, who had acted as assistant manager for some time, had been appointed to succeed Mr. Campbell as manager of the company.

Mr. Campbell's Wide Experience.

Mr. Campbell commenced his career as a chemist in the works of Chas. Tennant and Co., Ltd., of St. Rollox, Glasgow. After remaining at Glasgow from 1872-1874, Mr. Campbell took up a position as chief chemist and assistant manager to superintend a works belonging to the same firm on the Tyne. He remained there for five years, and during that time he came in contact with the late Dr. Lunge. He was afterwards connected with the Runcorn Soap and Alkali Co. During his residence at Runcorn he attended (at Widnes) the first meeting called to form a Chemical Society which afterwards developed into the now well-known Society of Chemical Industry. Among those present at this meeting (held at the offices of Messrs. Gaskell Deacon and Co.) were Mr. Campbell, Mr. John Hargreaves, Mr. Douglas Herman, and Mr. George E. Davis (founder of the *Chemical Trade Journal and Chemical Engineer*). He later took over the management of a works at Southampton carrying on the manufacture of sulphuric acid, sulphate of alumina, tar distillation, etc. Contrary to the usual order of things, Mr. Campbell returned to Scotland, where he used his English experience in reconstructing vitriol and other works. He afterwards came in contact with an American firm which was endeavouring to make bleaching powder by the Weldon process, but had not been very successful. Mr. Campbell accepted an offer of this firm to control their works in Erie, Pennsylvania. It was while in America that Mr. Campbell received an offer to take over the managership of the Derby-Oxide and Colour Co., Ltd., at Rugeley, and he commenced his duties there in 1897. During his earlier years at Glasgow Mr. Campbell came into close and frequent contact with Mr. Ludwig Mond.

ITEMS OF INTEREST.

More Blast-furnaces to Operate.—It is stated that Pease and Partners, Ltd., are rekindling two blast-furnaces at their Normanby Ironworks, Middlesbrough. This will increase the number of furnaces in operation on the North-East Coast to 48, as against 70 in normal times.

Unemployment Relief in Birmingham.—The Lord Mayor of Birmingham has opened a fund for the relief of the unemployed. The first list of contributions includes the names of the Midland Vinegar Company, Ltd., £100.; Southall Bros. and Barclay, £100.; Mr. W. A. Albright, £25.; Mr. Thomas Barclay, £25.; and Alderman F. C. Clayton, £50.

British Trade with Chile.—The Department of Overseas Trade announces that Mr. W. F. Vaughan Scott, the Commercial Secretary for Chile, has now opened offices at Avenida Vicuna Mackenna 133, Santiago. All communications intended for the Commercial Secretary should be sent to this address. His telegraphic address is "Commintell," Santiago.

Committee on Artists' Materials.—The Royal Academy has formed a Committee of artists and scientists for the investigation of the qualities of artists' materials and of the various methods of cleaning old pictures. The Committee includes:—Professor A. P. Laurie, Sir H. Jackson, Sir A. Schuster, Dr. A. Scott, Mr. C. F. Cross, Dr. W. W. Taylor, Dr. R. S. Morrell.

Dyestuffs Labourer's Death from Cancer. — The Manchester City Coroner last week adjourned the inquest on the body of Cornelius Kennedy (52), who had been employed as a labourer by the British Dyestuffs Corporation. The man had died from cancer, the Coroner said, but there was some question as to whether that had been caused by the chemicals in which he worked, and it was desirable that the inquiry should be attended by representatives of the Home Office.

Lime in North Wales. — A lime product of remarkable purity is being quarried at Parc-y-Murch, St. George, near Abergele, states the *Liverpool Post*. The property has been taken on an extensive lease from the Kinmel estate by a wealthy South Wales firm, and later on employment will be found for some hundreds of quarrymen. It is reported that the lime is superior to anything yielded by any other rock formation in any part of the country, its purity being over 99 per cent.

Colour Merchants' Bankruptcy.—A meeting of creditors of J. Damant and Co., Ltd., 84, Rosebery Avenue, E.C., colour merchants, was held on December 17 at 9, Mincing Lane, E.C., when the liquidator, Mr. Wright, presented a statement of affairs which showed liabilities £277., of which £177. was due to unsecured creditors, and there were debentures for £100. The assets comprised stock estimated to realise £97., leaving a deficiency as regarded the creditors of £179. It was decided to leave the matter in the hands of Mr. Wright as liquidator.

Italian Citrate-of-lime Sales.—According to the U.S. Commercial Attaché at Rome, the operations of the Camera Agrumeria of Messina, which has had the monopoly of the sale of citrate of lime, have been decidedly unsuccessful. Large stocks have been accumulated, and on May 31 debts owing to the organisation amounted to 86,500,000 lire. As from December 1 of this year, sales of citrate are to be made by the Camera on behalf of the producers and not on its own account. Payment will be made for the product at the market price at the time the citrate is sold by the Camera, not at the time the latter body purchases it from the producer.

White Lead Purchasing Restrictions in Australia.—The first British firm of white lead manufacturers to start work in Australia was Lewis Berger and Sons (Australia), Ltd. Afterwards six or seven other firms commenced operations under the form of a combine known as the British Australian Lead Manufacturers' Proprietary, Ltd. (B.A.L.M.). According to a *Manchester Guardian Commercial* correspondent, the B.A.L.M., acting presumably in concert with the Berger firm, is offering specially favourable terms to wholesale white lead buyers on condition that the latter purchase 90 per cent. of their total requirements from the combine, and restrict their sales of imported white lead to 10 per cent. of their total sales. This step, it is stated, has caused considerable perturbation among wholesale oil and colour men.

Insulin Prices Reduced. — It is announced by British Drug Houses, Ltd., and Allen and Hanburys, Ltd., that in view of the anticipated reduction in the cost of production, a further reduction in their price of insulin from 1s. 9d. to 1s. 3d. per dose will come into effect on January 1.

Personal.—Dr. W. F. Faragher has been appointed the assistant director of the Mellon Institute of Industrial Research of the University of Pittsburgh. Dr. Faragher, who is an authority on petroleum refining, was selected by the late Dr. R. K. Duncan as the incumbent of the first industrial fellowship established at the University of Kansas in 1907.

Gasworks Explosion at Preston.—Some alarm was caused at Preston Gasworks on Friday of last week by the explosion of a cylinder filled with tar which formed part of the water-gas plant becoming overheated and taking fire. All the windows in that part of the works were blown out, but two men working near by escaped with nothing more than a shaking.

British Association Meeting. — The date of the British Association meeting in Toronto next year, provisionally announced for September 3-10, has now been altered to August 6-13, and the meeting will be followed by official excursions, not preceded by them, as originally proposed. The Association, which will meet in Southampton in 1925, has received from the University and city of Oxford an invitation to meet there in 1926.

Empire Zinc Combination.—Negotiations in connection with the association of interests in zinc smelting in Great Britain and Australia, and the two largest zinc deposits in the Empire—namely, at Broken Hill and in Burma,—have been completed. Sir Robert Horne, M.P., will be chairman of the National Smelting Company. The issue of £1,500,000. of seven per cent. first mortgage debentures of the new company will not be made until after the turn of the year.

Argentina Exhibition of Educational Materials.—The American Academy of History is organising an International Congress of History and Geography of America and Exhibition of Educational Materials to be held in Buenos Aires in 1924. The Academy invites manufacturers of and dealers in materials concerned in the supply of educational institutions, libraries, science laboratories, etc., to participate. Further particulars of the scheme may be obtained from the Secretary of the Academy, Dr. A. E. de la Guardia, Academia Americana de la Historia, Buenos Aires.

Tariff Notes.—The importation of artificial fertilisers into Bulgaria will be permitted without payment of import duty, provided that a certificate is obtained from the Bulgarian Ministry of Agriculture certifying to the nature of the fertilisers in each case,—Carbo lime is exempted from payment of import duty under the Indian Customs Tariff. Under certain conditions of export the duty on salt manufactured in the Madras Presidency is remitted.—The operation of certain deferred Customs duties on various explosives has been further postponed by the Australian Government to July 1, 1924.—The following products are included in the schedule of percentage reductions in the Polish Customs Duties, to be applied to British goods as soon as the Anglo-Polish Commercial Treaty comes into force: Cream of tartar, tartrate of lime, citrate of lime, certain fine chemicals and drugs, soap, olive oil, blacking and cleaning polishes, artificial silk yarns, glues and gelatines, etc.

Commercial Cream of Tartar.—Two magistrates at the Birkenhead Police Court, on Friday last, fixed a standard for commercial cream of tartar, and decided that up to fifty parts of lead per million was safe for ordinary purposes. The point arose in a prosecution against the Birkenhead and District Co-operative Society, Catherine Street, for selling cream of tartar which contained forty-four parts of lead per million, this being twenty-four parts in excess of the maximum fixed by the British Pharmacopœia. Mr. Goldie, for the defendants, submitted there were two standards—namely, purified (which was obtained in chemists' shops) and the ordinary cream of tartar (purchased at grocers for cooking and other purposes). Mr. W. H. Roberts (Liverpool City Analyst) stated that there was a distinct difference between the two standards. The sample in the case was genuine cream of tartar, and the amount of lead was not injurious to health. He would require the amount to be over 100 parts to the million before he would condemn it. The case against the Co-operative Society was dismissed.

Dictionary of Specifications.—Work on the compilation of material for a dictionary or handbook of specifications for supplies purchased by Federal, State, and municipal governments and public institutions has been started at the Bureau of Standards, Washington, U.S.A. All the available specifications prepared by the various departments and independent establishments of the Federal Government and those used by State and municipal governments, public institutions, and the important national trade associations and technical societies, are being collected, card-indexed, and classified.

Disposal of Zinc Concentrates.—The full report of the Electrolytic Zinc Company of Australasia, for the year ended June 30 last, with reference to the supply of raw material for the company's operations which has been drawn from Broken Hill under the contract with the British Board of Trade, states that during the recent visit of the Chairman of Directors to England, negotiations were successfully concluded with the British Government for the purchase, on terms satisfactory to this company, of an additional 400,000 tons of Broken Hill zinc concentrates, making the total quantity so purchased 1,150,000 tons.

British Empire Exhibition.—The Prince of Wales has consented to become president and first member of the Fellowship of the British Empire Exhibition, a non-party organisation formed to assist Empire trade and industry. The subscription of two guineas, which is the full extent of every member's liability, will entitle the member to receive a parchment certificate of membership signed by the Prince of Wales, a badge of the Fellowship, and a ticket giving admission to the British Empire Exhibition at all times. The funds thus raised will be used to grant scholarships, each to the value of £1,000., to Fellows or their nominees, for university or technical education

Obituary.—We regret to announce the death of Professor Frank Clowes, D.Sc., F.I.C., F.C.S., at his residence in Dulwich, on Tuesday, at the age of 75. The late Dr. Clowes was appointed in 1881 Professor of Chemistry at University College, Nottingham, and held the chair till 1897, being also the first Principal of the College. From 1897 to 1913 he was Chemical Adviser to the London County Council and Director of the Council's staff and laboratories, and had since been expert adviser in gas supply to the Corporation of London. He was a past president of the Society of Chemical Industry, twice a vice-president of the Institute of Chemistry, twice vice-president of the Chemical Section of the British Association. Professor Clowes was the author of various contributions to analytical chemistry, including text-books which have gone through many editions and have become standard works.

The German Chemical Industry.—According to a report received by the Department of Overseas Trade from Mr. J. W. F. Thelwall, Commercial Secretary at Berlin, the general economic situation necessitated further restrictions of work during November in the chemical industry in Occupied Territory. In the chemical preparations industry the demand for laboratory chemicals was very small, and that for glass chemicals diminished in the degree in which the glassworks were compelled to restrict work or close down. The demand from abroad also fell off as sale prices approached the world's market level. It is felt to be a particular burden that just at the present time the refunding of the British Reparation Levy should have been discontinued and thus all possibility of selling German products to England removed. It is all the more to be regretted as French competition is greatly felt in England, and will now secure the whole trade without effort

Indian Tariff on Sulphur.—The Indian Tariff Board, which began an inquiry in Bombay on November 18, examined the representatives of the Dharamsi Morarji Chemical Company and the Eastern Chemical Company. The representative of the former company said that sulphur cost in India from Rs.115 to Rs.125 per ton. The import duty amounted to about 18 to 20 per cent. of the invoiced value of imported sulphur, besides Rs.5 per ton for landing and other charges. He suggested that sulphur should be imported duty free. The State's revenue from that source was less than Rs.2 lacs. The representative of the Eastern Chemical Company pointed out that sulphur, which had to be imported, formed the basis of at least three industries of vital importance to India—viz., steel, fertilisers, and chemicals. Regarding fertilisers especially, the witness considered the development of the use of fertilisers a matter of the first national importance.

BRITISH OVERSEAS CHEMICAL TRADE.

NOVEMBER IMPORTS AND EXPORTS.

TRADE in chemical products during November decreased, the value of exports dropping from £2,572,881. in October to £2,014,741. Imports were lower, though not to such a great extent as in exports, the November figure of £1,138,282. comparing with £1,245,916. in October. Compared with last year, however, the November figures are higher in the case of both imports and exports. The quantity figures of selected products are given in the comparative table below :—

IMPORTS—Increases on October Quantities.

		1923. November.	October.
Acetic acid (including acetic anhydride)	tons	630	537
Barytes, ground	cwts.	51,560	49,135
Borax	,,	9,320	2,555
Boron minerals	tons	1,938	1,757
Calcium carbide	cwts.	100,544	87,509
Cream of tartar	,,	3,059	2,871
Gums and resins (except rosin)	,,	17,123	16,868
Indigo, natural	,,	56	Nil
Paraffin wax	,,	79,895	64,578
Phosphate of lime	tons	36,696	21,181
Potassium nitrate	cwts.	14,459	12,352
Rosin	,,	134,570	131,226
Sodium nitrate	,,	110,629	109,142
Tanning extracts	,,	112,075	70,933
Tartaric acid (including tartrates not elsewhere specified)	,,	999	60
White lead	,,	11,942	10,561
Zinc oxide	tons	628	451

Decreases on October Quantities.

Bleaching materials	cwts.	1,445	2,285
Dyeing extracts	,,	7,558	9,457
Glycerine, crude and distilled	,,	1,472	3,524
Manganese ore	tons	31,199	76,336
Mercury	lb.	131,298	179,776
Nickel oxide	cwts.	1,873	6,656
Petroleum, crude mineral	galls.	21,375,599	31,907,825
Pyrites	tons	15,510	28,273
Sodium c'p'ds (except nitrate)	cwts.	22,008	24,462
Sulphur, crude	tons	2,181	7,982
Turpentine	cwts.	39,097	100,686

EXPORTS—Increases on October Quantities.

Ammonium chloride	tons	479	266
Caustic soda	cwts.	149,972	145,967
Copper sulphate	tons	585	340
Glycerine, distilled	cwts.	12,045	9,653
Naphtha, coal-tar	galls.	103,791	29,456
Paraffin wax	cwts.	18,832	17,448
Potassium chromate and bichromate	cwts.	4,200	3,815
Salt (other than table)	tons	34,404	34,050
Sodium carbonate	cwts.	486,743	375,804
Tartaric acid (including tartrates not elsewhere specified)	,,	2,901	2,422
Zinc oxide	tons	273	240

Decreases on October Quantities.

Ammonium sulphate	tons	19,005	26,587
Barytes, ground	cwts.	280	8,148
Benzol and toluol	galls.	214,830	424,599
Bleaching powder	cwts.	16,482	31,918
Carbolic acid	cwts.	10,848	15,694
Cement	tons	52,934	77,938
Disinfectants, insecticides, etc.	cwts.	38,472	48,279
Dyestuffs, coal-tar	,,	12,915	16,224
Glue and size	,,	15,875	16,128
Naphthalene	,,	18,281	21,314
Pitch, coal-tar	tons	36,005	36,208
Potassium compounds (except chromate and bichromate)	cwts.	3,230	5,545
Soaps (total)	,,	108,825	117,974
Sodium sulphate	,,	97,944	187,031
Sulphuric acid	,,	1,515	2,707
Tar, coal	tons	242	770
Tar oil, creosote, etc.	galls.	1,561,826	7,250,372
White lead	cwts.	14,604	15,988

MIDLAND CHEMISTS' DINNER.

CONJOINT FUNCTION AT BIRMINGHAM.

THE joint annual dinner of the Birmingham and Midland Section of the Society of Chemical Industry, and the Institute of Chemistry took place on Saturday, December 15, at the Queen's Hotel, Birmingham. Professor G. T. Morgan, head of the Chemistry Department of the University of Birmingham (and chairman of the Birmingham and Midland Section of the Institute), presided over a representative attendance which included: Professor Wynne (President of the Chemical Society); Dr. H. Levinstein (President of the British Association of Chemists); Mr. H. B. Jacks (President of the Birmingham Metallurgical Society); Professor Smith (Physics Department of the Birmingham University); Dr. Douglas Stanley (President of the Midland Medical Association), with Dr. A. P. Thomson, secretary of that Association; Dr. H. W. Brownsdon (Institute of Metals); Mr. F. R. O'Shaughnessy; Mr. Geo. King; Dr. W. Wardlaw, Mr. S. R. Carter; Mr. E. J. Hunt and Mr. W. A. S. Calder (Chance and Hunt, Ltd.); Mr. J. Wilson (Albright and Wilson, Ltd.); Mr. A. W. Knapp (Cadbury Bros.); Mr. E. W. Mann; Dr. R. S. Morrel (Mander Bros., Wolverhampton); Mr. T. F. E. Rhead (Birmingham Gas Department Laboratories); Dr. A. Parker (Research Department, Gas Industry); and Mr. E. C. Rossiter (British Cyanides). Professor F. W. Burstall, Dr. E. B. Maxted, and Professor Ling, were absent through indisposition. Dr. E. F. Armstrong and Mr. Woolcock also wrote apologising for absence.

The toast "The Society of Chemical Industry," was proposed by Mr. H. B. Jacks (Metallurgical Society). Mr. O'Shaughnessy, in responding, said: "It has been stated that every industry nowadays is practically a chemical industry. It is certainly no exaggeration to say—and those who are engaged on the chemical side in industrial operation, and able to appreciate the drift and extent of comparatively recent progress, will, I think, agree—that the modern industrial tendency is wholly in that direction. Even in the metallurgical industries in this country chemistry has something to say with regard to their welfare."

The Institute of Chemistry and the B.A.C.

Dr. H. Levinstein, in proposing the toast "The Institute of Chemistry," said he thought the British Association of Chemists had rendered admirable service in that it had aroused the Institute from a prolonged slumber to visible signs of activity in unexpected directions. As a result the Institute was stronger, more prosperous and more representative of chemists than ever before, and certainly it spoke with greater authority. He attributed this progress largely to the stimulus which had been given by other bodies, and particularly by the B.A.C. Birmingham, continued Dr. Levinstein, was to-day one of the greatest centres of chemistry, and one of the great centres of the Institute, and he felt that the progress it had made was due very largely to the distinguished Professor of Chemistry at the Birmingham University, Dr. Morgan. One of the things he always thought of with regret, particularly when one was talking closely about the Institute of Chemistry, was that there was not quite as much correlation between the work of that great Institute and with, for instance, the British Association of Chemists. He would welcome a much closer connection, from the administrative point of view, between the British Association and the Institute; and he thought it would be a very desirable thing if the affairs of those two societies, which affected chemists so much, were administered from one office. He would like to see some unity among the great chemical societies by which there would be set up one uniform entrance fee that would enable a man of suitable qualifications to become an associate of the Institute in the first case, and associated with the other bodies, and, by payment of a combined subscription, to have advantage of combined facilities.

Professor Morgan on the Need for Co-ordination.

Professor Morgan, in a facetious reply, observed that the various Associations, to which chemists belonged for scientific and professional reasons, illustrated all the types of government by which mankind was afflicted. The Chemical Society, the senior body, was as a Republic of the classical type—a centralised Bureaucracy. The Society of Chemical Industry was a Confederation of States—many of which had decided ideas about State rights,—and they had a Council that sometimes appeared to be as much related to it as was the American Senate to the affairs of Europe. (Laughter.) The Institute of Chemistry was a little more difficult to place in the scheme of Government, but it seemed to him that the Institute was not unlike a feudal monarch that existed in Japan until the year 1868. (Laughter.) The Institute was presided over by the President who was paraded once or twice a year before the eyes of the multitude, though the real power of the Institute lay in the hands of the Mayor of the Palace. (Renewed laughter.) He desired there to testify to the enthusiasm and energy of Mr. Pilcher. The British Association of Chemists, another and very active professional organisation, perhaps might be referred to as the Soviet Republic. (Laughter.) Dr. Levinstein had spoken of the lack of co-ordination, but he would point out that there was a composition fee of £3. for those who subscribed to the publications of the two principal Societies.

A NEGLECTED POINT IN MODERN PATENT PRACTICE.

VALUE OF "LICENCES OF RIGHT" REGULATION.

A JOINT meeting of the Leeds Area Section of the Institute of Chemistry and the Yorkshire Section of the Society of Chemical Industry was held at the Queen's Hotel, Leeds, on December 13. Mr. Griffith Brewer read a paper entitled "Practice Under the Modern Patent Law," in which he described how patentees were needlessly paying £140,000. every year in full-scale Government taxes, when they could with additional advantages save 50 per cent. on their payments.

A Fifty-per-cent. Saving in Fees.

Under a Regulation introduced in the Patents Act of 1919, a patentee may have his patent indorsed "Licences of Right." This indorsement has the effect of empowering the Comptroller of the Patent Office to intervene in the event of a patentee refusing to grant a licence on reasonable terms. The object is the ensuring of the invention being used to the greatest extent and so of the patentee being rewarded adequately for his invention. Although this provision has been in force for nearly four years, and although over 2,000 patents have been brought within the Section, no compulsory Licence of Right has yet been granted against the will of the inventor. As an inducement for the patentee to be reasonable and have his patent indorsed in this way, the taxes payable on the patent are reduced to a half scale. Thus, instead of a patentee paying the full £126. in renewal fees to the end of the term, he pays only £63. if the patent has been indorsed. This, Mr. Griffith Brewer contends, must be welcome news to many patentees who may not have realised the possibility of saving £63., in addition to the additional advantage that in many cases offers to work the invention may be received merely because of the declaration of the patentee that he will not be unreasonable.

The lecturer drew attention to the fact that every patent had indorsed upon its face the full scale of fees, and a statement saying that the continuance of the patent is conditional on the payment of those full scale fees. He suggested that this indorsement is misleading and should be corrected to conform to the new provisions of the Act, by adding a second column to the table showing the half-scale fees payable in respect of patents indorsed "Licences of Right." He believes that if, instead of merely publishing this information in the Act and in the *Official Journal of Patents* (which not one patentee in a hundred ever sees), the information were given on the face of every patent, instead of two per cent. of patents granted being indorsed "Licences of Right," eighty per cent. at least would be thus indorsed.

Negotiating power of the Patentee Strengthened.

It frequently happened, in his experience, the lecturer stated, that a patentee of an improvement desired to obtain a licence in respect to a patent of earlier date, but was afraid to approach the earlier patentee for fear of being refused a licence, and by the mere fact of having approached the earlier patentee, to have his notice drawn to the wish of the patentee of the improvement desiring to manufacture. In cases where the patent has not been indorsed "Licences of Right," the utmost caution has to be exercised in approaching the patentee, whereas if the patent has been indorsed then the patentee of the improvement can approach the earlier patentee with greater confidence.

LEGAL INTELLIGENCE.

ROAD TRANSPORT OF CARBON BISULPHIDE.

T. Paulding, Ltd., *v.* The Talbot Clearing House.

At Manchester, on Monday, December 17, before Mr. Commissioner Radcliffe, K.C., an action was brought by T. Paulding, Ltd., against The Talbot Clearing House. The plaintiffs, who are chemical merchants, sought to recover £260. damages from the defendants, who are haulage contractors, for breach of contract and negligence. The defendants made a counter-claim for £33.

It appeared that in November of last year the plaintiffs employed the defendants to convey from a London wharf to Manchester 35 drums of carbon bisulphide. They, in turn, employed sub-contractors. The plaintiffs, in communications to the defendants, stated that the goods to be conveyed, while of a dangerous nature, were quite safe if carefully handled; it was important that the drums should be securely fastened, and no drums shou'd be accepted which showed any signs of leakage. It was shown that when the goods were loaded up on January 2 there were, in fact, two drums which were leaking. On the next day the motor-wagon, petrol-driven, had reached Cannock, and while it was standing the whole wagon, with its load, was destroyed by fire owing to the leakage from the two drums. The plaintiffs accordingly claimed for the loss, alleging that the defendants had failed to carry out their instructions.

On the part of the defendants it was urged that they were not liable, as the goods were sent at the risk of the plaintiffs, that the arrangement with the plaintiffs (which they denied) was that they should insure against loss by fire, and that the drums in which the carbon bisulphide was carried were not suitable for the purpose. It was brought out in evidence that the defendants had given to the sub-contractors the same warning that had been given to them as to the need for securely fastening the drums, and as to not accepting leaking drums.

Judgment was given for the plaintiffs for £227., or less the counter-claim, with costs, and the costs of the counter-claim to a given date.

RE-PULPING OF SALVAGED PAPER.

Burlington Industrial Laboratories, Ltd.

A meeting of the creditors of the Burlington Industrial Laboratories, Ltd., Charing Cross Chambers, Duke Street, Adelphi, W.C. 2, late of Onslow Mills, Yewsley, Middlesex, consulting manufacturing chemists and dealers in chemicals and drugs, etc., was held on December 17 at the offices of Mr. C. H. Whatley, Duke Street, Adelphi, the liquidator of the company. The statement of affairs showed liabilities £1,780., all due to unsecured creditors. There was a debenture holder for £848. Mr. Whatley stated that the only tangible asset of the company was an amount of £582. owing from Protecine, Ltd. (in liquidation), which might in time realise 2s. in the £. The company was incorporated on August 24, 1921. The share capital was £1,000., in one thousand shares of £1. each, all issued. The registered office at that time was at Onslow Mills, Yewsley, Middlesex. In September, 1921, Dr. A. L. Burlin was appointed managing director of the company at a salary of £500. per annum. In November, 1923, Dr. Burlin ceased to be a director, and Mrs. Burlin was appointed in his place.

The liquidator also referred to a secret process by which Dr. Burlin was able to convert old "news" paper into pulp of a texture and quality which permitted it to be again utilised for the manufacture of "news" print, and he stated that this process was calculated to revolutionise the existing practice of repulping and milling salvaged paper. Mr. Whatley added that if this process were commercially exploited it might, of course, have a very marked result so far as the payment of creditors of the present company was concerned.

After some discussion, it was decided to confirm the appointment of Mr. Whatley as liquidator.

CASEIN COMPANY IN LIQUIDATION.

British Casein Company (1911), Ltd.

The Official Receiver has now issued his report in the liquidation of the above company of 24, Gt. Dover Street, S.E.

The statement of affairs showed as regards creditors liabilities expected to rank £1,689., and net assets £817. As regards contributories, the paid-up capital was £2,002., and the total deficiency amounted to £2,873. The report states that the company was a reconstruction of the British Casein Company, Ltd., which had been registered in 1907, and had an issued capital of £2,000., in £1. shares. By an agreement dated March 11, 1911, the company purchased the assets of the old company for £2,000., the voluntary liquidator retaining sufficient cash out of the assets to settle outstanding liabilities. The company was principally engaged as merchants in placing casein and milk products on the market. The business at first proved profitable, and until the year 1917 dividends were declared and paid. On December 10, 1918, Mr. N. A. C. Ouwehand was the sole director, and it was resolved that he should be responsible for the conduct of the business and for the due payment by the company of any debts contracted. The accounts for the year ended 1919 showed a net profit of £719, whilst the total remuneration and expenses of managing director amounted to £1,365. For the year 1920 the net profit was £482., and the total remuneration and expenses of managing director £1,584. Ouwehand states that he was unsuccessful in his efforts to obtain the assistance of another director, and that the business gradually decreased owing to lack of working capital.

The failure and insolvency of the company was attributable to lack of working capital, which restricted the company's operations in buying and selling casein, and to the comparatively heavy amounts drawn by Ouwehand for remuneration and expenses.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[Specially Contributed.]

The information given in these notes a few weeks ago concerning the developments in the coking and by-product industries prepared readers for the announcement that there is in course of arrangement a debenture issue by the United Coke and Chemicals Company, Ltd., formed by the United Steel Company, Workington, which is absorbing the whole of the capital. It is stated that the issue will consist of half a million first debenture stock unconditionally guaranteed by the present company. The intention, as was stated here, is to acquire the control of the supplies of coke from at least three of the collieries for the company's furnaces in West Cumberland. That control will come under the clauses of the agreement to be entered into between the company and the collieries which will send their tar to the new distillation plant to be erected at the United Steel Company's by-product plant at Lowca. At the present time the tar of some of the collieries is going to Messrs. Brotherton and Co., who since they are dismantling their distillation plant at the Lonsdale Dock at Workington are forwarding it to Sunderland. It is very important, it goes without saying, that the United Steel Company should make sure of obtaining the supplies of local coke they require. They have at present seven furnaces in blast in the district, and the number will be greater, it is believed, in the early months of next year. Even now practically all the coke is going to the Workington furnaces. The proportion being sent south from the whole of the Cumberland cokeries to other furnaces in the county and in the Furness district is not large. It has to be remembered that if the new washery plant does what it is declared it will do—namely, eliminate the phosphorus from the coke, then the Cumberland and North Lancashire smelters' needs of coke will be considerably increased. It is known that the smelters of low-phosphorus iron, bad as trade is, consume not less than 10,000 tons of East Coast coke every week. If the aim to make a coke as hard and as low in phosphorus as East Coast coke is achieved then the production of both the collieries and cokeries will have to be substantially increased.

British Coal Output.—The coal output at the mines of Great Britain for the week ended December 8 was 5,728,800 tons, as against 5,719,200 tons for the preceding week, and 5,592,000 tons for the corresponding week last year.

REPORTS OF COMPANIES.

Chemical and Metallurgical Corporation, Ltd.

The ordinary annual meeting was held in London on Monday, Mr. H. Guedalla (chairman of the company) presiding. The Chairman, in moving the adoption of the report and accounts, said: Since the last meeting, works at Stratford have been erected for the demonstration of the process on a commercial scale. These works are now nearing completion, and will come into operation early in the New Year.

As is so often the case in the heavy metallurgical and chemical industries, it is found that in the course of operations directed with one end in view many by-products are produced, and the credit against the cost of the process by this reason is such as to reduce very much, if not to entirely offset, the cost of the main process. Such will undoubtedly be the case in the treatment of lead-zinc sulphide ores by the company's process. The work during the past year has shown that numerous by-products can be produced, and the result is that the value of these by-products, quite unobtainable by existing metallurgical processes, will probably result in our being able to separate lead and zinc from their complex ores at an extremely low figure. It is possible by the company's processes to extract directly from a complex ore in substantially one operation the whole of the lead, leaving the bulk of the zinc constituents of the ore free from lead. At the same time, in the course of these operations we prepare valuable compounds of zinc. The operations are all conducted without the use of any materials other than those which occur at every mine.

The works at Stratford are intended chiefly to demonstrate the application of the process to ores of different characteristics, and naturally the cost on the scale of operations there will be higher than on the scale which would be adopted at a mine or a smelter. These works will, however, serve as a model from which others of larger capacity in suitable localities can be erected.

The resolution was unanimously adopted.

Anglo-Persian Oil Company, Ltd.

The annual general meeting was held in London on Monday. Sir Charles Greenway, in moving the adoption of the report and accounts, said: The development of production is best shown by continuing the table of figures which I gave you last year—viz.: 1918-19, 1,106,415 tons; 1919-20, 1,385,301 tons; 1920-21, 1,743,557 tons; 1921-22, 2,327,221 tons; 1922-23, 2,959,028 tons as compared with my estimate last year of 2,900,000 tons. For the current financial year it will probably amount to 3,775,000 tons, and for the following year it should amount to well over 4,500,000 tons.

With regard to the operations of Scottish Oils, Ltd., I regret to say that the heavy fall which has taken place in the prices of products has seriously affected the position of the shale industry, which at the moment is being conducted at a heavy loss. This loss is offset to some extent by the profit which is being made on the refining of Persian crude oil, but this aid is adventitious, and does not suffice to cover the loss on shale operations. The directors are very loth to close down the shale mines, in view of the far-reaching effect this would have, and particularly because of the serious unemployment which would inevitably result. They have decided, therefore, to carry on for the time being, but unless conditions improve or assistance in some form or other is provided for the industry, a very serious situation will arise within the next few months. Meantime the directors have been compelled to pass the interim dividend on the participating preference shares, which in the ordinary course would be paid next month. As I have already mentioned, the new refinery at Grangemouth is nearing completion, and when in operation will benefit Scottish Oils. It would be manifestly unsound, however, to permanently utilise the profits of one distinct industry—that is, the refining of imported crude oil—in order to keep alive another industry—the extraction of crude oil from shale—which can only be worked at a loss.

The resolution was adopted unanimously.

Peachey Process Company, Ltd.

The annual general meeting was held on Friday last in London. Sir Robert W. Gillan, the chairman, in moving the adoption of the report and accounts, said that in the commercial exploitation of the process the most important event had been the launching of Peachey Leather Products, Ltd. Another important line was floor coverings, for which an option had been given. A third application of the process was to the proofing of goods, where there was no doubt that the Peachey process had many advantages over the old method. The vulcanisation of raw rubber articles had been carried out by Plantation Rubber Manufacturing Company, and "Cold Process Rubberware, Ltd.," had been formed for the manufacture of moulded goods. Turning to the foreign rights, a cable had been received from the U.S.A. to say that the final appeal against the issue of a patent there had been dismissed. In other foreign countries their experience was that a successful conclusion to negotiations was not to be looked for until the process was operating in Great Britain. In Belgium, however, their licensee had already begun, and had produced excellent results.

After some considerable discussion the report and accounts were formally adopted.

Cassel Cyanide Company, Ltd.

Sir George Beilby, F.R.S. (chairman), presided over the annual meeting at Glasgow last week. The Chairman, in moving the adoption of the report, stated that the volume of trade for the year showed a gratifying increase compared with previous year. The quantity of ore treated on the Rand during 1923 should reach 26½ million tons. This was in excess of any year since 1917, and reflected the improvement in working conditions on this important goldfield. In Canada precious metal mining continued to develop, and all indications pointed to Northern Ontario becoming a great gold producer. In other fields, Australia excepted, a better tone prevailed, and operations were being carried on with greater confidence. While the turnover for the year was good, and while the outlook was satisfactory so far as the demand was concerned, the market price of cyanide continued to fall. The company saw no prospect in the near future of any improvement in the competitive conditions which prevailed in the cyanide trade. The position could only be met by a lowering of production costs. Substantial progress had been made during the year in this direction, and also with the important developments which they had on hand for improving the processes of manufacture.

The report was approved.

British Cyanides Company, Ltd.

The following statement has been issued: At the annual general meeting in July last the chairman stated that an interim dividend on the ordinary shares would be considered before the end of the year, subject to the proviso that the conditions of trade did not depart from the normal to any great extent. Unfortunately, conditions have been by no means normal since then, and the directors therefore do not feel justified in declaring a dividend. The plant for the manufacture of permanganate of potash was started up last August, and is earning revenue. The first unit plant for the fixation of atmospheric nitrogen, mentioned at the annual meeting, has been installed, and was started up in November. The process is producing and promises well, and further units are being installed.

DIVIDENDS.

United Indigo and Chemical Company, Ltd. — Interim dividend at 5 per cent. per annum for the six months ending December 31 on the ordinary shares, subject to tax, payable on December 29. This is the same as a year ago.

Reckitt and Sons, Ltd.—Interim dividend of 8d. per share on the ordinary shares.

Explosives and Chemical Products Company, Ltd.—Dividend of 2s. 6d. per share, free of tax, being at rate of 6d. per share for each of five years to June 30, 1923, payable December 27.

Ebbw Vale Steel, Iron and Coal Company, Ltd. — The directors have decided not to pay an interim dviidend on the 7 per cent. preference shares in respect of the year ending March 31 next. This leaves the dividend eighteen months in arrear

Tarslag (1923), Ltd.—Dividend at the rate of 8 per cent. per annum on the preference shares for the period ending December 31, payable on January 1.

Asbestos Corporation of Canada.—Dividend on the preferred stock of 1½ per cent. for the quarter ending December 31, payable January 15. The second quarterly dividend on common is passed.

FERTILISER NEWS.

Nitrate of Soda.—There has been a very decided recovery in nitrate sales during the first half of this month, and the market is rather firmer. The Producers' Association have disposed of some 85,000 tons, which brings the total for the current year up to about 1,525,000 tons. Of the former quantity, 50,000 tons was on American account, and it appears that the cotton planters, encouraged by the increased revenue from their cotton sales, are inquiring for nitrate in greater quantities. Such is the confidence in a complete revival in demand in the United States, that several cargoes which were originally destined for Europe have been diverted to that country. Shipments are on a much higher level for the fortnight, and total some 168,000 tons, against 120,000 tons last year and 146,000 tons in 1913. Of this amount, 105,000 tons were for Europe and Egypt, 60,000 tons for United States, and 3,000 tons for Japan and other countries. These large figures are hardly to be taken as indicative that the trade is, however, altogether re-established, but as due to the erratic movements of vessels consequent on the loading and labour conditions at the nitrate ports. Production during November is now reported to have reached 188,000 tons, leaving stocks on the West Coast at the end of the month about 990,000 tons, against 1,325,000 a year ago, and 636,000 in 1913. Producers are evidently making every effort to increase production, in spite of the shortage of labour. The increasing efficiency in working is undoubtedly having its effect, and the improved types of plant installed at many of the oficinas have raised the production capacity to a much higher point than was attained before the war. Amongst the developments which have been taking place recently, it is interesting to note that the Alianza Company is reported to have purchased the nitrate properties at Buenaventura, in connection with which negotiations have been proceeding for some months. It will be remembered that the control of this company was transferred from London to Chile in 1918, so that the present deal is an index of the trend of a certain body of opinion in Chile, which feels that the development of Chilean resources is too much dependent upon foreign capital.

Sulphate of Ammonia.—The Board of Trade figures for the month of November show that the exports of sulphate during that month amounted to 19,005 tons—a serious decline when compared with the figure for the previous month of 26,587 tons. Compared with the average monthly exportation for 1923, which totals nearly 21,000 tons, the November exports are low, but the present year has revealed a greatly increased overseas demand for the British product in comparison with the past three or four years. The pre-war figure of about 325,000 tons is hardly likely to be reached until world conditions become more settled, if, indeed, it will be reached at all. Foremost in the list of customers taking sulphate from this country is the Dutch East Indies. During November, 6,200 tons were despatched, against 4,300 tons in October, making the total for 1923 some 30,140 tons, about 50 per cent. higher than for the corresponding eleven months of last year. Japan, whose continued dependence upon this country for sulphate is clearly demonstrated in the November figures, took over 4,000 tons, compared with 3,650 tons in October. In the corresponding month of 1922, no material at all was shipped from British ports. For the eleven months, however, this year's exports are more than two hundred times greater than for last year, the actual figures being 53,340 tons against 255 tons. Inquiries and shipments are still strong, as the stocks destroyed in the earthquake have yet to be replaced. Spain and the Canaries record a decrease in November shipments, but this can only be of a temporary nature. The trade there has been carefully built up, and the year's figures show that exports in 1922 were approximately doubled this year, the tonnage for the latter period amounting to 62,170. With regard to France, exports dropped from 3,360 tons in October to 1,850 tons last month, compared with 202 tons for November, 1922. The depression in the French sulphate market earlier in the year, consequent on the seizure by the French at Oppau of large quantities of this fertiliser, is responsible for the 30 per cent. decline on the previous year's total trade. The British West Indies and Italy took less than in October; countries not separately specified also registered a considerable decrease, though in all these cases the year's total exports were on a much higher scale than in 1922. The total for the eleven months ending November 30 amounted to 230,598 tons, as compared with 127,338 tons in the corresponding period of last year.

SOUTH WALES NOTES.

(Specially Contributed.)

During the last few weeks the improvement in the tinplate trade has been so marked that the majority of factories will only be on stop for two days during the holiday season. Export orders are now plentiful, and in many instances customers are strongly pressing for immediate delivery. There is still some hesitancy by large consumers to enter into any contracts just at present, while manufacturers are not offering with freedom on long commitments owing to the threatened trouble in the coalfields. Galvanised sheets are not so much in demand, and with the slight reduction both in spelter and raw steel, makers are offering corrugated galvanised sheets at about 5s. less per ton. The patent-fuel trade is much brighter and the outlook for next year seems rather hopeful; pitch has again been reduced in price, and small coal is rather more plentiful. Export trade is keeping good, and it seems likely that more briquette works will be re-opened at the commencement of the year. At the factory of the Crown Preserved Coal Co., Ltd., at Port Talbot, which has been idle for several months, steps are being taken to make a restart in two or three weeks' time. The copper smelters are fairly well employed, but the trade is very indifferent. Spelter furnaces are working well, and there will not be much relaxation during the holidays, the trade being fairly good. Several more batteries of coke-ovens are to be started at the beginning of January, and several colliery owners have announced their intention to build new ovens and extend their by-product plants.

The imports for the week included 297cwt. barytes from Hamburg, 43cwt. zinc oxide from Rotterdam to Cardiff; 15 tons felspar from Antwerp to Newport; 2,200 tons iron pyrites from Seville, 31cwt. cobalt oxide, and 9 tons zinc ashes from Montreal, 103 tons precipitate of copper from Antwerp, 53 tons nitrate of soda from Hamburg, 50 tons nitrate of soda from Porsgrund, 22 tons copper ore from Christiania, 20cwt. refined saltpetre from Rotterdam to Swansea.

NEW COMPANIES.

United Coke and Chemicals Company, Ltd.—Capital £150,000. To adopt an agreement with the United Steel Company, Ltd., and manufacture chemicals and allied products, etc. Office: Moss Bay, Workington, Cumberland.

Coty (England), Ltd.—Private company. Capital £25,000. Perfume manufacturers, etc. Office: 3, Grays Inn Place, W.C.

Ellis Jones and Co. (Stockport), Ltd.—Private company. Capital £30,000. Colour and chemical manufacturers, etc. Office: Tiviot Colour Works, Manchester Road, Stockport.

"Flare" Firelighters, Ltd.—Private company. Capital £100. Manufacturers of firelighters, etc. Office: 21A, Berrylands Road, Surbiton.

Hydro Carbon Distillation Syndicate, Ltd.—Private company. Capital £5., in 1s. shares. To acquire and turn to account certain patent rights, etc. Office: 277, Finsbury Pavement House, E.C.

Lee and Pollard, Ltd.—Private company. Capital £3,000. Dyers and finishers. Office: Priestree Road, Sutton-in-Ashfield, Notts.

New Brights, Ltd. — Private company. Capital £30,000. Manufacturers, refiners, preparers of and dealers in blue, blacklead, starch, ultramarine, plumbago, emery, emery cloth, knife, plate, and other powders, etc. Office: Ings Lane Brough, East Yorks.

Standfast Dyers and Printers, Ltd.—Private company. Capital £60,000. Office: Caton Road Works, Lancaster.

Stream-Line Filter Company, Ltd.—Private company. Capital £72,000., in £1. shares (20,000 7½ per cent. cumulative preference). Office: 64, Victoria Street, Westminster, S.W.

Stovoids, Ltd.—Private company. Capital £1,000. Manufacturers of and dealers in briquettes and patent fuels, etc. Office: Clare House, 57, Kingsway, W.C.

Voldek Soap Company, Ltd.—Private company. Capital £2,500. Soap manufacturers, etc. Office: 15, Henthorn Street, Oldham.

World List of Scientific Periodicals. — Limited by guarantee. Council of management: Sir Arthur Schuster, Dr. P. C. Mitchell, and R. L. Mond, 10, Cavendish Square, W.

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN NOVEMBER.

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of November, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the returns.

Articles.	Quantities. Month ended November 30.			Value. Month ended November 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):						
Acids:						
Acetic (including Acetic Anhydride) tons	156	582	630	1,045	22,974	28,587
Tartaric, including tartrates, not elsewhere specified . cwts.	709	1,049	999	3,306	5,024	5,399
Bleaching Materials ,,	3,919	3,099	1,445	3,130	12,530	5,201
Borax ,,	2,025	4,040	9,320	2,525	4,850	11,641
Calcium Carbide . ,,	50,598	82,301	100,544	39,516	55,576	65,131
Coal Tar Products not elsewhere specified ..... val.	—	—	—	70,658	791	31,567
Glycerine:						
Crude ..... cwts.	535	868	1,139	1,840	2,120	2,798
Distilled ..... ,,	254	245	333	1,230	993	1,211
Lead Compounds:						
Red Lead and Orange Lead ... ,,	2,707	3,822	2,992	3,995	6,107	5,263
Nickel Oxide .... ,,	2,000	—	1,873	12,000	—	8,731
Potassium Compounds:						
Nitrate (Saltpetre) .... ,,	7,396	8,401	14,459	9,920	9,883	16,288
Other C'pounds ,,	184,894	458,933	508,137	51,551	84,525	68,260
Sodium Compounds:						
Nitrate ..... ,,	222,008	179,084	110,629	158,565	115,413	66,781
Other C'pounds ,,	3,843	23,487	22,008	3,733	20,179	34,318
Tartar, Cream of ,,	1,300	2,227	3,059	6,146	8,342	12,550
Zinc Oxide ..... tons	461	588	628	13,477	17,719	21,579
All other Sorts .. val.	—	—	—	96,878	184,134	233,787
DRUGS, MEDICINES, AND MEDICINAL PREPARATIONS containing no Dutiable Ingredient:						
Quinine and Quinine Salts ..... oz.	27,871	159,149	144,222	3,710	16,807	15,726
Bark, Cinchona (Bark, Peruvian, etc.) ..... cwts.	75	22	318	594	140	1,361
Other Sorts ..... val.	—	—	—	97,887	112,469	133,406
DYES and DYE STUFFS (except Dye Woods and Raw Dyeing Substances) and Extracts for Dyeing and Tanning:						
Intermediate Coal Tar Products used in the manufacture of Dyes (including Aniline Oil and Salt, and Phenyl-Glycine) ..... cwts.	29	21	10	343	552	140
Finished Dye Stuffs obtained from Coal Tar:						
Alizarine ..... cwts.	1,401	384	222	4,662	4,128	8,433
Indigo, synthetic ,,	—	—	21	—	—	514
Other Sorts .... ,,	1,707	6,581	2,444	90,454	136,564	73,425
Extracts for Dyeing:						
Cutch ..... ,,	4,334	2,205	3,287	7,233	3,446	3,932
All other Sorts .. ,,	2,270	14,038	4,271	19,784	51,498	19,672
Indigo, natural .. ,,	17	49	56	1,340	1,200	1,871
Extracts for Tanning (solid or liquid) ,,	50,330	80,367	112,075	50,888	86,436	107,118
PAINTERS' COLOURS and MATERIALS, not elsewhere specified:						
Barytes, ground (including Blanc Fixe) ..... cwts.	29,614	48,437	51,560	7,268	11,776	12,486
White Lead (basic carbonate) ..... ,,	6,394	11,188	11,942	11,951	19,162	23,249
Other Sorts ..... ,,	33,600	42,685	66,122	80,116	72,748	117,827
OILS, REFINED						
Essential (other than Turpentine):						
Natural ..... lb.	290,248	338,202	317,768	84,718	94,921	75,501
Petroleum:						
Lamp Oil ..... galls.	13,520,894	9,448,119	13,452,579	347,588	250,945	245,428
Motor Spirit .... ,,	17,036,547	20,635,732	27,165,569	1,113,181	1,306,209	1,913,132
Spirit other than Motor Spirit ... ,,	12,420	—	50	1,249	—	8
Lubricating Oil .. ,,	6,094,872	6,474,176	3,080,826	563,751	434,987	233,374
Gas Oil ..... ,,	62,337,798	768,839	5,055,738	121,004	11,386	74,615
Fuel Oil..... ,,	34,709,623	29,383,878	28,302,165	653,362	398,975	361,752
Other Sorts ..... ,,	1,227	3,355	5,558	244	321	575
Total ..... ,,	77,609,381	66,714,099	77,062,485	2,890,349	2,402,823	1,928,884

Articles.	Quantities. Month ended November 30.			Value. Month ended November 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
SOAP, not containing Spirit:						
Soft ..... cwts.	626	238	20	1,171	357	30
Hard, Household and Laundry, in bars and tablets ..... cwts.	10,687	11,369	9,247	29,615	27,439	21,740
Polishing and Scouring ..... ,,	3,296	4,623	8,794	4,567	5,696	10,306
Hard Toilet Soap and Shaving Soap ,,	1,429	5,115	2,978	14,916	29,292	16,592
Soap not elsewhere specified ..... ,,	175	905	61	835	1,063	139
Total ..... ,,	16,213	22,550	21,100	51,104	63,847	48,815
TURPENTINE..... ,,	17,722	61,911	39,097	58,018	285,236	139,428
WAX:						
Paraffin Wax ... ,,	108,870	91,237	79,895	122,971	68,796	72,373
OILS and FATS, refined edible:						
Animal (except Marine Animal), refined:						
Lard:						
From U.S.A. .... tons	8,767	8,850	8,348	635,503	593,325	592,975
,, Other C'tries ,,	970	1,057	2,489	69,579	64,114	171,479
Total ..... ,,	9,737	9,907	10,837	705,082	657,439	764,454
Lard, Imitation . ,,	355	536	328	24,996	33,271	19,301
Oleo - margarine and Oleo-oil and Refined Tallow . ,,	2,872	2,902	1,700	170,744	148,128	96,263
Vegetable, other than Essential, Refined:						
Coconut Oil, Refined ..... tons	306	790	652	19,739	36,213	31,627
Cotton - seed Oil, Refined ..... ,,	844	208	928	34,639	8,786	38,202
Olive Oil, Refined ,,	129	197	350	11,056	14,990	25,088
Palm and Palm-Kernel Oil, Refined ,,	35	4	36	1,730	263	1,536
All other Sorts, Refined ..... ,,	598	650	423	34,451	36,203	22,859
Total ..... ,,	14,876	15,194	15,254	1,002,437	935,290	999,330
SEEDS for expressing Oil:						
Castor ..... tons	2,093	27	794	38,502	485	16,508
Cotton:						
From Egypt .... ,,	10,920	39,446	51,663	132,215	386,710	577,398
,, British India ,,	6,185	12,397	4,948	61,609	113,530	47,775
,, Other C'tries ,,	11,080	1,850	4,455	111,345	18,019	40,305
Total ..... ,,	28,185	53,693	61,066	305,169	518,259	665,478
Flax or Linseed:						
From Russia ... ,,	15	—	—	540	—	—
,, U.S.A. ... ,,	—	—	—	—	—	—
,, Argentine Republic .. ,,	23,118	4,027	11,141	122,359	71,434	220,689
,, British East Indies .... ,,	3,820	11,929	15,448	82,253	239,184	323,140
,, Canada ... ,,	—	—	—	—	—	—
,, Other C'tries ,,	606	1,341	866	11,643	22,282	17,160
Total ..... ,,	27,859	17,297	27,455	516,795	336,900	560,989
Rape:						
From B. East Indies ,,	2,712	3,881	6,346	57,202	67,642	91,559
,, Other C'tries ,,	1,762	91	57	23,779	2,672	1,649
Total ..... ,,	4,474	3,972	6,403	80,981	70,314	93,208
Sesame (or Sesamum, Benni, Gingelly or Teel):						
From China ..... tons	—	—	—	—	—	—
,, Other C'tries ,,	50	—	—	1,289	—	—
Total ..... ,,	50	—	—	1,289	—	—
Soya Beans:						
From Russia .... ,,	—	—	—	—	—	—
,, China ..... ,,	1,461	—	—	18,993	—	—
,, Japan .... ,,	6,611	—	—	88,461	—	—
,, Other C'tries ,,	—	—	—	—	—	—
Total ..... ,,	8,072	—	—	107,454	—	—
Other Sorts, including Sunflower ..... tons	1,538	3,363	1,548	18,788	43,379	24,229
NUTS and KERNELS for expressing Oil therefrom:						
Copra ..... tons	8,106	6,862	8,660	236,535	164,866	233,415
Ground Nuts (Arachide, Pea, or Monkey Nuts) .. ,,	2,617	4,620	2,561	51,863	79,672	50,014
Palm Kernels ... ,,	22,176	22,153	27,514	408,502	371,642	502,789
Other Sorts ..... ,,	189	7	916	5,384	254	19,463
Total ..... ,,	33,088	33,642	39,651	702,284	616,434	805,681

(To be concluded.)

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN NOVEMBER.

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during the month of November, 1923, compared with 1921 and 1922. As from April 1, 1923, the export trade of the Irish Free State is excluded from the returns.

ARTICLES.	QUANTITIES. Month ended November 30.			VALUE. Month ended November 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
CHEMICAL MANUFACTURES AND PRODUCTS (other than Drugs and Dyestuffs):				£	£	£
ACIDS:						
Sulphuric ..... cwts.	1,165	1,076	1,515	2,593	1,440	1,755
Tartaric (including Tartrates not elsewhere specified) ..... ,,	518	1,098	2,901	3,195	7,052	17,465
AMMONIUM COMPOUNDS:						
Chloride (Muriate) tons	443	456	479	18,280	17,509	15,793
Sulphate—						
To France..... ,,	1,755	202	1,850	21,392	3,535	25,437
,, Spain and Canaries ... ,,	1,760	5,662	2,037	27,560	98,505	51,563
,, Italy ..... ,,	85	300	116	1,360	5,300	1,676
,, Dutch East Indies ..... ,,	615	3,350	6,201	9,715	57,393	95,028
,, Japan ..... ,,	856	—	4,011	11,876	—	59,972
,, British West India Islands (including Bahamas) and British Guiana ,,	501	1,160	810	7,904	20,695	11,864
,, Other C'ntries ,,	1,836	3,384	2,980	27,864	56,446	41,645
Total ..... ,,	7,408	14,058	19,005	107,671	241,874	277,185
BLEACHING POWDER cwts.	14,276	25,484	16,482	11,957	15,083	96,75
COAL TAR PRODUCTS, not elsewhere specified:						
Anthracene..... cwts.	—	—	248	—	—	203
Benzol and Toluol galls.	—	5,427	214,830	—	987	13,041
Carbolic Acid ... cwts.	6,350	10,000	10,848	11,608	20,850	32,474
Naphtha ..... galls.	2,799	5,949	103,791	456	958	8,235
Naphthalene .... cwts.	1,456	9,927	18,281	1,717	5,294	12,287
Tar Oil, Creosote, etc. ..... galls.	28,672	2,938,137	1,561,826	2,815	80.362	64,656
Other Sorts ..... cwts.	19,990	27,034	30,375	12,107	14,656	21,249
Total ..... val.	—	—	—	28,703	123,107	152,145
COPPER, Sulphate of ..... tons	710	2,282	585	21,901	60,343	14,445
DISINFECTANTS Insecticides, Weed-killers and Sheep and Cattle Dressings, except Tobacco Offal, containing no Dutiable Ingred'ntcwts.	24,207	33,200	38,472	64,350	84,990	96,787
GLYCERINE:						
Crude ..... cwts.	5	2,991	4,217	24	9,101	10,605
Distilled ..... ,,	4,633	14,021	12,045	26,242	57,713	48,030
Total ..... ,,	4,638	17,012	16,262	26,266	66,814	58,635
POTASSIUM COMPOUNDS:						
Chromate and Bichromate ..... cwts.	2,540	2,191	4,200	8,656	6,276	10,857
Nitrate (Saltpetre)						
Birtish prepared ,,	970	910	1,165	2,370	2,010	2,485
Other Sorts ..... ,,	1,213	1,925	2,065	11,103	18,381	16,498
Total ..... ,,	4,723	5,026	7,430	*22,129	26,667	29,840
SODIUM COMPOUNDS:						
Carbonate (including Soda Crystals, Soda Ash, and Bi-carbonate) .. cwts.	360,583	437,478	486,743	129,673	138,546	137,220
Caustic ..... ,,	88,688	121,728	149,972	103,462	123,882	123,815
Chromate and Bichromate ..... ,,	2,415	4,692	2,932	7,058	11,175	6,268
Sulphate, including Saltcake ... ,,	24,381	174,726	97,944	12,538	37,424	23,233
Other Sorts ..... ,,	61,497	49,425	48,911	117,759	86,896	79,144
Total ..... ,,	537,564	788,049	786,502	370,490	397,923	369,680
ZINC OXIDE ..... tons	53	222	273	2,610	7,913	11,187
CHEMICALS, all other sorts .... val.	—	—	—	219,516	275,616	282,035
DRUGS, MEDICINES, and MEDICINAL PREPARATIONS:						
Quinine and Quinine Salts... oz.	156,940	154,103	130,160	33,397	19,766	17,064
Opium, Dried and powdered in the United Kingdom lb.	8,553	252	398	5,190	227	404
Other Sorts ..... val.	—	—	—	180,953	196,726	240,725
Total ..... ,,	—	—	—	218,640	216,719	258,193

ARTICLES.	QUANTITIES. Month ended November 30.			VALUE. Month ended November 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
DYES and DYESTUFF (except Dye-woods an Raw Dyeing Sul stances) and Extract for Dyeing and Tanning Products of Coal..				£	£	£
Tar ..... cwts.	5,955	4,561	12,915	63,634	48,049	111,174
Other Sorts ..... ,,	3,837	7,924	8,521	7,784	11,814	9,930
Total ..... ,,	9,792	12,485	21,436	71,418	59,863	121,104
PAINTERS' COLOURS and MATERIALS not elsewhere specified:						
Barytes, Ground (including Blanc Fixe) . cwts.	2,942	5,076	280	1,567	2,506	189
White Lead (Basic Carbonate) .... ,,	11,094	14,897	14,604	28,879	34,161	33,293
Paints and Colours Ground in Oil or Water ..... ,,	18,406	29,823	30,372	59,482	71,708	75,237
Paints and Enamels Prepared (including Ready-Mixed) ,,	15,103	20,566	27,604	52,475	67,281	84,058
Other Sorts ..... ,,	29,207	47,763	55,298	74,883	97,500	105,740
Total ..... ,,	76,752	118,125	128,158	208,286	273,156	298,517
CANDLES ..... cwts.	11,223	10,275	19,837	33,960	27,724	40,080
OILS, REFINED—						
*Lubricating Mixed galls.	—	53,228	89,182	—	7,941	9,726
Petroleum:						
Lubricating .... ,,	400,496	718,936	530,074	63,137	81,727	60,667
Other Sorts ..... ,,	79,749	6,158,674	10,071 416	6,800	93,436	192,718
SOAP, not containing Spirit:						
Soft ..... cwts.	1,018	1,242	2,066	2,205	2,426	3,231
Hard: Household and Laundry, in bars and tablets:						
To China..... cwts.	108	280	1,324	409	683	3,213
,, Other Foreign Countries .. ,,	24,779	21,010	32,708	58,501	45,853	61,982
,, British South Africa ..... ,,	56	30	218	155	75	511
,, British East Indies ..... ,,	28,998	24,228	28,703	61,150	48,198	52,735
,, Other British Possessions . ,,	29,869	27,232	32,416	74,728	55,669	67,711
Total ..... ,,	83,810	72,780	95,369	194,943	150,478	186,152
Toilet (including Shaving) ..... ,,	4,045	5,798	4,997	47,870	59,581	44,443
Polishing and Scouring ..... ,,	1,389	2,409	1,787	4,053	4,994	5,327
Soap, not elsewhere specified . ,,	3,219	3,526	4,606	11,617	17,885	19,319
Total of Soap ,,	93,481	85,755	108,825	260,688	235,364	258,472
VARNISH ..... galls.	63,904	107,791	100,228	44,286	49,604	58,100
WAX: Paraffin Waxcwts.	24,785	14,482	18,832	31,800	15,211	20,940
OIL-SEED CAKE:						
Cotton-seed Cake tons	301	908	234	2,471	5,877	3,176
Linseed Cake ... ,,	627	219	1,597	7,800	4,960	18,657
Rape-seed Cake.. ,,	—	200	—	—	1,450	—
Soya Bean Cake . ,,	145	698	795	1,925	7,620	7,449
All other Sorts .. ,,	3,170	1,733	5,552	21,441	12,046	37,892
Total ..... ,,	4,243	3,758	8,178	33,637	31,953	67,174
OILS and FATS, refined, edible—Animal (except Marine Animal), refined:						
Lard ..... tons	11	42	69	1,537	3,958	4,902
,, Imitation . ,,	18	21	184	1,191	1,133	10,595
Vegetable (other than Essential), refined:						
Coconut Oil ..... tons	130	51	288	7,191	2,887	15,029
Cotton-seed Oil .. ,,	512	1,113	1,352	29,959	47,035	60,179
Olive Oil ..... ,,	11	11	7	2,698	2,727	2,084
Palm Oil ..... ,,	15	24	56	634	878	2,161
Palm Kernel Oil . ,,	261	30	278	12,233	1,077	11,927
All other Sorts .. ,,	417	931	1,001	21,138	38,617	44,550
Total ..... ,,	1,375	2,223	3,235	76,581	98,312	151,427
SALT (other than Table Salt):						
To Sweden ..... tons	3,609	2,774	2,333	13,176	9,842	7,437
,, U.S.A. ..... ,,	330	677	775	1,530	2,057	3,195
,, Nigeria ..... ,,	7,280	4,997	3,111	39,366	22,958	13,478
,, Brit. E. Indies ,,	15,047	9,450	12,162	45,201	18,992	24,438
,, Australia..... ,,	1,887	359	116	4,404	1,362	458
,, New Zealand . ,,	2,002	2,212	2,764	9,297	7,808	10,673
,, Canada ..... ,,	3,417	5,240	4,817	10,649	14,070	11,175
,, Other Countries ,,	8,686	5,509	8,326	26,658	18,007	21,089
Total ..... ,,	42,258	31,218	34,404	150,281	95,096	91,943

* Included in "Oils, Refined: Petroleum—Lubricating" prior to 1922.

(To be concluded.)

GAZETTE NEWS.

MORTGAGES AND CHARGES.

Barnsley Chemical Company, Ltd.—Registered November 26, £15,000. debs.

British Burmah Petroleum Company, Ltd., London, E.C. —Registered December 1, mort. created out of the United Kingdom (supplemental to Trust Deed dated January 16, 1922, securing £600,000. 2nd deb. stock and premium of 5 per cent.).

Clement and Johnson, Ltd., London, W.C., chemists.—Registered December 3, £38,600. debs., part of £60,000.

Cyprus Sulphur and Copper Company, Ltd. (late New Lymni, Ltd.), London, E.C.—Registered November 30, £1,300. 1st. debs., part of £20,000.

Somerset Oxide and Ochre Company, Ltd., Bristol.—Registered November 26, £6,000. deb., to Branch Nominees, Ltd., 15, Bishopsgate, E.C.

Walker (J. B.) and Co., Ltd., Hull, oil refiners.—Registered November 27, mort. (collateral to £8,000. debs.), to London Joint City and Midland Bank, Ltd., securing all moneys due or to become due to the bank.

West Hensbarrow China Clay Company, Ltd.—Registered November 29, £500. debs., part of £10,000.

SATISFACTIONS.

Standardised China Clay Company, Ltd., London, E.C.—Satisfaction registered December 3, £9,223., registered November 27, 1914, to February 15, 1921.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Burlington Industrial Laboratories, Ltd. — Resolved November 30: That the company be voluntarily wound up. C. H. Whatley, 6/7, Charing Cross Chambers, Duke Street, Adelphi, W.C., liquidator.

Surrey Chemical Company, Ltd., London, S.E. — W. R. Theobald, 143, Bow Road, E., appointed receiver. November 27.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Scholes (John R.) and Co., Ltd., 14-15, Argyle Chambers, 67, Hanging Ditch, Manchester; chemical merchants; £15. 5s. 7d. October 29.

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

Canada.

A well-known Montreal firm are desirous of receiving quotations from British firms for 75 to 100 containers for liquid chlorine in accordance with specification. (Ref. D.O.T. 12,639/E.D./E.C./2.)

Egypt.

Tenders are invited for the supply of various stores required during 1924-25 by the Port and Lighthouses Administration, Alexandria, comprising considerable quantities of paints (mixed and in powder), varnishes, various oils (boiled and raw linseed, bicycle, clock, colza, etc.), shellac, coal and Stockholm tar, tallow, soap, etc. Tenders will be received by the Director-General, Ports and Lighthouses Administration, Alexandria, up to noon on January 7, 1924. (Ref. D.O.T. 11,944/F.E./C.C.)

Netherlands.

A firm of wholesale dealers in Almelo are desirous of obtaining the sole agency of British chemical works for the sale in Holland of heavy chemicals, including caustic soda, sodium sulphide, bichromates, bleaching powder, sulphate of alumina, potash alum, etc. (Ref. No. 640.)

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

December 3 to 8 (inclusive).

Organic Mercury Compounds. Albert, A. 30,611.
Apparatus for Chemical Action under the Influence of Light. Atkinson, R. G. 30,438.
Ultra-filter Membranes. Duclaux, J. 30,604.
Disazo-dyestuffs. Durand and Huguenin Akt.-Ges. 30,838.
Alkali Metals. Ewan, T. 30,871, 30,872, 30,873, and 30,874.
Alkali Metal Amides. Ewan, T. 30,875.
Chlorinating Benzene. Farbwerke vorm. Meister, Lucius, and Bruning. 30,645.
Acids. Guadagni, G. 30,726.
Green Vat Dyestuffs. Johnson, J. Y. (*Badische Anilin- and Soda-Fabrik*). 30,390.
Dyestuffs of the Anthraquinone Series. Johnson, J. Y. 30,721.
Rubber Preservative. Kingston, W. B.; and Prickett, R. B. 30,351.
Concentrating Aqueous Solutions of Volatile Substances. Lichtenthaeler, F. E. 30,535.
Distillation. Loisy, M. C. J. E. de. 30,421.
Bituminous Emulsions. Mackay, H. A. 30,640.
Resinous Preparations. McLean, A. 30,585.
Gelatine. Pansky, A. 30,378.
Purification of Minerals and Salts. Soc. Chimique de la Grande Paroisse (Azote et Produits Chimiques). 30,825.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1922.

Cellulose Acetates. Dreyfus, H. 14,610. **207,562**
Emulsions. Travis, P. M.; and Glabau, C. A. 17,369. **195,033**
Sodium Nitrate. Guggenheim Brothers. 20,192. **192,032**
Acid Plant Equipment. Fairlie, A. M. 23,083. **207,589**
Electrolytic Gas-generating Systems. Scott, J. P. 23,977. **207,630**
Soluble Sulphonated Oils of Animal Origin. Aische, M. I. 28,995. **207,678**
Recovery of Aluminium. Tullis, D. R. 29,309. **207,679**
Treatment of Waters Containing Alkaline Bicarbonates. Grant, E. D.; and Becco Engineering and Chemical Co., Ltd. 31,977. **207,696**
Dyeing Acetyl Silk in Deep Fast Shades by Direct Dyeing. British Dyestuffs Corporation, Ltd.; Baddiley, J.; and Tatum, W. W. 34,894. **207,711**

1923.

Preliminary Treatment of Gases Intended for the Recovery of Hydrogen by Partial Liquefaction. L'Air Liquide Soc. Anon. pour l'Etude et l'Exploitation des Procédés G. Claude. 5,565. **195,598**
Solid Polymerisation Products of Acetylene. Elektrizitatswerk Lonza. 16,283. **200,087**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Obtaining Phosphorescence in Luminous Paints. Risler, J. 19,333. **207,786**
Hardening the Products of Condensation from Phenols and Aldehydes. Deutsch, L.; Thorn, I.; and "Amalith" Chemische Industrie Ges. 25,274. **207,790, 207,791,** and **207,792**
Diaphragm for Electrolytic Pressure. Reinhardt et Cie, P (firm of). 28,853. **207,801**
Hydrogen Cyanide. Deutsche Gold- und Silber-Scheideanstalt vorm. Roessler. 30,414. **207,830**

ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

Amino-Anthraquinone Derivatives. A. G. Bloxam, London. (Soc. of Chemical Industry in Basle, Basle, Switzerland.) British Patent **205,525,** of 1922.

Aminoanthraquinone derivatives are prepared by the condensation of an amino compound of the anthraquinone series, the amino group of which may be monosubstituted, with a 1 : 3 : 5-triazine derivative halogenated in the nucleus—for example, cyanuric chloride or bromide; when the triazine derivative contains more than one atom of chlorine, part of the halogen only may react, and remaining reactive halogen atoms may then be saponified or caused to react with substances such as ammonia or primary or secondary amines, or with aliphatic or aromatic compounds containing one or more -OH or -SH groups. For the condensation diluents, such as nitrobenzene, chlorbenzene, naphthalene, toluene, or glacial acetic acid, may be employed, or condensing agents such as

cuprous chloride or agents binding halogen acid. Some of the products are useful as dyes, dyeing cotton and wool in red to yellow shades from the vat, and others as starting materials for the manufacture of dyestuffs. Several examples are given.

Benzanthrone Dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. Convention date, October 12, 1922. British Patent **295,502.**

Vat-dyestuffs are obtained by condensing benzanthrone, or a substitution product thereof having a free 1'-position, with an aromatic acid chloride in presence of a catalytic or condensing agent. The products dye cotton in yellow to deep orange shades from red to bluish red hydrosulphite vats; that obtained by condensing benzanthrone with benzoyl chloride in presence of aluminium chloride, with or without some zinc chloride, is probably 3 : 4 : 8 : 9-dibenzopyrene-5 : 10-quinone.

Monazo Dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main, Germany. Convention date, October 12, 1922. British Patent **205,503.**

Monoazo dyes are prepared by coupling diazotised *m*-aminobenzaldehyde, or a substitution product thereof, with a pyrazolone; in place of a *m*-aminobenzaldehyde, a substance yielding one may be used such as an oxime, hydrazone, or aldazine. The products dye wool from an acid bath in even greenish-yellow shades fast to light, alkalies, and washing.

Welding or Cutting Metals. J. R. Rose, Pennsylvania; and J. Harris, Lakewood, Ohio, U.S.A. British Patent **205,543,** of 1922.

A gaseous fuel for the cutting or welding of metals with oxygen comprises a mixture of hydrogen with from 1 to 50 per cent. by volume of a hydrocarbon or hydrocarbon derivative with entire absence of oxides of carbon. Examples of hydrocarbons are butane, propane, methane, natural gas, gasoline alcohol, hydrocarbons from distillation of vegetable and animal oils and fats, acetylene, or hydrocarbons of the benzene series. With liquid hydrocarbons the mixture is made by saturating the hydrogen with their vapours, employing a saturator or carburettor. A mixture of 1 to 5 per cent. of hydrocarbons is used for cutting light metals and for narrow clean cuts, 5 to 15 per cent. for medium and heavy masses, and 15 to 50 per cent. for the heaviest masses of metal, including cast iron.

Aryl-oxy-naphthyl-ketones. O. Y. Imray, London. (Soc. of Chemical Industry in Basle, Basle, Switzerland.) British Patent **203,824,** of 1922.

Aryl-oxy-naphthyl-ketones are prepared by interaction of an arylchloroform such as a phenylchloroform or 1-chlor-2-naphthylchloroform and β-naphthol, or an α-or β-naphthol containing negative substituents, in absence of a substance for neutralising acid; by heating in presence of a suitable liquid the carboxylic or sulphonic group of those ketones derived from naphthol carboxylic or sulphonic acids is eliminated, giving the simple ketones.

Cellulose Ester-containing Paints. Titanine, Ltd., T. W. H. Ward, and J. Fletcher, London. British Patent **203,847,** of 1922.

Varnishes or paints comprising solutions of cellulose esters, particularly nitrocellulose, are rendered less inflammable by adding a finely divided substance which is insoluble in the solvents used and which decomposes with heat absorption at moderate high temperatures, such as above 350° C. Suitable substances are bicarbonates, double borates, and phosphates, containing ammonium borate or phosphate as a constituent; and particularly magnesium ammonium phosphate, which may be added in small proportions, such as 5 per cent. The prior use of ammonium phosphate is referred to.

Aluminium Chloride and Alumina. A. L. Mond, London. (Chemische Fabrik Griesheim-Elektron, Frankfurt-on-Main, Germany.) British Patent **205,563,** of 1922.

An aluminium-chloride solution which may be obtained by treating calcined clay with hydrochloric acid (or with aluminium-chloride solution enriched with hydrochloric acid) is evaporated to produce a crystal sludge from which the mother liquor is separated. The crystals are washed with hydrochloric acid or first with some of the original solution and then with pure hydrochloric acid (for instance of 20 per cent. strength), the mother liquor and washings being used to absorb hydrochloric acid arising from the calcination of the crystals to obtain alumina (when such calcination is effected) or from other sources and used according to their content of iron either for washing the crystals or for treating more clay. When the solutions accumulate too much iron they are evaporated and calcined to produce hydrochloric acid.

Synthetic Drugs. O. Y. Imray, London. (Soc. of Chemical Industry in Basle, Basle, Switzerland.) British Patent **203,608,** of 1922.

N-Mono- or di-carboxylic acid esters of asymmetrically substituted alkylene diamines are produced by the interaction of one molecular proportion of an asymmetrically substituted alkylene diamine with one or two molecular proportions respectively of a halogeno-formic acid ester, followed by the addition of alkali. According to an example, diethylamino-ethyl carbamic acid benzyl ester is obtained from *as*-diethyl-ethylene diamine and chloroformic acid benzyl ester.

ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Germicides and Fungicides. Koholyt Akt.-Ges., Berlin. British Patent **205,827.** Convention date, October 21, 1922.

Products having germicidal and fungicidal properties are obtained by treating plant extracts, such as sulphite lye or tanning extracts, with a halogen or a substance giving rise thereto. Sulphite lye is treated with chlorine, for example, preferably until the reddish-yellow precipitate obtained has a chlorine content of at least 10 per cent. The product may be subsequently treated with an oxidising agent, such as chloric acid. The products may be mixed with ointments and soaps, and, for making compresses or antiseptic powders, with substances such as clay; they may be applied to materials for dressing wounds. In solution they may be used for steeping seeds and for preserving wood, hair, feathers, and other animal or vegetable fibres. Their action is more powerful in acid than in alkaline solution, and is assisted by the presence of neutral salts.

Production of Alcohol and Yeast. E. Klein, Vöslau, near Vienna. British Patent **205,813.** Convention date, August 29, 1922.

In preparing alcohol by fermentation and utilising the residual liquor after separation of the alcohol for the formation of yeast by the aeration process, phosphorus compounds such as phosphates are added to the materials used in forming the mash prior to or during the sugar-conversion period. Nitrogen-containing materials and other yeast-nourishing substances may be added after the first fermentation. A mash prepared with a mixture of rye, malt, and superphosphate is acidified. Fermentation is effected in a concentrated liquor to diminish yeast formation. Alcohol is separated by distillation. The residual liquor is clarified and fermented with yeast while being vigorously aerated. In using mash prepared from rice or other materials poor in nitrogen, the fermentation to produce alcohol is stopped before completion, and nitrogenous substances such as uric acid, calcium cyanamide, extracts of acrospires, or cotton-seed cake are added prior to the fermentation to produce yeast. In using worts from molasses or crude sugar, additions of phosphates are made and the alcoholic fermentation is not carried to completion. The wash, after distillation to separate alcohol, is treated to yield the maximum quantity of yeast, additions of wort from molasses, superphosphate, and ammonium sulphate being made periodically. The yeast is afterwards improved by growth in a mash prepared from grain and superphosphate.

Chlorine Dioxide in Glue Manufacture. Köln-Rottweil Akt.-Ges., Berlin. British Patent, **203,276.** Convention date, January 31.

The raw material, such as sinews, bones, or split leather scrap, is treated with an aqueous solution of chlorine dioxide, washed with cold water, and finally treated with warm water for the extraction of gelatin or glue.

Vulcanising Fats. J. H. van der Meulen, Arnhem, Holland. British Patent, **201,531**. Convention date, July 31, 1922.

Fats, etc., are vulcanised by exposure to sulphur chloride vapour, preferably in an exhausted chamber and at atmospheric temperature The process is especially adapted for varnishing or lacquering leather, artificial leather, and rubber goods, by coating the article with fatty oil and then submitting it to the action of the chloride. The untreated layer of oil may be covered with one of rubber, so that the oil and rubber are vulcanised simultaneously.

Decomposition of Titanium-nitrogen Compounds. Titan Co. Aktieselskabet, Fredriksstad, Norway. British Patent. **199,713**. Convention date, June 24, 1922.

Titanium-nitrogen compounds are treated with sulphuric acid (which may be somewhat diluted) at a pressure greater than atmospheric and at a suitable temperature, the products being titanium sulphate or oxide and ammonium sulphate. If the temperature pressure and dilution of the acid are suitably chosen, the titanium may be obtained as oxide, a small quantity of acid beyond that necessary to produce ammonium sulphate being then sufficient. In an example 50 per cent. sulphuric acid is employed at a heat necessary to produce a pressure of 25 atmospheres. The titanium oxide obtained contains a small quantity of nitrogen and may be treated again with sulphuric acid under pressure to remove the nitrogen, the acid liquor obtained being used for treating fresh nitride. Specification 115,020 is referred to.

PUBLICATIONS RECEIVED.

"**Dangerous Goods.**"—2nd Edition. Dr. Jules Aeby. London: Crosby, Lockwood and Son; 30s. net.

The British Photographic Journal Almanac, 1924; 2s. net. Messrs. Henry Greenwood and Co., Ltd., 87, Strand, W.C. 2.

Calendar, 1924.—The Sheffield Smelting Company, Ltd.

Desk Calendar, 1924.—Messrs. Brotherton and Co., Ltd., Leeds. A very attractive day-to-day calendar, mounted on a substantial metal base carrying a vertical support for the current date. Suitable, very striking quotations have been compiled by Mrs. Charles Ratcliffe, a lady of considerable literary reputation and accomplishment.

Chemical Society Library.—The library of the Chemical Society will be closed for the Christmas holidays from Monday, December 24, to Thursday, December 27, inclusive.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Wednesday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—There is little change to report on the past week. Business has been rather quieter, but the general tone of the market remains quite steady. The Continental position is still very strong. The complete stoppage of business with Germany continues. **Acetic Acid,** 80% technical, £47. 10s.; 80% pure, £50. to £51.; 98% glacial, £60. in casks, and about £73. per ton in glass demijohns, ex wharf London; spot supplies are running short, and prices are dearer, with the market firm; still higher prices are expected for the 80% pure grade. **Acetone,** British Government specification, about £124. per ton, in drums; the spot position holds very steady, and some fair business has been done. **Alum,** lump, in casks, £10. to £10. 10s. per ton, dealers continue to quote at these figures, with the market quiet. **Arsenic,** Cornish white powdered, £68. per ton, ex wharf; at the figure quoted the market is firm; business, however, has again been poor; the price stated appears to be too high for buyers, but there is little evidence of any easier conditions. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; this item has been again quiet, and dealers' prices are unchanged. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; very little interest is shown in dealers' offers of Continental material at these rates. **Barium Chloride,** 98—100%, £14. 10s. to £15. per ton; some limited business has been done close up to these quoted rates. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27.; B.P., crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commercial, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71. per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P. crystals, about 1s. 4½d. per lb., less 5%; spot supplies are offered at about this figure, with little or no demand. **Cream of Tartar,** B.P., 99—100%, 86s. to 87s. 6d. per cwt., less 2½%; dealers continue to quote close up to these rates, and some fair business has been booked; the market is steady. **Epsom Salts,** commercial quality, about £4. 15s. per ton, in bags; there is little interest shown in this item, and dealers' prices for Continental material are unchanged. **Formaldehyde,** 40% volume, £64. to £65. per ton; quotations on spot for this article are rather irregular, and it may be possible to place orders at lower figures. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; dealers' prices are round about these rates, with business dull. **Lead Acetate,** brown, about £43.; white, £44. per ton; material in limited quantities is available on spot; the market is fully maintained. **Litharge,** imported, about £37. 10s. per ton, on spot; slightly cheaper to arrive; dealers are quoting at these prices, with occasional business being done. **Lithopone,** 30% Continental red seal, £23. to £24. per ton; a very satisfactory inquiry continues on spot for this article, and dealers' prices as quoted are supported by Continental offers. **Ammonium Chloride,** grey galvanising, £31. to £31. 10s. per ton; spot supplies are available at the prices mentioned; the market is very steady, with a rising tendency. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at these unchanged rates. **Oxalic Acid,** about 5¾d. per lb.; there is still but poor business for this article; prices are about the same, with market unsteady. **Carbonate of Potash,** 90—92%, about £25. 10s. to £26.; 96—98%, £28. to £28. 10s. per ton; this item is quite firm on spot, with dealers holding spot supplies doing a fair business. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; business, so far as merchants are concerned, remains dull; quoted values unchanged. **Caustic Potash,** 88—92% solid, fully £33. per ton; during the past week there has been only a small call for this article, but owing to the much firmer conditions on the Continent spot values are fully maintained, and may advance. **Permanganate of Potash,** commercial quality, about 9d. per lb.; dealers report a week of slow and small business; prices well maintained. **Prussiate of Potash,** yellow, about 10¼d. per lb.; only small business is reported, with dealers offering British material quoting at about this figure. **Sulphate of Potash,** 90%, £11. per ton; this market shows no change on the week. **Mercury,** about £9. 17s. 6d. per bottle of 75—76lb.; the spot market has been rather quiet again, but so far prices are being maintained. **Red Lead,** imported, about £37s. 10d. per ton on

spot; slightly cheaper to arrive; dealers continue to quote at about these rates. **Salammoniac,** dog-tooth crystals, fully £50.; medium, £44. to £45.; fine white crystals, £28. to £29. per ton; dealers holding spot supplies are firm at about these figures; supplies are now limited, and the market has a rising tendency. **Saltcake,** ground and unground, about £4. 10s. per ton, delivered; supplies available are fully taken up to the end of the year. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; merchants are offering at about these prices, with still but small inquiry. British makers' prices for domestic consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; this figure is quoted by British makers for home trade only, packages free, carriage paid. **Bichromate of Soda,** home trade, about 4½d. per lb.; British makers continue to quote at this figure for home trade only; dealers are offering at cheaper prices to arrive. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers continue to quote at these rates, and slightly more for home trade. **Soda Ash,** 58% light alkali. £7. 10s. per ton, in bags; British makers' price, for home trade only, is unchanged, packages free, carriage paid to any station in Great Britain. **Hyposulphite of Soda,** pea crystals, about £15. 10s. per ton, in 1cwt. kegs; commercial quality, about £10. to £10. 10s. per ton, in casks; spot prices show a further slight hardening, and the market stands quite firm; Continental prices are dear. **Nitrate of Soda,** 96%, £13. 5s. per ton, f.o.r. or f.o.b.; prices quoted here are very steady. **Nitrite of Soda,** 100%, £28. 10s. per ton; no further change in quotations is recorded, with market steady. **Prussiate of Soda,** about 5½d. per lb.; only small business is being done; dealers continue to offer British material at about this figure. **Sodium Sulphide,** 60—62%, about £14. 10s.; ditto, broken, £15. 10s. per ton, in drums; dealers are finding but small business; their prices, however, are fully maintained. **Tin Crystals,** 1s. 3½d. per lb.; this market shows no change on the week. **Tartaric Acid,** B.P. crystals, about 1s. 1½d. per lb., less 5%; although business is just as poor, the market seems a little steadier; spot supplies are freely offered. **White Lead,** imported, about £41. to £42. per ton, on spot; dealers are quoting at these prices, and slightly less to arrive; business is quiet. **Zinc Oxide,** B.P., £52.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers' prices remain at these levels.

Pharmaceutical Chemicals.—The tone of this market continues firm throughout, with very few exceptions. One or two further advances in spot values are recorded. A good volume of business is again reported. The position of the Continent, especially in Germany, indicates nothing in the way of easier conditions in the near future. **Acetanilid,** crystals and powder, up to 4s. per lb.; spot offers are now made up to the higher figure quoted, and supplies are very short. The Board of Trade persist in their attitude of refusing to grant import licences for adequate quantities, thus forcing up the spot price to consumers. **Acetyl-Salicylic Acid,** B.P., 3s. 9d. to 4s. per lb.; holders of spot supplies of good material are quoting at about these rates, according to quantity. **Benzoic Acid,** B.P., 4s. to 4s. 3d. per lb., nominal; it is doubtful if there are any supplies available; licences to import in sufficient quantity are still being refused by the Board of Trade. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. 9d. to 19s. per lb.; although there is little call for this article, the spot price is well maintained. **Salicylic Acid,** B.P., 2s. 6d. per lb.; at this unchanged rate the spot position is very steady. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; spot values are steady as quoted, with some demand on the market. **Amidopyrin,** about 15s. per lb.; this article is seldom asked for on spot; market steady. **Ammonium Bromide,** B.P., 9d. per lb.; at this figure the spot position is now very steady, and any movement will probably be to higher rates. **Benzonaphthol,** 5s. per lb., nominal; there is little or no demand on spot; dealers' prices are unchanged. **Betanaphthol,** resublimed, about 2s. 6d. per lb.; the market remains dull, and quoted prices by dealers are unchanged. **Benzaldehyde 03,** 3s. 5d. to 3s. 6d. per lb.; a sharp advance in spot values is recorded, with the market quite firm. **Calcium Lactate,** about 2s. 6d. per lb.; spot values are fully maintained, with a fair volume of business being done. **Chloral Hydrate,** duty paid, 4s. 3d. per lb.; this is a very steady market, with business fairly good. **Creosote,** B.P., about 2s. 6d. per lb.; the market has been rather quieter, but prices are steady. **Creosote Carbonate,** about 6s. 6d. per lb., nominal; there is practically no interest shown in this product. **Guaiacol Carbonate,** about 14s. per lb.; the position here holds very firm at the rate quoted, with supplies on the short side, and Continental offerings small and dear. **Hexamine,** fully 4s. 6d. per lb.; the spot price as quoted is fully maintained, with a fair volume of business being done. **Hydroquinone,** 4s. to 4s. 3d. per lb.; not much actual business has been on the market, but prices from dealers are steady at about these rates. **Methyl Salicylate,** 3s. to 3s. 3d. per lb.; there is little offering on spot below these figures, and business has again been good. **Methyl Sulphonal,** about 25s. per lb.; dealers are quoting up to this figure, but any business would generally be at lower rates. **Paraformaldehyde,** about 3s. 9d. per lb.; it should not be difficult to book orders for early delivery at slightly less than this figure. **Paraldehyde,** about 1s. 7d. per lb.; supplies are being taken up quite well, and are now on the short side; prices are firmer. **Phenacetin,** up to 8s. per lb.; there has been good business for this article, and dealers' stocks are now restricted. **Phenazone,** fully 8s. 9d. per lb.; there is very little offered on spot at below this figure, the tendency is towards higher prices. **Phenolphthalein,** 8s. 6d. per lb.; any supplies about should be worth close up to this quoted figure; the market is firm. **Potassium Bromide,** B.P., crystals and granular, about 8d. per lb.; the spot position is fully maintained at this figure; business continues satisfactory, and Continental offerings are dearer. **Potassium Permanganate,** B.P., about 9½d. per lb.; dealers seem unable to offer below this figure, and any fresh imports will have to be well up to this figure. **Potassium Sulphoguaiacolate,** about 7s. per lb.; this market has been idle during the past week. **Resorcin,** about 6s. 6d. per lb.; dealers are asking up to this figure, with the market moderately active during the past week. **Sodium Benzoate,** 3s. 3d. to 3s. 6d. per lb., nominal; supplies are kept very short here, with the result that prices have been forced up. **Sodium Bromide,** B.P., crystals and granular, fully 9d. per lb.; dealers offering spot material at this price are firm; business has again been good. **Sodium Diethylbarbiturate,** about 20s. per lb.; the spot market is well maintained at last week's higher price as quoted by dealers. **Sodium Salicylate,** B.P., crystals, about 3s. powder, about 3s. 2d. per lb.; this article has been in active demand during the past week, and higher prices are now being quoted, with the position generally very firm. **Sulphonal,** about 20s. per lb.; this market has shown but little life during the week; quoted values are easy. **Terpin Hydrate,** about 1s. 9d. per lb.; a steady but not very active market. **Thymol,** about 14s. to 14s. 6d. per lb.; the market is steady, but the demand has been rather quiet.

Coal-tar Products, Etc.—Pitch, solvent naphthas, and one or two other products are again easier. The general tone of this market is rather unsteady, and any movements are likely to be towards slightly cheaper prices. **Aniline Oil,** 9d. to 9½d. per lb., naked, ex works; this item shows no change on the week, with business dull. **Aniline Salt,** 9½d. to 10d. per lb., naked, ex works; the market is steady, with business slow. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; as quoted the market is rather easy, with little doing. **Benzol,** crude 65's, 8d. to 10d.; standard motor, 1s. 1d. to 1s. 4d.; pure, 1s. 6½d. to 1s. 8d. per gallon, ex works, in tank wagons; British makers report no change in their prices. **Carbolic Acid,** crystals, 11½d. to 1s. per lb.; at the lower prices quoted last week this market remains dull and still unsteady. **Cresylic Acid,** 97—99%, 2s. to 2s. 1d. per gallon; this market is slightly firmer, and the demand has improved. **Toluol,** 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; 90%, 1s. 3d. per gallon; prices are about the same, with business quiet. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per gallon; this market remains dull, with no change in quoted values. **Creosote Oil,** about 9¼d. per gallon, f.o.b.; a fair volume of business is reported, with the market well maintained. **Naphtha,** crude, 8½d. to 8¾d. per gallon; matters have not improved here; market dull. **Solvent Naphtha,** 90/160, 1s. 1d. to 1s. 2d. per gallon; a further reduction in price is recorded, with the market still neglected and far from steady. **Heavy Solvent Naphtha,** 90/190, 1s. 1d. to 1s. 2d. per gallon; this item is again cheaper, but the market seems fairly steady, with but very little business being done. **Naphthalene,** about £19. per ton; this market is slightly easier, and matters have been quiet all round. **Pyridine,** 22s. to 23s. per gallon; spot supplies remain very small, and

prices are fully maintained. **Hexamethylene,** 3s. 9d. to 4s. per gallon; this item keeps very steady, with some little business passing. **Pure Methyl Alcohol,** £90. per ton, in drums, ex wharf London; dealers' prices are well maintained at this level. **Pitch,** about 105s. per ton, f.o.b. East Coast; a further decline in quoted rates is recorded, and the market is still neglected; it is not thought that values will go much lower, and with a revival in demand a sharp recovery may take place.

LONDON METAL MARKET. Wednesday.

Copper: Standard brands, £62. to £62. 2s. 6d., cash; £62. 17s. 6d. to £63., three months; electrolytic, £67. 15s. to £68. 5s. **Tin**: Standard, £232. 15s. to £233., cash; £234. 12s. 6d. to £234. 15s., three months; Straits, £234. 15s.; English, £233. 10s. **Lead,** soft foreign, £30. 15s., prompt; English, £32. 5s.; chemical sheet, 37s. 6d. per cwt. for 2-ton lots, delivered. **Spelter,** prompt £32. 17s. 6d.; hard, £27. **Antimony,** English regulus, 99%, £38.; special brands, £44. to £45. **Aluminium,** 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel,** £130., delivered; £125. to £130. for export, f.o.b. **Mercury,** £9. 12s. 6d. to £9. 15s. **Bismuth,** 10s. **Platinum,** £29. per oz.; scrap, £27. **Wolfram,** spot, 11s. 9d. per unit, c.i.f. U.K. or Continent. **Zinc Dust** has shown much increased activity; Beaver brand, 90—92%, £48.; American, 92—94%, £48.; Continental, 83—88%, £42. to £46. per ton, delivered.

MANCHESTER CHEMICAL MARKET. Wednesday.

The demand for heavy chemicals remains on the slow side both for home and export account, with values generally in buyers' favour. Alkali products are unchanged, and makers are fairly well engaged with orders. **Bleaching Powder,** softwoods, is now offering at £10., delivered, for 1924 contracts, 4-ton lots, with extra carriage for smaller quantities. **Chlorates** are firmly maintained at 3d. per lb., ex store. **Bichromates** unaltered. **Roasted Saltcake,** quiet at £4. 10s. in bulk, carriage paid. **Glauber's Salt** only in small request, and price easy at 70s. per ton, carriage paid. Imported American **Sulphur,** firm at £5. 5s. on rails. Demand for **Copper Sulphate** is quiet, and price weak at £25., f.o.b. **Phosphate of Soda,** lower at £14., c.i.f. Commercial **Hyposulphite of Soda,** £9. 10s., bags, f.o.r. **Nitrite,** firm at £28. 10s., ex store. Concentrated **Sodium Sulphide** £14. 10s. per ton. White powdered Cornish **Arsenic** is a shade easier at £68., delivered Manchester, but supplies are short. **Yellow Prussiates** weaker; **Potash** at 9½d., and **Soda** 5½d., per lb. Grey and brown **Acetate of Lime** are scarce, and the recent advanced prices are well maintained. **Acetic Acid** and **Acetate of Soda** are without change. Miscible wood **Naphtha,** 5s. 6d. per gallon. **Acetone,** £124. per ton. **Lead Salts** are firm, and supplies short: White **Acetate** £46., brown £45.; **Nitrate,** £43., delivered. **Barium Chloride,** steady at £11 10s., ex store. **Ammonia Salts** are moving off fairly well, and prices have a firmer tendency. **Green Copperas** is in active demand, and stocks are low. **Oxalic Acid** dull at 5¾d., delivered.

SWANSEA MARKET REPORT. Wednesday.

Tinplate prices have a slight upward tendency, and premiums were again offered on the fixed basis of £1. 3s. 6d. per standard box, f.o.b., as the minimum. **Galvanised Sheets** firm at £19. 2s. 6d. per ton. **Copper** steady at £62. 7s. 6d. per ton cash and £63. 7s. 6d. three months. **Tin** prices irregular round £232. 7s. 6d. cash and £234. 12s. 6d. three months; English ingots, £234. 7s. 6d. **Lead** firm, with fair demand; foreign, £31. 10s. 6d. per ton prompt, and £30. 17s. 6d. forward; English, £32. 12s. 6d. **Spelter** easier, with prompt at £32 7s. 6d. per ton, and forward £32. 12s. 6d. **Zinc Sheets** £39. 7s. 6d. per ton, on rails at makers' works. **Pitch** prices fell back to £5. 7s. 6d. per ton, delivered docks. **Creosote** active, and in much call at 8½d. to 9½d. per gallon. **Benzol** in less demand at 1s. 1d. to 1s. 4½d. per gallon. **Tar** in better request at 9d. to 10d. per gallon, and refined £1. 13s. 6d. per barrel of 40 gallons; crude, £4. 12s. 6d. per ton at ovens. **Sulphate of Ammonia** in better inquiry, with fair export business; home trade prices £14. 16s. **Sulphate of Copper** dull at £25. 7s. 6d. per ton, less 5%, in casks, f.o.b. **Nitrate of Soda** rather slow at £13. 7s. 6d. per ton. **Bone Meal** dull at £9. 1s. 6d. per ton for prompt Indian. **Seed Oils** firmly held, with raw **Linseed** at £2. 5s. 8d. and boiled £2. 7s. 6d. per gallon. **Cottonseed Oil** firmly held, with common edible at £2. 6s. 3d., and deodorised £2. 8s. 3d., per cwt., net, in barrels. **Rape Oil** firm; refined, prompt, £2. 7s. 3d. per cwt., net, in barrels. **Cod Oil** steady; Newfoundland, prompt, £2. 5s. 3d.; English, £1. 13s. 9d., per cwt. **Coconut Oil** rather quiet at £2. 7s. 3d. per cwt. for prompt Ceylon. **Castor Oil** firmly held, with bests at £3. 6s. 3d., seconds £3. 1s. 3d., and ordinary £3 0s. 3d., all per cwt., net; quotations for delivery over January slightly higher. **Olive Oil** scarce and nominal. Palm Oil quietly steady; Lagos, £38. 2s. 6d.; softs, £37. 7s. 6d. prompt and £37. 10s. forward; mediums, £37. 12s. 6d.; and hards, £37. 17s. 6d., all per ton, ex ship. **Sulphuric Acid** in good call at unchanged prices. **Oxalic Acid** moves slowly at 6¼d. per lb., f.o.r. **Arsenic** in rather better demand, with white powdered at £66. 17s. 6d. per ton. **Copperas** remains dull at £2. 2s. 6d. per ton, delivered London or equal in 4-ton lots. **Turpentine** quiet, with American, prompt, at £3. 13s. 6d. per cwt. **Coal**: Best Admiralty smokeless £1. 9s. 6d., seconds £1. 8s. 6d.; ordinaries, £1. 7s.; Monmouthshire black vein, £1. 8s. 6d., all per ton, f.o.b. **Anthracite** in fair demand: Best large £2., seconds £1. 15s.; Paris and French nuts, £2. 12s. 6d. per ton, all f.o.b. **Cokes** very strong; export, £2. 10s. per ton, f.o.b.; foundry, £2.; and furnace, £1. 10s. per ton at ovens. **Patent Fuel,** very steady from £1. 10s. to £1. 12s. 6d. per ton, f.o.b.

LIVERPOOL CHEMICAL MARKET. Wednesday.

Inquiries for chemicals of the heavier kind, for delivery to home-trade users in the early part of 1924, have been made to an extent that has shown an anticipation of a very fair consumption of chemicals within the first three months of the New Year. In the export branch of the trade shipments have been fairly active, especially those of some soda products. **Bleaching Powder** has been in steady and fair demand, and the price for 1924 has been reduced by 5s. per ton; for spot and for export it is £11. per ton; for contracts special prices are quoted, according to requirements. **Chloride of Calcium** has been in moderate demand, and is £5. 12s. 6d. per ton. **Caustic Soda** has been rather more in request for use in the U.K., and has had a fairly large shipment to overseas ports; it is £19. 7s. 6d. per ton, carriage paid to home-trade buyers; special prices being quoted in contracts, according to requirements. **Bicarbonate of Soda** has again been in good request for use by the home trade, and has been shipped largely for export; it is £10. 10s. per ton, in bags, for use in the U.K. **Soda Crystals** have sold with some freedom for home-trade use, and have had a moderate shipment on export account; they are £5. 5s. per ton, carriage paid, for use by the home trade. **Nitrate of Soda** has had a quietly steady sale, and is £13. 5s. to £13. 10s. per ton. **Borax** has been more in request; commercial crystals are £25. per ton, and powdered is £26.; higher grades are—crystals £29. per ton, powdered £30., and superfine £31. per ton, in 2cwt. bags, carriage paid, to home-trade users. **Saltcake** has been in very fair demand; the price is £4. 10s. to £5. per ton for use in Great Britain, and is £5. to £6. per ton for export. **Bichromate of Soda** has been quieter, and is 4½d. to 4¾d. per lb. **Ammonia Alkali** has been in rather good request for use by the home trade, and has had a heavy shipment; the price has been reduced for the New Year, and is £6. 15s. per ton, f.o.r., special prices being quoted for export, according to destination and for home-trade contracts, according to requirements. **Hyposulphite of Soda** has been in fair request, and is £10. per ton, in 2cwt. bags, for commercial, and £15. per ton for photographic. **Sulphide of Soda** has had a moderate inquiry, and is £14. 15s. to £15. 15s. per ton for solid, and £9. 2s. 6d. to £9. 17s. 6d. per ton for crystals. **Chlorate of Soda** has been but little called for, and is 3d. per lb. **Phosphate of Soda** has been rather more inquired for, and is £14. 10s. to £15. per ton. **Prussiate of Soda** has been very quiet, and is 6d. per lb. **Yellow Prussiate of Potash** has been in quietly steady demand, and the price has eased; it may be given as 10d. to 10½d. per lb. **Red Prussiate** has been quiet, and is 2s. 8d. per lb. **Carbonate of Potash** has been in fair demand, and is £25. 10s. to £28. per ton, according to test. **Nitrate of Potash** has been more in request, and is £29. to £32. per ton. **Chlorate of Potash** has been but little called for, and is 3½d. to 4d. per lb. **Caustic Potash**

has again been in rather good demand, and is £32. to £35. per ton. **Permanganate of Potash** has been more in request, and is 9d. to 9¼d. per lb. **Bichromate of Potash** has had a moderate sale, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has sold more freely; first quality is £56. per ton, and second quality £53. per ton. **Sulphate of Ammonia** continues to meet with a moderate inquiry for use in the United Kingdom, but has again had a large shipment on export account; it is £14. 16s. per ton, neutral, of 25¾%, and £13. 13s. per ton for ordinary of 25¼%; for January neutral is £15. 2s. per ton, for February £15. 3s., and for March to May £15. 5s. per ton, for use in the United Kingdom, the price of ordinary being also increased. **Carbonate of Ammonia** has sold with some freedom, and is 4d. per lb. **Muriate of Ammonia** has been quiet; grey is £32. per ton. **Magnesia** has been in very fair demand; **Carbonate** is £2. per cwt., and **Sulphate** £4. to £6. per ton. **Alum** has been quieter; it is £11. per ton for use by the home trade, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has had a steady inquiry, and is £8. to £11. per ton, according to quality. **Sulphur** has been in good request; flowers are £9. 10s. per ton, roll is £8. 10s., rock is £8. per ton, and American £5. 10s. per ton. **Tartaric Acid** has been rather more in request, and is 1s. 0¼d. to 1s. 1d. per lb. **Cream of Tartar** has again sold somewhat freely, and is £4. 6s. to £4. 8s. per cwt. **Boric Acid** has had a steady inquiry; commercial is £48. per ton, and powdered £51.; B.P. grades were £54. to £60. per ton, carriage paid to home-trade users. **Citric Acid** has been but little called for, and is 1s. 5d. per lb. **Oxalic Acid** has been very quiet, and is 6d. per lb. **White Acetate of Lead** has been rather more in demand, and is £44. 10s. to £45. per ton. **Sulphate of Copper** has moved but slowly for home-trade use, but has been shipped more freely for export; it is £25. to £25. 10s. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been in very fair demand; white powdered is £68. to £69. per ton.

WEST OF SCOTLAND CHEMICALS.

Tuesday.

A fair amount of business has been transacted on home account after the quietening-down during the election. Export demand, however, continues to be limited, and will doubtless remain dull until the advent of the New Year. Prices generally are steady, with a firmer tendency in lead acetate. **Alum**, lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic**, white powdered, scarce at £70. 10s. per ton on spot; some resale material is obtainable at this price. **Barium Chloride**, £15. per ton; at this price the market remains steady; foreign imported material offered round £14. to £14. 5s. **Bleaching Powder**, quiet at £11. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid**, crystals, £48. per ton, carriage paid in the U.K., makers' prices. **Borax**, crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities lower. **Calcium Chloride**, 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted below this figure. **Citric Acid**, 1s. 5d. per lb., less 5%; business a little firmer at this figure, with some local inquiry. **Copper Sulphate**, £25. 15s. per ton, less 5%. **Cream of Tartar**, £4. 1s. per cwt. for 99% at Glasgow; quotation steady, and inquiry small. **Lead Acetate**, white, dearer at £44. per ton on spot; brown, good inquiry at £45. per ton; Continental material offering at slightly cheaper rates. **Magnesium Chloride**, £3. 5s. per ton, ex store; foreign material quoted at much under this figure. **Oxalic Acid**, quiet at 5¾d. per lb.; inquiry in this direction is moderate. **Paraffin Bichromate**, 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate**, crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate**, crystals, 1s. per lb.; at this price there is only a medium inquiry. **Salammoniac**, first and second lump, £55. and £52. 10s. per ton respectively; crystals, £48. 10s. per ton; at these reduced quotations the market is rather inactive. **Saltpetre**, £1. 12s. per cwt., net; a better market, with price unaltered; fresh arrivals are cheaper. **Sodium Bichromate**, 4½d. per lb.; unchanged. **Sodium Chlorate**, 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate**, 7d. per lb., ex store; the spot market remains fairly steady, with but little demand. **Sodium Bicarbonate**, £9. 15s. per ton, in 2cwt. bags; £12. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic**, 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid**, 1s. 1d. per lb.; less 5%, at Glasgow; the market is much firmer, with price slightly higher.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending December 15.

BARYTES—
Bremen, 600 bgs., 21 cks.

BONE PHOSPHATE—
Antwerp, 500 bgs.

CARBON BLACK—
Antwerp, 10 brls.
New York, 4 cs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 1,627 pkgs.

CREAM OF TARTAR—
Genoa, 76 brls.

DEXTRINE—
Hamburg, 100 bgs.
Newport News, 430 bgs.

DYESTUFFS (NATURAL)—
Logwood
New York, 120 cks.

GELATINE—
Bremen, 8 cs.

GLUE—
Bremen, 7 bls.

LITHOPONE—
Antwerp, 4 cks.

MAGNESITE—
Hamburg, 730 bgs.

MANGANESE ORE—
Calcutta, 2,000 t.

OCHRE—
Norfolk, Va., 158 brls.

PLUMBAGO—
Genoa, 120 bgs.

POTASSIUM CHLORATE—
Hamburg, 60 brls.

POTASSIUM NITRATE—
Antwerp, 120 pkgs.

POTASSIUM SALTS (*otherwise undescribed*)—
Antwerp, 80 t., 1,285 bgs.

PYRITES—
Huelva, 4,233 t.

ROSIN—
Hamburg, 20 brls.

SALT—
Bremen, 600 bgs.
Hamburg, 500 bgs.

SOAP—
Antwerp, 1 cs.; Bremen, 2 cs.; Genoa, 40 cs.; New York, 300 cs.; Norfolk, Va., 100 brls.

SODIUM CHLORATE—
Hamburg, 40 brls.

SODIUM HYPOSULPHITE—
Marseilles, 20 cks.

TANNING MATERIALS—
Chestnut
Leghorn, 160 brls.
Myrabolans
Calcutta, 3,000 pkts.
Sumac
Palermo, 100 bgs.
Unspecified
Norfolk, Va., 137 bgs.

WAX (*otherwise undescribed*)—
Philadelphia, 32 brls.

WAX (VEGETABLE)—
Kobe, 75 cs.

GOOLE.

Week ending December 15.

CALCIUM CARBIDE—
Antwerp, 58 drms.

CHEMICALS (*otherwise undescribed*)
Antwerp, 5 cs.

COLOURS (*otherwise undescribed*)
Antwerp, 33 brls.
Hamburg, 6 cks.

MAGNESITE—
Amsterdam, 50 bgs.

POTASSIUM NITRATE—
Antwerp, 10 bgs.

SODA CRYSTALS—
Hamburg, 32 drms.

GRANGEMOUTH.

Week ending December 15.

ACETIC ACID—
Rotterdam, 18 cks.

CALCIUM CARBIDE—
Bergen, 1,350 drms.

CALCIUM OXALATE—
Rotterdam, 10 bgs.

CAUSTIC POTASH—
Antwerp, 35 drms.

FERRO SILICON—
Hamburg, 47 cs.

GLYCERINE—
Rotterdam, 5 cs.

OXALIC ACID—
Christiania, 2 cks., 10 kgs.

POTASSIUM CHLORATE—
Hamburg, 40 cks.

TALLOW—
Christiania, 90 brls.
Christiansand, 220 brls.

WHITE LEAD—
Rotterdam, 30 cks.

GRIMSBY.

Week ending December 15.

COLOURS (*otherwise undescribed*)
Antwerp, 38 pkgs.
Rotterdam, 5 pkgs.

GLUCOSE—
Hamburg, 23 cks.

KAINIT—
Hamburg, 2,000 bgs., 398 t.

MAGNESITE—
Hamburg, 1,395 bgs.

HULL.

Week ending December 15.

CALCIUM CARBIDE—
Christiania, 26 t. 15 c.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 2 t.; Antwerp, 14 t. 15 c.; Baltimore, 27 t. 10 c.; Genoa, 3 t.; Hamburg, 27 t. 7 c.; Melbourne, 15 t.; Rotterdam, 5 t. 2 c.

COAL TAR PRODUCTS—
Tar Oil
Kotka, 1 t. 12 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Rotterdam, 2,400 lb.

FERRO CHROME—
Gothenburg, 16 t.
Hamburg, 2 t.

GELATINE—
Rotterdam, 3 c.

GLUE—
Bremen, 2 c.

KAINIT—
Antwerp, 50 t.

PARAFFIN WAX
Baltimore, 25 t. 6 c.

PHOSPHATE OF LIME
Tampico, 529 t.

ROSIN—
Gothenburg, 68 t.; Hamburg, 8 c.; Wiborg, 10 t. 10 c.

SALT—
Hamburg, 700 t.

SALTPETRE—
Rotterdam, 1 t. 10 c.

SOAP—
Marseilles, 5 t. 5 c.; New York, 1 t. 2 c.; Philadelphia, 20 t.

STEARINE—
Antwerp, 2 t. 2 c.; Gothenburg, 1 c.; Hamburg, 2 t.

TANNING MATERIALS—
Myrabolans
Bombay, 270 t. 15 c.
Valonia
Smyrna, 170 t.

TURPENTINE—
Riga, 5 t.

LEITH.

Week ending December 15.

BARIUM SULPHATE (BLANC FIXE)—
Hamburge, 53 bxs.

BASIC SLAG—
Antwerp and Ghent, 1,200 bgs.

BARYTES—
Bremen, 100 bgs.

BONE MEAL—
Bombay and Karachi, 20,000 bgs.

CALCIUM CARBIDE—
Amsterdam, 40 drms.

CRYOLITE—
Copenhagen, 750 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 10 cks.

DYESTUFFS (NATURAL)—
Cutch
Calcutta, 28 cs.

FERRO SILICON—
Gothenburg, 13 cs.

FERTILISER—
Antwerp, 1,500 bgs., 100 t.

FULLER'S EARTH—
Baltimore, 380 bgs.

GLUCOSE—
Amsterdam, 20 cks.

GLUE—
Amsterdam, 2 cks.
Antwerp and Ghent, 120 bgs.

LACTIC ACID—
Rotterdam, 25 cks.

LITHOPONE—
Amsterdam, 80 cks.
Rotterdam, 40 cks.

NAPHTHA (*otherwise undescribed*)
Amsterdam, 6 cks.

NITRIC ACID—
Amsterdam, 5 kgs., 1 ck.

OCHRE—
Baltimore, 640 brls.

PHOSPHATE (*otherwise undescribed*)
Antwerp, 500 bgs.

POTASH (*otherwise undescribed*)—
Hamburg, 20 cks.

ROSIN—
Antwerp and Ghent, 15 brls.
Bremen, 100 cks.

SALT—
Bremen, 250 bgs.

SALTPETRE—
Rotterdam, 40 kgs.

SILICO MANGANESE—
Gothenburg, 184 brls.

SOAP—
Copenhagen, 8 cs.
Rotterdam, 11 cs.

SODA CRYSTALS—
Antwerp and Ghent, 100 bgs.

STEARINE—
Antwerp and Ghent, 25 bgs.

TANNING MATERIALS—
Unspecified
Antwerp, 5 cks.

TARTARIC ACID—
Amsterdam, 14 cks.

ZINC OXIDE—
Antwerp, 40 cks.
Rotterdam, 50 cks.

LIVERPOOL.

Week ending December 15.

ACETATE OF LIME—
U.S., 3,853 bgs.

ACETIC ACID—
Germany, 33 crbys.
Holland, 3 cks.

ACETONE—
Czecho-Slovakia, 15 drms.
Germany, 10 drms.

ALUNITE—
Australia, 11 t.

ANTIMONY OXIDE—
Germany, 100 bgs.

ARGOLS—
France, 144 bgs.

BARYTES—
Germany, 79 cks.

BEESWAX—
W.C. Africa, 367 blks., 239 pkgs.

BISMUTH ORE—
Bolivia, 5 t.

BONE MEAL—
India, 1,000 bgs.

BORAX—
U.S., 500 bgs.

CARBON (DECOLOURISING)—
Holland, 20 bgs.

CARBON BISULPHIDE—
Germany, 147 drms.
Italy, 125 drms.

CARBON BLACK—
U.S., 10 cs.

CAUSTIC POTASH—
Czecho-Slovakia, 60 drms.

CREAM OF TARTAR—
Germany, 100 kgs.
Spain, 12 brls.

CRYOLITE—
Denmark, 1 bx., 200 bgs.

DEXTRINE—
U.S., 6 brls.

DYESTUFFS (NATURAL)—
Cochineal
Canaries, 46 bgs.
Fustic
France, 2 cks.
Logwood
France, 80 cks.
Jamaica, 30 cks.
Unspecified
France, 16 cks.

FERRO SILICON—
Norway, 60 t.

FERTILISER (DRIED BLOOD)—
Argentine, 1,000 bgs.

GELATINE—
Belgium, 100 bls.
Germany, 10 c.

GLUE—
France, 140 bgs.

GLYCERINE—
France, 128 drms.; Holland, 11 drms.; Switzerland, 106 drms.

IODINE—
Chile, 376 brls.

KAINIT—
Belgium, 1,750 bgs.; France, 5,750 bgs.; Germany, 2,500 bgs.

KIESELGUHR—
Algiers, 728 bgs.; U.S., 1,079 bgs.; U.S., 2,238 bgs.

LEAD ASHES—
Egypt, 4 t. 10 c.

LITHOPONE—
Holland, 12 cks.

MAGNESITE (CALCINED)—
Holland, 100 bgs.

MANGANESE ORE—
Holland, 21 t.
India, 1,542 t. 10 c.

MANGANESE OXIDE—
Germany, 15 brls.

METHYL ALCOHOL—
Germany, 40 drms.

MINERAL COLOURS (*otherwise undescribed*)—
Germany, 8 cks.

OCHRE—
Italy, 50 bgs.

PARAFFIN SCALE—
U.S., 3,982 brls.

PITCH (PETROLEUM)—
U.S., 55 drms.

PLUMBAGO—
U.S., 1 brl.

POTASH (*otherwise undescribed*)—
U.S., 1 brl.

POTASSIUM CARBONATE—
Germany, 17 brls., 120 cks.

POTASSIUM CHLORATE—
France, 200 cs.

POTASSIUM CHLORIDE—
Belgium, 100 bgs.
France, 800 bgs.

POTASSIUM SALTS (*otherwise undescribed*)—
Germany, 400 t.

PYRITES—
Spain, 4,319 t.

RED LEAD—
Germany, 8 cks.

ROSIN—
U.S., 1,880 brls.

SALT—
Germany, 5 t.

SOAP—
Australia, £1,800.; France, £340.; U.S., £3,694.; U.S., £5,473.

SODIUM NITRATE—
Chile, 16,218 bgs.

SODIUM PERBORATE—
Germany, 39 drms.

SPERMACETTI WAX—
Chile, 45 cs.

STEARINE—
Argentine, 29 tcs.; France, 6 cks.; Germany, 168 bgs.

SULPHUR—
Italy, 84 brls., 100 bgs.

SUPERPHOSPHATE—
U.S., 522 brls.

TALLOW—
Argentine, 32 pps., 1,436 cks.
Germany, 6 brls.
N.Z., 58 brls.

TANNING MATERIALS—
Chestnut
France, 547 cks., 6 cs.
Italy, 422 cks., 113 cs.
Myrabolans
India, 899 pkts.
Quebracho
Argentine, 5 bgs.
Italy, 205 brls.
Sumac
Italy, 310 bgs.
Sicily, 100 bgs.
Valonia
Smyrna, 700 bgs.
Wattle
Germany, 100 cks.
South Africa, 6,909 bgs.

TURPENTINE—
U.S., 450 brls.

ULTRAMARINE BLUE—
Belgium, 2 brls.
France, 20 brls.

WAX (*otherwise undescribed*)—
U.S., 50 cs., 20 drms.

WHITE LEAD—
Holland, 41 drms.

ZINC OXIDE—
Belgium, 40 cks.

LONDON.

AMENDMENTS.

To return for week ending December 8, 1923, add :—

ACETYL SALICYLIC ACID—*
——— £448.

CARBON TETRACHLORIDE—*
——— £221.

CHEMICALS (*otherwise undes.*)—*
——— £5,334.

COCAINE HYDROCHLORIDE—*
——— £259.

OXALIC ACID—*
——— £359.

PROPYL ALCOHOL—*
——— £290.

SODIUM PHOSPHATE—*
——— £1,026.

Week ending December 15.

ACETIC ACID—
Canada, 27 pkgs.

ACID (*otherwise undescribed*)—
Germany, 10 pkgs. Greeff
,, 10

ALBUMEN—
Argentine
Rep. £1,100 Swift
China, £7,750. Baxter
Hoare
,, £3,725. Fellows, Morton & Clayton
,, £1,900.
,, £1,045. R. Warner

ALUMINA (FUSED)—
Sweden, 10 pkgs.

AMMONIUM CHLORIDE—
Germany, 60 pkgs. Bush, Beach & Gent.

AMMONIUM NITRATE—
Germany, 290 pkgs. Stott & Hotopf

ANTIMONY REGULUS—
China, 17 t. Scriven
,, 40 Cookson

ANTIPYRIN—*
——— £555.

ARGOLS—
France, 163 pkgs.
Greece, 135
Italy, 20

ARSENIC—
Holland 2 t. 4 c. Harrison Clark

ARSENIOUS ACID—
Japan, 200 pkgs. W. S. Bowditch

* Entered under the Safeguarding of Industries Act.

BARYTES—
Germany, 150 bgs. Dexters
,, 33 cks. Taylor & Cox
,, 300 bgs. ,,
,, 155 cks. W.
,, 150 bgs. Harrison
,, 73 cks. Greeff
,, 71
,, 40 pkgs. D. M. Henderson
,, 152 cks. Pallister, Luck

BASIC SLAG
Belgium, 50 t. W. Smith

BEESWAX—
Italy
Somaliland 1 pkgs. Beresford
Morocco, 20 bgs. W. H. Muller
Tanganyika Terr. 18 pkgs.

BORATE OF LIME—
Germany, 10 t. 8 c. Fellows, Morton & Clayton

CAMPHOR—
Japan, 100 cs. W. M. Smith
,, 350 R. Warner
,, 50

CARNAUBA WAX—
Azores, 18 bgs.

CASEIN—
Argentine
Rep., £650.
,, £467. H. Trengrouse
Germany, £218. Lewis Hawkins

CAUSTIC POTASH—
Belgium, 61 pkgs.

CERESINE WAX—
Germany, 10 bgs. Holroyds Oil & Cer.

CHEMICALS (*otherwise undescribed*)
Belgium, £248. Murray
,, £7. J. Bailey
British India, £2,630.
Canada, £10,478. E. A. Kimpton
France, £131.
,, £49. Symons
,, £28. Shilbeck
,, £16. Mory
Germany, £26.
,, £38. Townsend
,, £25. Schnurmann
,, £47. Davidson, Park & Speed
,, £75. Johnson
,, £94. Ronsheim & Moore
,, £232. Stephens
,, £9. E. E. Mayer
,, £6. M. Benscher
Holland, £81. W. H. Muller
U.S.A., £34. A. W. Peabody
——— £2,859.

COAL TAR PRODUCTS—
Unspecified
Belgium, £161. Lazard-Godchaux Dyes

CREAM OF TARTAR—
France, 140 pkgs.
Italy, 100
Spain, 20 Leach

DEXTRINE—
Germany, 13 t. 16 c. K. J. Mulder
Holland, 23 5
,, 6 K. J. Kulder
,, 17 J. Braithwaite

DYESTUFFS (ARTIFICIAL)—
Alizarine
Germany, 3 pkgs.
Unspecified
Germany, 2 kgs. Stott & Hotopf
,, £323.
Canada, 48 pkgs. Knight & Morris

DYESTUFFS (NATURAL)—
Annatto
Denmark, 4 tanks. Anderson, Green
Indigo
Brit. India, 14 chts.

FERTILISERS (*otherwise undes.*)—
Belgium, 3 t.
Cuba, 25 t. Beresford
Egypt, 120 Fox, Roy
France, 60 C. Page
Holland, 5 W. H. Muller
Irish F. State 3

FUSEL OIL—
Greece, 9 drms. W. J. Bush

GELATINE—
Czecho-Slovakia, £151. Oury, Millar
France, £8.
Germany, £240. Crowe
,, £21. Stewart & Esplen
,, £462. E. Friedlander
Luxemburg, £102.
Switzerland, £47. Europ. & Gen. Exp.

GLUE—
Belgium, £1,119.
,, £60. A. Bramwell
,, £2,500. G. E. King
,, £19. O. Murray
,, £13,650. G. E. King
France, £58.
,, £286. A. J. Malicet
,, £48. Symons
,, £63. Mory
Roumania, £265. Union Glue & Gel.
U.S.A., £21. Beck & Pollitzer

HEXAMINE—*
——— £413.

ISINGLASS—
Brit. India, 53 cs.
China, 8 W. M. Smith
Straits Setts., 1

KIESELGUHR—
Algeria, 10 t. 17 c. J. W. Cook
Sweden, 24 12 W. Hall

LITHOPONE—
Hilland, 80 cks. F. T. H. Nye
,, 240
,, 40 Taylor & Cox

MAGNESITE—
Holland, £100.
,, £80. Ray

MINERAL COLOURS (*otherwise undescribed*)—
Czecho-Slovakia, 21 cks. Taylor & Cox
Spain, 34 brls. Houlder

MINERAL WAX—
Germany, 40 cs. Holroyds Oil & Cer.

MONTAN WAX—
Germany, 500 bgs. Holroyds Oil & Cer.

OCHRE—
Brit. India, 100 bgs. Taylor & Cox
France, 51 brls. W. Harrison

OZOKERITE—
Austria, 137 bgs. F. H. Mims
Germany, 32 Holroyds Oil & Cer.

PARAFFIN WAX—
Burmah, 75 t. Asiatic Petr.
,, 100 Candles
,, 50
Germany, 10 Holroyds Oil & Cer.
Poland, 40
U.S.A., 49 11 c. A. C. E. Garnham
,, 393 14 Anglo-Amer. Oil
,, 10 4 S. Bramwell
,, 38 15 Mawson Clark

PHOSPHATE OF LIME—
Belgium, 235 t. Hollingshurst

PITCH (*otherwise undescribed*)—
France, 40 brls. G. Elliott
Holland, 11

PLUMBAGO—
Brit. India, 67 bgs. W. M. Smith
Ceylon, 31 brls. A. Bramwell
France, 48 cks. G. T. Symons

POTASSIUM CARBONATE—
Germany, 40 pkgs. Stephens

POTASSIUM CHLORATE—
Germany, 100 pkgs.
Sweden, 200 E. J. Brash
,, 80 J. J. Masters
Switzerland, 20 Greeff

POTASSIUM PRUSSIATE
Holland, 4 pkgs.

PRUSSIAN BLUE—
France, 10 cs. H. H. Poole

QUININE ETHYL CARBONATE—°
——— £454.

ROSIN—
France, 35 cks. Lowden, Connell
Portugal, 95 brls.
U.S.A., 1,250 Fairclough, Dodd & Jones
,, 25 Houlder
,, 2,469
,, 500 Lowden Connell
,, 200 Langley Smith
,, 350 Fox, Stockell

SALAMMONIAC—
Poland, 81 pkgs. Beck & Pollitzer

SALT—
Germany, 75 t. Morris

SALTPETRE—
Holland, £170 C. E. Morton

SHELLAC—
Brit. India, 55 t. 2 c. Dunlop
,, 23 3 Litchfield & Saundy
,, 147 11 J. W.
Siam, 7 17 Cook

SOAP—
Austria, £7.
,, £130. Moss Roughton
Belgium, £51.
Denmark, £143.
,, £18. Honeychurch
,, £95. Beck & Pollitzer
France, £7. C. Atkins & Nisbet
,, £51. Wegeil Leygoine
,, £13. Anglo-French Exp.
,, £72. G. T. Symons
,, £97.
,, £29. H. Desmidt
,, £190. J. E. Maeder
,, £38. Munzi
,, £8. W. H. Muller
,, £50. E. E. Mayer
,, £39. Weigel, Leygoine
Germany, £286.
,, £90. C. W. Hartrodt
,, £38. Amer. Exp.
,, £7. Weiss Biheller & Brooks
Holland, £153. Litchfield & Saundy
,, £24. Brit. Casein
U.S.A., £15.
,, £2,015. J. Knill
,, £1,500. L. F. Smtih
,, £25. W. Wingate & Johnston
,, £390. J. W. Cook

SODA CRYSTALS—
Belgium, 5 t. P. Winn

SODIUM NITRATE—
Germany, 10 t. Stott & Hotopf

SODIUM SALTS (*otherwise undes.*)
Germany, 20 t. Stott & Hotopf

STEARINE—
Argentine Rep. 100 trcs.
Belgium, 26 bgs. H. H. Poole
,, 13 cks. Rubeck Thew
Holland, 7 bgs.
,, 3 cs.
Victoria, 10 pps.

STEARINE WAX—
Belgium, 20 bgs. A. C. Garnham

SULPHUR—
France, £55. G. W. Wheatley

TALLOW—
Argentine Rep., 50 t. 4 c. Nickoll & Knight
,, 59 cks. Thomas & Ardley
N.S.W., 25 t. 2 c.
N.Z., 16 13 Anning & Cobb
,, 10 4

TALLOW—
Queensland, 105 t. 6 c. Weber, Smith & Hoare
S. Australia, 20 ,,
W. Australia, 117 15

TANNING MATERIALS—
Gambier
Straits, 103 pkgs. Leach
Myrabolans
Brit. India, 5,000 pkgs. Wills
Sumac
Switzerland, 5 pkgs.
Spain, 138 MacAndrews
Unspecified
Argentine Rep., 1,026 pkgs. Beresford
Natal, 50 t. Mimosa Bark
,, 49

TAR (*otherwise undescribed*)—
Finland, 127 brls.
,, 10 White Sea & Baltic
Russia, 300 brls. ,,
U.S.A., 100 Bowring, Jones & Tidy

TAR OIL—
Finland, 10 cks. Grindley

TURPENTINE—
Belgium, 200 brls. G. Levita
France, 50
Portugal, 99 bxs. Fairclough Dodd & Jones
Russia, 150 brls. White Sea & Baltic
U.S.A., 100 Philip & Watt
,, 1,450 Fairclough, Dodd & Jones
,, 1,500 Goodlake & Mutter
,, 200 Lowden Connell
,, 100

ULTRAMARINE—
Belgium, 1 cs. Shilbeck
France, 4 cks.
Holland, 10 M. Ashby

WAX (*otherwise undescribed*)—
Japan, 100 pkgs. W. M. Smith
,, 75
,, 25 cs. Thornett & Fehr

WHITE LEAD—
Belgium, 100 cks. L. Walford
Holland, 80 drms.

ZINC OXIDE—
Czecho-Slovakia, 100 cks. Greeff
France, 2 cs.

MANCHESTER.

Week ending December 15.

ALUMINIUM SULPHATE—
Rouen and Caen, 100 bgs.

CARBON TETRACHLORIDE
Hamburg, 5 drms.

CHEMICALS (*otherwise undescribed*)
Hamburg, 163 drms., 90 cks.
Rouen and Caen, 10 cs.

COPPER PRECIPITATE—
Panaron, 1 bx.

DEXTRINE—
Amsterdam, 625 bgs.
New York, 50 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Hamburg, 38 cks.
Rotterdam, 14 cks., 10 brls.
Unspecified
Hamburg, 5 cks.
New York, 1 brl.
Rotterdam, 3 cs., 2 brls.

GLUCOSE—
New York, 20 brls.

GLUE—
Antwerp, 327 bls.

GLYCERINE—
Rotterdam, 1 drm.

KAINIT—
Antwerp, 500 bgs., 50 t.

LITHOPONE—
Rotterdam, 260 cks.

MAGNESITE—
Hamburg, 192 bgs.

* Entered under the Safeguarding of Industries Act.

MAGNESITE (CALCINED)—
Amsterdam, 100 bgs.

MAGNESIUM CHLORIDE—
Hamburg, 58 brls.

MAGNESIUM SULPHATE—
Hamburg, 220 bgs.

MANGANESE ORE—
Calcutta, qnty.

MINERAL COLOURS (*otherwise undescribed*)—
Amsterdam, 10 cks.
Hamburg, 140 bgs.

PARAFFIN SCALE—
New York, 814 brls.

PARAFFIN WAX—
Danzig, 61 brls.

PHOSPHATE OF LIME—
New York, 32 brls.

PHOSPHORUS—
Montreal, 188 drms.

POTASH ALUM—
Hamburg, 15 cks.

POTASH FELSPAR—
Gothenburg, 50 t.

POTASSIUM CARBONATE
Hamburg, 27 drms.

POTASSIUM CHLORIDE—
Hamburg, 100 cks.

POTASSIUM NITRATE
Antwerp, 100 bgs.

PYRITES—
Panaron, 952 t.

ROSIN—
Mobile, 150 brls.; Pensacola, 410 brls.; Savannah, 500 brls.

SALAMMONIAC—
Hamburg, 15 brls.

SOAP—
New York, 100 bxs.

SODIUM ACETATE—
Antwerp, 36 cks.
Hamburg, 10 cks.

SODIUM PRUSSIATE—
Amsterdam, 10 cks.
New York, 28 brls.

SODIUM SALTS (*otherwise undes.*)
Rotterdam, 30 bgs.

SODIUM SULPHATE—
Hamburg, 100 bgs.

TANNIC ACID—
Hamburg, 15 cks.

TANNING MATERIALS—
Unspecified
New York, 31 brls.

ZINC OXIDE—
Antwerp, 86 cks.

NEWCASTLE-ON-TYNE

Week ending December 15.

ACETIC ACID—
Rotterdam, 5 cks.

CALCIUM CARBIDE—
Christiania, 350 drms.

KAINIT—
Bremen, 140 t.

LITHOPONE—
Rotterdam, 20 cks.

RED LEAD—
Rotterdam, 7 cks.

SULPHUR—
Hamburg, 500 t.

N. & S. SHIELDS.

Week ending December 15.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

AT THE PRINCIPAL PORTS OF THE UNITED KINGDOM.

GLASGOW.

Week ending December 15.

ALUM—
Calcutta, 3 t.

CHEMICALS (*otherwise undescribed*)
Adelaide, 50 pkgs.; Algoa Bay, 250 pkgs.; Bangkok, 40 cs.; Barcelona, 23 pkgs.; Bombay, 165 pkgs.; Buenos Ayres, 800 pkgs.; Calcutta, 617 pkgs.; Cape Town, 130 pkgs.; Colombo, 25 pkgs.; Dar-es-Salaam, 1 pkg.; East London, 350 pkgs.; Genoa, 2 pkgs.; Karachi, 100 pkgs.; Madras, 26 pkgs.; Melbourne, 103 pkgs.; Monte Video, 300 pkgs.; Nantes, 524 bgs.; New York, 125 pkgs.; Pt. Swettenham 5 pkgs.; Singapore, 127 pkgs.; Sydney, 153 pkgs.

COAL TAR PRODUCTS—
Naphtha
Hamburg, 180 galls.
Pitch
Belawan, 2 c.
Tar
Algoa Bay, 2 t. 8 c.; Calcutta, 8 c.; Colombo, 24 t. 5 c.; Dar-es-Salaam, 4 t.; Hamburg, 15 c.; Karachi, 4 t. 3 c.; Kilindini, 1 t. 4 c.; Mombasa, 1 t. 4 c.; Mossel Bay, 1 t. 2 c.; Padang, 5 t. 12 c.; Penang, 46 t.; Pt. Sudan, 12 c.; Singapore, 34 t.; Tuticorin, 4 t.
Unspecified
Antwerp, 304 t.; Bombay, 14 t. 13 c.; Calcutta, 55 t. 14 c.; Dar-es-Salaam, 1 t. 6 c.; Famagusta, £28.; Karachi, 41 t. 4 c.; Madras, 16 t.; Mombasa, 2 t.; New York, 15 t. 7 c.; Pt. Sudan, 4 t. 5 c.

DISINFECTANTS (*otherwise undes.*)
Penang, 3 t.
Pt. Swettenham, 1 t. 3 c.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Adelaide, £84.; Melbourne, £197.

FERTILISER (DRIED BLOOD)—
Colombo, 20 t.

GELATINE—
Karachi, 5 c.

GLUE—
Belawan, 1 c.

PARAFFIN WAX—
Famagusta, £81.; Melbourne, £900.; Naples, 10 t.; Newcastle, N.S.W., £680.

PLUMBAGO—
Penang, 1 t.

POTASSIUM BICHROMATE—
Hamburg, 14 c.; Madras, 10 t.; Melbourne, 1 t. 2 c.

ROSIN OIL—
Antwerp, 3 t.

SOAP—
Algoa Bay, 2 t. 4 c.; Bombay, 7 t. 10 c.; Colombo, 11 c.; Dar-es-Salaam, 2 c.; Mombasa, 1 t. 10 c.

SODIUM BICHROMATE—
Melbourne, 9 t. 18 c.
Sydney, 7 t. 12 c.

TALLOW—
Calcutta, 4 c.; Dar-es-Salaam, 2 c.; Hamburg, 10 t. 17 c.

TANNING MATERIALS—
Unspecified
Sydney, £98.

WAX (*otherwise undescribed*)—
Bordeaux, 8 c.; Dar-es-Salaam, 10 t.; Genoa, 2 t.; Leghorn, 28 t. 10 c.; New York, 1 t.; Pt. Sudan, 1 t.

ZINC ASHES—
Antwerp, 6 t.

GRANGEMOUTH.

Week ending December 15.

AMMONIUM CARBONATE
Trondhjem, 5 cs.

COAL TAR PRODUCTS—
Creosote
Antwerp, 6 cks.

PITCH (*otherwise undescribed*)
Trondhjem, 36 brls.

POTASSIUM BICHROMATE—
Antwerp, 14 cks.

SODIUM BICHROMATE—
Rouen, 78 cks.

HULL.

Week ending December 11.

AMMONIUM SULPHATE—
Antwerp, 508 bgs.; Christiania, 50 bgs.; Catania, 250 bgs.; Palermo, 150 bgs.

CAUSTIC SODA—
Helsingfors, 15 cks.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 1 drm.; Copenhagen, 30 drms.; Helsingfors, 24 drms.; Lisbon, 5 cks.; Rotterdam, 10 cks., 19 drms.; Stockholm, 1 cs.; Stavanger, 15 cs., 5 drms.; Trondhjem, 10 kgs.

COAL TAR PRODUCTS—
Naphtha
Christiania, 6 drms.
Naphthalene
Rotterdam, 315 bgs.
Tar
Amsterdam, 1 brl.; Bergen, 6 drms.; Christiania, 10 drms.; Dunkirk, 250 t.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiania, 1 cs.
Harlingen, 1 cs.

GLUE—
Christiania, 20 bgs.
Helsingfors, 20 bgs.

IRON OXIDE—
Ghent, 5 cks.

MAGNESIUM CARBONATE—
Fiume, 100 bgs.

MINERAL WHITE—
Antwerp, 50 bgs.

OLEINE—
Aalesund, 4 brls.
Bergen, 5 brls.

SALT—
Copenhagen, 114 cs.

SOAP—
Fiume, 51 cs.
Stockholm, 2 pkgs., 7 bxs.

LEITH.

Week ending December 15.

CARBON (RETORT)—
Antwerp, 9 t.

MAGNESIUM CARBONATE—
Amsterdam, 33 cs.

PITCH (*otherwise undescribed*)—
Antwerp, 10 t.

LIVERPOOL.

Week ending December 13.

ACETIC ACID—
Durban, 3 c., £25.

ALUM—
Hamburg, 2 t., £49.; Patras, Talcahuano, 1 t. 16 c., £19.

ALUMINIUM SULPHATE—
Bergen, 5 t., £34.; Gothenburg, 10 t., £85.; Montreal, 5 t. 1 c., £49.; Rotterdam, 10 t., £93.

ALUMINIUM SULPHOCYANIDE—
Rio de Janeiro, 5 t. 5 c., £269.

ALUMINOFERRIC—
Rosario, 50 t., £352.

AMMONIA—
Falklands, 2 c., £11.

AMMONIUM CARBONATE—
Alexandria, 1 t., £40.; Adelaide, 12 c., £20.; Brisbane, 8 c., £12.; Corfu, 1 t., £40.; Constanza, 1 t., £27.; Hong Kong, 3 t., £133.; Hamburg, 4 t., £93.; Maccio, 1 t., £42.; Marseilles, 3 t. 10 c., £94.; New York, 14 t. 9 c., £203.; Oporto, 1 t., £29.; Piraeus, 3 t. 8 c., £91.; Rangoon, 2 t., £96.; Singapore, 1 t., £12.; Sydney, 2 t., £71.

AMMONIUM CHLORIDE—
Bombay, 5 t., £203.; Calcutta, 7 t., £284.; Lisbon, 10 c., £24.; Melbourne, 1 t. 7 c., £46.; St. John, N.B., 2 t. 3 c., £64.; Varna, 1 t., £41.; Valparaiso, 2 t. 19 c., £99.; Yokohama, 29 t. 19 c., £869.

AMMONIUM PHOSPHATE—
Libau, 6 c., £18.
Riga, 1 t., £60.

AMMONIUM SULPHATE—
Alicante, 39 t. 10 c., £544.; Colombo, 100 t., £1,400.; Demerara, 477 t., £6,678.; Hong Kong, 10 t., £173.; Kingston, 15 t., £214.; Kobe, 400 t., £5,351.

AMMONIUM SULPHATE—
Las Palmas, 103 t., £1,437.; Orotava, 50 t., £700.; San Francisco, 100 t., £1,850.; Teneriffe, 25 t., £375.; Yokohama, 400 t., £6,602.

ANTIFOULING COMPOSITION—
Bombay, 2 t. 10 c., £160.; Melilla, 1 t., £45.; Singapore, 6 t. 3 c., £570.; Sarawak, 12 c., £61.; Valparaiso, 1 t. 19 c., £228.

ANTIMONY SULPHIDE—
Kobe, 4 t. 19 c., £271.

ARSENIC—
Valencia, 6 t. 1 c., £421.

BARIUM SULPHIDE—
Melbourne, 2 t. 3 c., £33.

BITUMEN—
Bergen, 12 c., £21.
Genoa, 11 t., £187.

BLEACHING POWDER—
Alexandria, 15 c., £23.; Algoa Bay, 1 t. 10 c., £24.; Brisbane, 2 t., £26.; Buenos Ayres, 25 t. 2 c. £278.; Bombay, 25 t., £309.; Bangkok, 1 t. 6 c., £18.; Corunna, 7 t. 17 c., £80.; Cape Town, 1 t., £12.; Callao, 3 t., £36.; Drammen, 41 t. 5 c., £412.; Hong Kong, 2 t. 12 c., £34.; Philadelphia, 3 t. 9 c., £90.; Piraeus, 5 t., £52.; Sydney, 4 t. 2 c., £49.; Shanghai, 5 t., £73.; Vera Cruz, 26 t. 2 c., £298.

BOILER COMPOSITION—
Rangoon, 60 t., £622.

BORIC ACID—
Stockholm, 1 t. 19 c., £98.

CALCIUM CARBIDE—
Lagos, 11 c., £19.

CALCIUM CHLORIDE—
Algoa Bay, 3 t. 18 c., £23.; Brisbane, 11 t., £65.; Buenos Ayres, 80 t. 2 c., £361.; Las Palmas, 4 t. 2 c., £24.; Lisbon, 1 t. 11 c., £10.; Rangoon, 15 t. 1 c., £85.; Sydney, 5 t. 4 c., £30.; Shanghai, 9 t. 19 c., £57.; Tampico, 3 t. 19 c., £19.

CAUSTIC POTASH—
Dunkirk, 4 t., £136.

CHEMICALS (*otherwise undescribed*)
Adelaide, 3 t., £90.; Albany, 11 c., £17.; Auckland, 2 t., £52.; Brisbane, 1 t., £26.; Bombay, 5 t. 1 c., £61.; Gothenburg, 5 t., £130.; Hong Kong, 20 t. 16 c., £604.; Helsingfors, 10 t., £86.; Jaffa, 10 t., £25.; Lisbon, 1 c., £27.; Melbourne, 8 t. 16 c., £1,282.; Madras, 9 t. 15 c., £25.; New York, 9 t. 11 c., £24.; Newcastle, 2 t. 2 c., £21.; Para, 4 c., £36.; Rosario, 50 t., £443.; Rangoon, 3 t., £75.; St. John, N.B., 5 t., £25.; Sydney, 8 t., £206.; Santos, 27 t. 14 c., £671.; Seville, 20 t., £500.; Teneriffe, 9 t. 6 c., £23.; Valencia, 2 t., £51.; Wiborg, 10 t., £97.; Wellington, N.Z., 3 t., £93.

CHLORINE—
Bombay, 10 c., £14.

CITRIC ACID—
Shanghai, 2 c., £13.

COAL TAR PRODUCTS—
Carbolic Acid
Bombay, 14 c., £157.
Hamburg, 2 t. 7 c., £310.
Kobe, 3 t., £350.
Sydney, 19 c., £42.
Creosote
Alexandria, 15 c., £15. ; Kobe, 10 t. 6 c., £472. ; New York, 6 c. 2 qrs., £11. ; Rio de Janeiro, 1 t. 4 c., £40. ; Sydney, 1 t. 4 c., £36.
Dinitrochlorbenzol
Hamburg, 29 t., £2,274.
Naphthalene
Melbourne, 1 t., £15.
Pitch
Antwerp, 10 t. 4 c., £184.
Salonika, 5 t. 1 c., £45.
Tar
Lagos, 1 t. 17 c., £25.
Tar Oil
Calcutta, 5 t., £150.

COBALT OXIDE—
Gijon, 4 c., £180.
Kobe, 1 t. 11 c., £1,594.
Santander, 4 c., £190.

COPPER SULPHATE—
Brisbane, 3 t., £73. ; Calabar, 1 t. 5 c., £32. ; Dunedin, 10 c., £13. ; Jacksonville, 22 t. 10 c., £529. ; Melbourne, 5 t., £121. ; Santos, 5 c., £86. ; Sydney, 15 t., £394. ; Timaru, 10 c., £13.

CREAM OF TARTAR—
Auckland, 1 t., £85. ; Fremantle, 2 t., £176. ; Melbourne, 2 t., £174. ; Sydney, 3 t., £261. ; Townsville, 2 t., £174.

DISINFECTANTS (*otherwise undes.*)
Algoa Bay, 1 t. 1 c., £29. ; Buenos Ayres, 10 c., £88. ; Cape Town, 5 c., £23. ; Canton, 4 pkgs., £17. ; East London, 2 t. 3 c., £62. ; Famagusta, 8 c., £16. ; Hong Kong, 1 t. 18 c., £26. ; Havre, 18 c., £101. ; New Plymouth, 3 c. 2 qrs., £12. ; Nelson, 2 c. 1 qr. £19. , Timaru, 2 c. 3 qrs., £31. ; Wellington, N.Z., 2 t., £53.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 15 t. 17 c., £1,775.
Indigo
Shanghai, 53 t. 15 c., £7,506.
Unspecified
Brisbane, 1 t., £240. ; Lyttleton, 4 c., £25. ; Melbourne, 3 t. 2 c., £166. ; Montreal, 3 t. 4 c., £614. ; Napier, 3 c., £37. ; Oporto, 10 c., £170. ; Singapore, 3 qrs., £15. ; Sydney, 1 t. 9 c., £575. ; Shanghai, 3 t. 15 c., £880. ; Wellington, N.Z., 1 c., £12.

DYESTUFFS (NATURAL)—
Fustic
Hamburg, 16 c., £147.
Logwood
Hamburg, 2 t. 9 c., £116. ; New York, 1 t., £93. ; Santos, 1 t., £91.
Unspecified
Sav-la-Mar, 2 t. 6 c., £16.

ESSENTIAL OILS (SYNTHETIC)—
Iddo, 8 c., £70.

FERTILISER (NITROGENOUS)—
Charleston, 99 t. 5 c., £495.
Wilmington, 75 t.,

FERTILISERS (*otherwise undes.*)—
Kobe, 99 t. 5 c., £1,700.
Las Palmas, 5 t., £76.

GLYCERINE—
Antofagasta, 31 t. 15 c., £2,729. ; Antwerp, 2 t. 3 c., £143. ; Amsterdam, 3 t. 18 c., £266. ; Bourgas, 1 t. 19 c., £164. ; Cape Town, 2 t. 19 c., £210. ; Christiania, 25 t., £1,900. ; Carupano, 2 c. 2 qrs., £10. ; Copenhagen, 1 t., £67. ; Gothenburg, 19 c., £75. ; Kobe, 123 t. 5 c., £9,196. ; Pt. Said, 3 t. 18 c., £325. ; Sydney, 6 t. 17 c., £525. ; Shanghai, 5 t. 1 c., £430. ; Varna, 2 t., £162. ; Yokohama, 19 t. 7 c., £1,410.

HYDROFLUORIC ACID—
Bahia, 3 c., £18.

IRON CHROMATE—
Valencia, 1 t. 1 c., £26.

LACTIC ACID—
Fremantle, 1 t. 4 c., £56. ; Melbourne, 2 t. 8 c., £112. ; Sydney, 1 t. 3 c., £54.

MAGNESIA—
Havana, 17 c., £64.

MAGNESIA (CALCINED)—
Kobe, 2 t. 10 c., £244.
New York, 5 t., £480.

MAGNESIUM CARBONATE—
Havana, 1 t., £65. ; Melbourne, 5 c., £16. ; New York, 5 t., £145.

MAGNESIUM SULPHATE—
Calabar, 2 c., £3. ; Duala, 2 c. 2 qrs., £3. ; Falklands, 1 c., £1. ; Fernando, Po , 2 c., £3. ; Grand Bassam, 6 c., £8. ; Lyttleton, 14 c., £32. ; Rangoon, 2 t. 11 c., £18.

NICKEL OXIDE—
Santos, 5 c., £37.

PHOSPHORUS (AMORPHOUS)—
Kobe, 6 t. 14 c., £1,242.
Rio de Janeiro, 1 t. 19 c., £470.

PHOSPHORUS SESQUISULPHIDE
Auckland, 1 t. 9 c., £325.

PITCH (*otherwise undescribed*)—
Calcutta, 11 t. 10 c., £277. ; Havre, 7 c., £19. ; Rio, 9 c., £21.

POTASSIUM BICARBONATE—
Constanza, 1 t. 1 c., £51.
Melbourne, 10 c., £28.

POTASSIUM BICHROMATE—
Alexandria, 3 t. 14 c., £176. ; Lisbon, 2 t., £106. ; Malmo, 7 c., £16. ; Marseilles, 10 t. 1 c., £399. ; Piraeus, 19 c., £47. ; Valencia, 1 t. 19 c., £86.

POTASSIUM BISULPHITE—
Adelaide, 7 c., £29.

POTASSIUM CHLORATE—
Wellington, N.Z., 5 t., £198.

POTASSIUM CITRATE—
Bombay, 2 c., £26.

POTASSIUM CYANIDE—
Montreal, 3 c., £55.

POTASSIUM IODIDE—
Accra, 37 lb., £39. ; Calabar, 150 lb., £138. ; Madras, 2 qrs., £48. ; Pt. Harcourt, 150 lb., £146.

POTASSIUM IODIDE AND IODOFORM—
Warri, 74½ lb., £76.

POTASSIUM NITRATE—
Lagos, 6 c., £11.
Melbourne, 10 c., £19.

POTASSIUM PRUSSIATE—
Bordeaux, 1 t. 19 c., £176. ; Bilbao, 7 c., £44. ; Kobe, 24 t. 2 c., £1,920. ; New York, 1 t. 2 c., £219.

SALAMMONIAC—
Madras, 2 t. 2 c., £104.
Marseilles, 15 c., £37.

SALICYLIC ACID—
Singapore, 1 c., £13.

SHEEP DIP—
Algoa Bay, 25 t. 2 c., £1,627. ; Buenos Ayres, 3 t., £155. ; Calcutta, 1 t. 1 c., £39. ; Comodoro Rivadavia, 24 t. 18 c., £962. ; Durban, 2 t. 13 c., £204. ; East London, 13 t. 10 c., £1,005. ; Gisborne, 10 t. 13 c., £793. ; Napier, 17 t. 17 c., £1,316. ; Pto. Deseado, 49 t. 3 c., £4,675. ; Rio Coyle, 3 t. 10 c., £131. ; Rio Gallegos, 4 t. 14 c., £175. ; San Julian, 9 t., £350. ; Timaru, 4 t. 10 c., £331. ; Wellington, N.Z., 27 t. 5 c., £1,947.

SULPHUR—
Christiania, 1 t., £12.

SULPHURIC ACID—
Adelaide, 29 t. 19 c., £282.

SUPERPHOSPHATE—
Demerara, 1 t. 16 c., £42.
Las Palmas, 3 t., £19.

TANNING MATERIALS—
Unspecified
Alexandria, 1 t. 1 c., £24.
Christiania, 5 t. 8 c., £70.

TANNING MATERIALS—
Unspecified
Dunkirk, 7 t. 12 c., £202.
Pt. Elizabeth, 11 c., £22.

TARTARIC ACID—
Adelaide, 2 t., £252. ; Brisbane, 10 c., £61. ; Perth, 1 t. 10 c., £189. ; Sydney, 3 t. 10 c., £428.

TIN OXIDE—
Santos, 11 c., £133.

VANILLIN—
Montreal, 5 c., £532.

WOOD PRESERVATIVE—
Singapore, 2 t. 5 c., £65.

ZINC CHLORIDE—
Calcutta, 1 t. 15 c., £45. ; Rotterdam, 5 t. c., £119. ; Rangoon, 1 t. 14 c., £44. ; Sydney, 1 t., £33.

Week ending December 14.

BASIC SLAG—
Fremantle, 100 t.

CALCIUM CHLORATE—
Barcelona, 30 pkgs.
Wellington, 40 pkgs.

CASEIN—
Hamburg, 5 t.

CAUSTIC SODA—
Acapulco, 52 pkgs. ; Adelaide, 50 drms ; Alexandretta, 169 drms ; Algoa Bay, 116 drms. ; Bangkok, 100 cs. ; Bari, 17 drms. ; Bourgas, 250 drms. ; Bombay, 110 drms. ; Brisbane, 32 drms. ; Buenos Ayres, 983 drms. ; Calabar, 10 drms. ; Cartagena, 30 drms. ; Cabedello, 159 drms. ; Calcutta, 108 drms. ; Christiania, 40 drms. ; Cape Town, 77 pkgs. ; Constantinople, 683 drms., 35 pkgs. ; Corinto, 10 drms. ; Corfu, 10 pkgs. ; Danzig, 50 drms. ; Dunedin, 55 drms. ; Durban, 17 drms. ; Fremantle, 37 pkgs. ; Genoa, 176 drms. ; Gothenburg, 23 pkgs. ; Hamburg, 817 drms. ; Karachi, 200 drms. ; Luderitz Bay, 10 cs. ; Melbourne, 587 pkgs. Mollendo, 17 drms. ; Monte Video, 150 drms. ; Naples, 60 drms. ; Newcastle, 91 drms. ; Oporto, 154 drms. ; Piraeus, 84 drms. ; Patras, 34 drms. ; Penang, 20 drms. ; Perth, 20 drms. ; Petone, 129 drms. ; Pt. Said, 10 cs. ; Pt. Elizabeth, 10 cs. ; Rosario, 192 drms. ; Rotterdam, 17 drms. ; Rockhampton, 15 cs. ; Salonika, 217 pkgs. ; Samarang, 300 drms. ; Sydney, 153 cs. ; Santos, 2,000 cs. ; Suez, 155 drms. ; Valencia, 10 drms. ; Varna, 350 drms. ; Volo, 20 drms. ; Wellington, 12 cs. ; Yokkaichi, 28 drms. ; Zanzibar, 33 drms.

CRYOLITE—
Santos, 30 bgs.

FERRO MANGANESE—
Kobe, 300 t. ; Vancouver, 6 t.

GLUE, SIZE, AND GELATINE—
Bombay, 12 cks. ; Boston, 2 cs., 100 cks. ; Calcutta, 3 pkgs. ; Cape Town, 9 pkgs. ; Havana, 240 pkgs. ; Lagos, 10 pkgs. ; Melbourne, 5 cks. ; Norrkoping, 2 brls. ; Pernambuco, 8 pkgs. ; Pto. Colombia, 6 bgs. ; Rotterdam, 10 cks. ; Pt. Elizabeth, 10 cks. ; Pt. Harcourt, 5 pkgs. ; Pt. Sudan, 5 bgs. ; Quebec, 2 cs. ; Shanghai, 25 cks. ; Sydney, 10 cks. ; Tacoma, 37 cks. ; Tientsin, 200 bgs.

LEAD ASHES—
Antwerp, 7 t.

PARAFFIN WAX—
Cuidad Bolivar, 50 cks.
Pto. Colombia, 80 bgs.

PARAFORMALDEHYDE—
Rotterdam, 1 cs.

SALT—
Antwerp, 150 t. ; Auckland, 135 t. ; Bombay, 12 t. ; Brisbane, 25 t. ; Burutu, 200 t. ; Dunedin, 46 t. ; Cape Town, 20 t. ; Christiania, 330 t. ; Dunedin, 70 t. ; Durban, 43 t. ; Falklands, 5 t. ; Fremantle, 10 t. ; Geile, 30 t. ; Ghent, 150 t. ; Gibraltar, 2 t.

SALT—
Gothenburg, 105 t. ; Half Assinie 5 t. ; Iddo, 440 t. ; Iquique, 1 t. ; Koko, 57 t. ; Lyttleton, 164 t. ; Manila, 5 t. ; Melbourne, 25 t. ; New Orleans, 138 t. ; Norrkoping, 210 t. ; Sekondi, 18 t. ; St. John, N.B., 100 t. ; Sierra Leone, 50 t. ; St. John's, N.F., 10 t. ; Stockholm, 10 t. ; Valparaiso, 2 t. ; Wellington, 82 t.

SALTCAKE—
Accra, 76 pkgs.

SOAP—
Algiers, 4 pkgs. ; Alleppey, 25 pkgs. ; Alexandria, 330 pkgs. ; Amsterdam, 100 pkgs. ; Amboina, 100 pkgs. ; Antwerp, 3 bxs. ; Antofagasta, 50 bxs. ; Arequipa, 25 bxs. ; Bahia Blanca, 100 cs. ; Bandjermassin, 90 cs. ; Bangkok, 202 pkgs. ; Barbadoes, 1,032, pkgs. ; Barranquilla, 5 pkgs. ; Basrah, 8 cs. ; Batavia, 190 cs. ; Beira, 239 pkgs. ; Belawan, 30 pkgs. ; Bluff, 80 cs. ; Bolivia, 1,310 bxs. ; Bordeaux, 2 cs. ; Bourgas, 305 pkgs. ; Bombay, 8,219 bxs. ; Brisbane, 1 cs. ; Buenos Ayres, 1,847 bxs. ; Calcutta, 457 pkgs. ; Callao, 125 pkgs. ; Calicut, 529 pkgs. ; Cape Town, 25 bxs. ; Cape Mount, 20 bxs. ; Ceuta, 125 pkgs. ; Cheribon, 40 bxs. ; Christchurch, 37 pkgs. ; Colombo, 619 bxs. ; Colon, 205 bxs. ; Conakry, 3 pkgs. ; Constantinople, 20 cs. ; Copenhagen, 35 pkgs. ; Corinto, 225 bxs. ; Curacao, 225 pkgs. ; Delagoa Bay, 100 bxs. ; Dunedin, 37 pkgs. ; Durban, 86 bxs. ; Genoa, 2 bxs. ; Gibraltar, 32 pkgs. ; Guadaloupe, 500 pkgs. ; Guayaquil, 132 bxs. ; Helsingfors, 200 pkgs. ; Hong Kong, 128 bxs. ; Iddo, 100 bxs. ; Invercargill, 15 pkgs. ; Karachi, 513 bxs. ; Kilindini, 5 bxs. ; Kingston (Ja.), 73 bxs. ; Kobe, 4 bxs. ; Langsa, 25 bxs. ; Lagos, 275 bxs. ; Larache, 718 bxs. ; Las Palmas, 576 bxs. ; Leghorn, 45 bxs. ; Lho Seumaweh, 25 bxs. ; Lyttleton, 10 bxs. ; Madras 585 pkgs. ; Malacca, 210 bxs. ; Matadi, 3 cs. ; Marmagoa, 500 bxs. ; Maroni River, 25 bxs. ; Melbourne, 20 drms. ; Menado, 200 cs. ; Meulabar, 25 cs. ; Mollendo, 12 cs. ; Mombasa, 20 drms. ; New York, 5 cs. ; Olehleh, 100 cs. ; Paita, 50 cs. ; Panama, 281 pkgs. ; Penang, 1,400 bxs., 25 cs. ; Petta, 30 cs. ; Piraeus, 25 cs. ; Pontianak, 200 bxs. ; Puerto de la Luz, 28 cs. ; Pt. Said, 26 pkgs. ; Pt. Stanley, 28 cs. ; Punta Arenas, 50 cs. ; Rangoon, 1,113 pkgs. ; Rio de Janeiro, 4 cs. ; Rotterdam, 1,053 pkgs. ; Sabang, 25 cs. ; Salaverry, 160 pkgs. ; Salonika, 10 cs. ; Samarang, 150 cs. ; Santo Domingo, 10 cs. ; Santos, 4 cs. ; Sekondi, 2 cs. ; Segli, 50 cs. ; Sherbro, 81 cs. ; Shanghai, 1,803 pkgs. ; Siauw, 50 cs. ; Sierra Leone, 19 cs. ; Sinabang, 50 cs. ; Singkel, 50 cs. ; Singapore, 142 pkgs. ; Sinoe, 4 cs. ; Sourabaya, 355 pkgs. ; St. John, N.B., 10 bxs. ; St. John's, N.F., 4 cs. ; Stockholm, 850 cs. ; Sydney, 12 pkgs. ; Tagoelandang, 30 cs. ; Tamako, 30 cs. ; Tapatoean, 50 cs. ; Taroena, 60 cs. ; Teneriffe, 112 pkgs. ; Timaru, 26 bxs. ; Tjilatjap, 90 cs. ; Trinidad, 975 bxs. ; Tumaco, 350 bxs. ; Varna, 100 cs. ; Volo, 17 pkgs. ; Warri, 258 bxs. ; Wellington, 45 pkgs.

SODA ASH—
Adelaide, 59 pkgs. ; Antwerp, 4,920 pkgs. ; Auckland, 18 pkgs. ; Bahia Blanca, 192 cks. ; Batavia, 20 bgs. ; Bombay, 11 kgs., 250 pkgs. ; Boston, 32 cks. ; Brisbane, 303 pkgs. ; Buenos Ayres, 1,414 cks., 214 pkgs. ; Calcutta, 14,000 pkgs. ; Constantinople, 200 pkgs. ; Dunedin, 24 pkgs. ; Durban, 75 pkgs. ; Gothenburg, 2,300 pkgs. ; Hamburg, 150 pkgs. ; Karachi, 8,000 pkgs. ; Kobe, 8,208 pkgs.

SODA ASH—
Lyttleton, 37 pkgs.; Malmo, 300 bgs.; Mantyluoto, 30 bgs.; Moji, 54 bgs.; Monte Video, 199 cks.; Norrkoping, 150 bgs.; Oporto, 200 bgs.; Penang, 24 pkgs.; Pernambuco, 30 pkgs.; Piraeus, 30 pkgs.; Rangoon, 90 pkgs.; Rotterdam, 15,000 pkgs.; Shanghai, 2,474 pkgs.; Skein, 7,720 bgs.; Stockholm, 1,150 bgs.; Sydney, 59 bgs., 2,384 pkgs.; Vancouver, 542 pkgs.; Victoria, B.C., 426 bgs.; Vigo, 10 cks.; Yokkaichi, 9,738 bgs.; Zante, 150 bgs.

SODA CRYSTALS—
Bangkok, 20 kgs.; Buenos Ayres, 1,726 kgs.; Demerara, 30 pkgs.; Kingston, 10 pkgs.; Patras, 10 pkgs.; Samarang, 30 pkgs.; Sourabaya, 25 kgs.; Suez, 13 brls.

SODIUM BICARBONATE—
Adelaide, 34 pkgs.; Alexandria, 120 kgs.; Apapa, 20 pkgs.; Bangkok, 7 kgs.; Batavia, 50 kgs.; Bombay, 300 bgs.; Brisbane, 40 kgs., 130 pkgs.; Broome, 15 brls.; Buenos Ayres, 1,427 pkgs.; Catania, 100 pkgs.; Christiania, 25 pkgs.; Danzig, 50 pkgs.; Durban, 100 pkgs.; Genoa, 416 pkgs.; Gothenburg, 50 pkgs.; Hamburg, 861 pkgs.; Karachi, 100 pkgs.; Kobe, 3,231 pkgs.; Malta, 20 kgs.; Melbourne 230 pkgs.; Moji, 3,662 bgs.; Newcastle, 266 pkgs.; Penang, 4 pkgs.; Palermo, 50 kgs.; Perth, 100 pkgs.; Pt. Swettenham, 12 pkgs.; Shanghai, 450 pkgs.; Stamboul, 20 kgs.; Stockholm, 21 pkgs.; Sydney, 556 pkgs.; Teneriffe, 20 kgs.; Yokkaichi, 5,385 pkgs.; Zanzibar, 18 cks.

SODIUM BISULPHITE—
Corral, 20 drms.

SODIUM HYDROSULPHITE—
Genoa, 10 pkgs.
Rio de Janeiro, 5 kgs.

SODIUM PEROXIDE—
Antofagasta, 6 cs.

SODIUM SILICATE—
Adelaide, 115 pkgs.; Barranquilla 20 cks.; Cartagena, 30 pkgs.; Dunedin, 32 pkgs.; Durban, 106 pkgs.; Lisbon, 265 pkgs.; Melbourne, 241 pkgs.; Messina, 33 cks.; Newcastle, 5 drms.; Para, 10 pkgs.; Sydney, 29 bgs., 14 drms.; Teneriffe, 3 drms.; Vancouver, 10 cs.

SODIUM SULPHIDE—
Cape Town, 8 pkgs.; Dunedin, 34 pkgs.; St. John, N.B., 32 drms.; Lisbon, 14 pkgs.; Lyttleton, 15 pkgs.; Pernambuco, 36 pkgs.; Santos, 62 drms.

STEARINE—
Cuidad Bolivar, 27 bgs.; La Guaira, 27 pkgs.; Shanghai, 93 dble. bgs.

TALLOW—
Alexandria, 6 brls.; Antwerp, 70 pkgs.; Dunkirk, 158 pkgs.; Shanghai, 16 pkgs.

WAX (*otherwise undescribed*)—
Christiania, 20 pkgs.

LONDON.

OFFICIAL AMENDMENT.

From return for week ending September 5, 1923, deduct—

CREAM OF TARTAR—
Auckland, 1 t., £98.

Week ending December 12.

ACETIC ACID—
Auckland, 1 crby., £6.; Cape Town, 4 cs., £13.; Channel Islands, 2 cks., £5.; East London, 2 cs., £7.; Lyttleton, 20 cs., £63.; Timaru, 6 cs., £18.

ACETONE—
Antwerp, 31 drms., £1,085.; Antwerp (F.), 34 drms., £1,320.; Delagoa Bay (F.), 15 drms., £71.

ACETYL SALICYLIC ACID—
Irish Free State, 3 cs. (pt.), £34.; Karachi, 1 cs. (pt.), £9.; Montreal, 5 cs. (pt.), £50.; Shanghai, 2 cs. (pt.), £8.

ALKALINE TARTRATES—
Santander, 14 cs., £125.

ALUMINIUM SULPHATE—
Pt. Sudan, 5 cs., £29.

AMMONIA—
Alexandria, 27 pkgs., £56.; Barcelona, 14 drms., £140.; Buenos Ayres, 4 cs. (pt.), £9; Cape Town, 24 cs., £44.; Delagoa Bay, 9 drms., £40.; Durban, 9 cs., £16.; Irish Free State, 26 cs., £47.; Pt. Elizabeth, 15 cs., £43.; Pt. Sudan, 3 cs., £5.; Rangoon, 10 cs., £18.; Valparaiso, 20 cs., £60.

AMMONIA (ANHYDROUS)—
Penang, 10 cylds., £121.; Pt. Said, 5 cylds., £68.; Punta Arenas, 22 cylds., £186.; Singapore, 20 cylds., £151.

AMMONIUM CARBONATE—
Bari, 1 t., £27.; Beyrouth, 2 c., £6.; Calcutta, 14 c., £60.; Durban, 5 c., £11.; Hamburg, 1 t., £28.; Helsingfors, 1 t. 10 c., £38.; Hong Kong, 2 t., £112.; Jaffa, 6 c., £18.; Kobe, 7 t. 10 c., £250.; Penang, 1 t. 3 c., £55.; Seremban, 2 c., £6.; Trinidad, 2 c., £5.

AMMONIUM CHLORIDE—
Sydney, 1 brl., £12.

AMMONIUM NITRATE—
Harlingen, 50 t. 19 c., £1,130.

AMMONIUM SULPHATE—
Bombay, 200 t., £2,595.; Calicut, 15 t., £198.; Dunkirk, 45 t., £585.; Hong Kong, 100 t., £1,540. Jamaica, 40 t., £550.; Keelung, 560 t., £8,316.; Kobe, 200 t., £2,786.; Teneriffe, 25 t., £340.; Yokohama, 1,350 t., £18,225.

ANTIMONY SULPHIDE—
New York, 8 cks., £151.; Ostend, 3 cks., £56.; Rotterdam, 5 bgs., £19.; Rouen, 2 cks., £17.

ARSENIC—
East London, 1 cs., £6.

BARIUM NITRATE—
Santos, 10 cks., £19.

BENZINE—
Durban, 30 brls., £205.

BENZOIC ACID—
Wellington, 1 cs., £8.

BISMUTH CARBONATE—
Alexandria, 1 cs. (pt.), £6.; Calcutta, 7 cs. (pt.), £113.; Melbourne, 1 cs., £73.; Pt. Elizabeth, 1 cs. (pt.), £7.

BISMUTH SALICYLATE—
Durban, 1 cs. (pt.), £7.

BISMUTH SALTS (*otherwise undes.*)
Amoy, 1 cs. (pt.), £32.; Calcutta, 3 cs., £124.; Montreal, 1 cs., £53.; Toronto, 1 cs. (pt.), £12.

BISULPHITE OF LIME—
Irish Free State, 50 brls., £37.
Toronto, 4 kgs., £28.

BITUMEN—
Auckland, 3 brls., £8.
Melbourne, 18 brls., £60.

BORAX—
Antwerp, 40 t. (F.), £980.
Bremen, 5 t., (F.), £130.

BORAX GLASS—
Benkoelen, 2 t. 5 c., £176.

BORIC ACID—
Calcutta, 13 c., £39.
Madras, 1 c., £5.

CALCIUM CARBIDE—
Channel Islands (F.), 2 t. 7 c., £42.; Sierra Leone, 10 c., £8.

CALCIUM CARBONATE—
Toronto, 1 ck., £7.

CALCIUM CHLORIDE—
Adelaide, 8 pkgs., £7.
Singapore, 3 cs., £9.

CALCIUM HYPOPHOSPHITE—
Bombay, 2 cs. (pt.), £30.

CALCIUM LACTATE—
Melbourne, 2 cs., £15.

CARBON BISULPHIDE—
Cape Town, 4 cs., £11.
Pt. Elizabeth, 3 cs., £8.

CARBON TETRACHLORIDE—
Belawan, 2 cs., £11.; Lyttleton, 2 cs., £6.; Madras, 14 cs., £43.

CARBONATE OF LIME—
Channel Islands, 965 bgs., £150.

CAUSTIC POTASH—
Sydney (F.), 1 cs., £6.

CAUSTIC SODA—
Cairns, 1 t., £52.
Jamaica, 4 c., £7.

CHEMICALS (*otherwise undescribed*)
Alexandria, 7 pkgs. (pt.), £22.; Amsterdam, 1 t., £100.; Basra, 1 cs., (pt.), £18.; Beyrouth, 2 cs. (pt.), £6.; Bombay, 7 cs. (pt.), £34.; Brisbane, 10 pkgs., £15.; Buenos Ayres, 13 pkgs., £34.; Calcutta, 20 pkgs. (pt.), £79.; Cape Town, 3 pkgs. (F.), £8.; Cape Town, 4 pkgs., £12.; Christchurch, 8 cs., £73.; Colombia, 4 cs. (pt.), £15.; Demerara, 3 pkgs. (F.), £8.; Durban, 3 pkgs. (pt.), £15.; Hamburg, 10 pkgs. (F.), £51.; Hankow, 2 cs., £5.; Hong Kong, 24 cs. (pt.), £88.; Irish Free State, 3 cs. (pt.), £8.; Madras, 50 pkgs., £63.; Mauritius, 1 cs. (pt.), £10.; Melbourne, 32 pkgs. (pt.), £114.; Milan, 1 cs. (pt.) £15.; Mombasa, 2 pkgs., £19.; Montreal, 10 pkgs. (pt.), £84.; New York, 2 cs. (pt.), £16.; Penang, 8 pkgs., £21.; Porto Alegre, 10 pkgs., £12.; Pt. Elizabeth, 12 pkgs. (pt.), £31.; Pt. Sudan, 11 pkgs., £14.; Rangoon, 4 cs., £6.; Rio de Janeiro, 12 pkgs. (pt.), £51.; Rockhampton, 1 cs. (pt.), £10.; Rotterdam, 20 pkgs. (F.), £250.; Rotterdam, 5 pkgs., £88.; Santander, 1 pkgs., £26.; Stockholm, 19 pkgs., £33.; Stockholm, 7 pkgs. (F.), £22.; Sydney, 24 pkgs. (pt.), £78.; Tientsin, 4 cs., £10.; Toronto, 2 cs. (pt.), £7.; Wellington, 10 pkgs. (pt.), £99.

CHLORAL HYDRATE—
Rio de Janeiro, 1 ck. (pt.), £8.

CITRIC ACID—
Beyrouth, 1 c., £8.; Bombay, 1 c., £12.; Brussels, 4 c., £25.; Christiania, 5 c., £36.; East London, 1 c., £7.; Gibraltar, 1 c., £8.; Hango, 1 c., £6.; Hong Kong, 9 c., £84.; Irish Free State, 3 pkgs. (pt.), £8.; Mackay, 1 c., £7.; Melbourne, 2 t. 19 c., £346.; Pt. Elizabeth, 1 c., £7.; Townsville, 5 c., £36.; Wellington, 1 c., £11.

COAL TAR PRODUCTS—
Carbolic Acid
Bombay, 6 cs., £34.; Rio de Janeiro, 1 ck., £12.; Sydney, 3 cks., £18.
Mirbane Oil
Penang, 2 cs., £8.
Naphthalene
Rangoon, 10 cs., £12.
Pitch
Alexandria, 50 brls., £60; Antwerp (bulk), 485 t., 47 pkgs., £2,784.; Asuncion, 50 kgs., £11.; Cette, 850 t., £6,375.; Dunkirk, 1,060 t., £6,800.; Havre, 18 cks., £90.
Tar
East London, 180 drms., £24.; New York, 1 cs. (pt.), £8.; Penang, 10 brls., £25.; Pt. Elizabeth, 200 drms., £16.

COBALT OXIDE—
Amsterdam (F.), 1 ck., £203.; Copenhagen (F.), 2 pkgs., £97.; Paris, 8 cs., £563.

COLOURS (*otherwise undescribed*)—
Colombo, 1 cs. (pt.), £5.
Singapore, 1 cs., £8.

COPPER OXIDE—
Buenos Ayres, 8 drms., £111.

COPPER SALT (*otherwise undes.*)—
Santos, 1 cs. (pt.), £6.

COPPER SULPHATE—
Pt. Elizabeth, 11 c., £19.

CREAM OF TARTAR—
Beyrouth, 2 c., £9.; Brisbane, 6 t., £502.; Cairns, 1 t., £84.; Calcutta 1 c., £5.; Durban, 10 c., £50.; Fremantle, 2 t. 1 c., £173.; Mackay, 19 c., £42.; Malta, 2 c., £9.; Maryborough, 10 c., £42.; Melbourne, 20 t., £1,672; Nassau, 1 c. (F.), £6.; Pt. Alma, 3 t. 10 c., £293.; Rangoon, 1 c. (F.), £8.; Rotterdam, 10 c. (F.), £43.; Sydney, 19 t. 10 c., £1,631.; Townsville, 1 t., £84.; Wellington, 1 t., £84.

DISINFECTANTS (*otherwise undes.*)
Belawan, 2 t. 5 c., £67.; Buenos Ayres, 6 c., £10.; Cape Town, 3 t. 9 c., £80.; Channel Islands, 3 c., £10.; Durban, 4 t. 3 c., £120.; East London, 1 t., £30.; Hong Kong, 7 c., £13.; Irish Free State, 5 c., £13.; Malacca, 5 c., £6.; Penang, 13 c., £25.; Pt. Elizabeth, 2 t. 14 c., £97.; Pt. Swettenham, 3 t. 4 c., £89.; Shanghai, 17 c., £46.; Singapore, 11 c., £39.

DYESTUFFS (ARTIFICIAL)—
Alizarine
New York, 1 kg., £5.
Nigrosine
Sydney, 4 drms., £50.
Unspecified
Adelaide, 1 kg., £10.; Boulogne, 8 kgs., £40.; Dunedin, 1 cs., £21.; Hobart, 1 cs., £13.; Melbourne, 12 pkgs., £189.; Pt. Elizabeth, 4 kgs., £32.

ETHER—
Bombay, 3 cs., £24.

ETHYL ACETATE—
Demerara, 1 cs., £6.

ETHYL CHLORIDE—
Pt. Elizabeth, 2 cs. (pt.), £24.

FERTILISERS (*otherwise undes.*)—
Channel Islands, 108 t., £905.
Irish Free State, 3 c., £15.

FORMALDEHYDE—
Paris, 25 cks., £298.

GLYCERINE—
Bilbao, 1 c., £5.; Buenos Ayres, 4 c., £32.; Colombo, 2 c., £6.; Durban, 1 c., £5.; Madras, 1 c., £5.; Rio de Janeiro, 1 c., £5.; Wellington, 2 cs., £5.

GUANO—
Barbados, 60 t., £716.
Melbourne, 25 t., £286.

HYDROCHLORIC ACID—
Benkoelen, 1 t. 16 c., £81.; Hong Kong, 4 c., £11.; Pt. Elizabeth, 8 c., £25.; Trinidad, 2 c., £6.

HYDROFLUORIC ACID—
Pt. Elizabeth, 2 cs., £34.

HYDROGEN PEROXIDE—
Alexandria, 3 cs. (pt.), £9.; Basrah, 2 cs., £23.; Post Said, 1 cs., £9.

HYPOPHOSPHITE OF LIME—
Sydney, 3 c., £64.

IODIDES (*otherwise undescribed*)—
Athens, 1 cs. (pt.), £28.
Melbourne, 1 cs. (pt.), £40.

IODINE—
Calcutta, 1 cs. (pt.), £53.
Rockhampton, 1 cs. (pt.), £14

IODINE (RESUBLIMED)—
Alexandria, 1 cs. (pt.), £7.; Dunedin, 1 cs., £20.; Petrograd, 20 cs., £198.

IRON AMMONIUM CITRATE—
Bombay, 3 cs., £26.

IRON IODIDE—
Lyttleton, 1 cs., £8.

LEAD ARSENATE—
Pt. Elizabeth, 2 cs., £14.

LEAD OXIDE—
Vancouver, 4 cks., £38.

LITHIUM BENZOATE—
Buenos Ayres, 1 cs. (pt.), £6.

MAGNESIA—
Calcutta, 2cs. (pt.) £8.; Sydney, 60 cs., £1,285.; Wanganui, 5 cs., £12.

MAGNESIA (CALCINED)—
Alexandria, 1 cs., £15.
Rio de Janero, 1 cs., £6.

MAGNESIUM CARBONATE—
Bombay, 2 cs., £11.
Valparaiso, 4 cs., £14.

MAGNESIUM CITRATE
Havre, 13 cs., £214.

MAGNESIUM SULPHATE—
Brisbane, 4 t. 8 c., £98. ; Calcutta, 5 c., £15. ; Fremantle, 2 t. 14 c., £59. ; Jaffa, 10 c., £13. ; Lyttleton, 1 t. 15 c., £51. ; Malacca, 6 c., £5. ; Melbourne, 3 t. 19 c., £94. ; Penang, 10 c., £9. ; Perth, 1 t. 5 c., £28. ; Rockhampton, 2 t. 8 c., £54. ; Sydney, 1 t. 5 c., £27. ; Townsville, 2 t. 7 c., £53. ; Wanganui, 1 t. 2 c., £26. ; Wellington, 2 t. 2 c., £50.

MANGANESE BORATE—
Petrograd, 3 t. 6 c., £210.

MANGANESE HYDROXIDE—
Petrograd, 15 cks., £146.

MERCURIALS (*otherwise undes.*)—
Calcutta, 2 cs. (pt.), £24.

MERCURY OXIDE—
Bombay, 2 cs., £69.

NICKEL SALTS (*otherwise undes.*)—
Lyttleton, 3 cs. (pt.), £5.

NICKEL SULPHATE—
Kobe, 3 cks., £27.

NITRIC ACID—
Christchurch, 3 c., £5. ; Madras, 2 c., £17. ; Pt. Sudan, 3 cs., £6.

PHOSPHATE (*otherwise undescribed*)
Hamburg, 1 t. 18 c., £20.

PHOSPHORIC ACID—
East London, 2 cs., £6. ; Hong Kong, 6 cs., £13. ; Pt. Elizabeth, 1 cs., £7.

PHOSPHORUS—
Melbourne, 1 cs., £9.

POTASSIUM CITRATE—
Bombay, 6 cs. (pt.), £63. ; Melbourne, 1 cs., £10. ; Montreal, 2 cks., £19. ; Sydney, 2 cs., £25. ; Toronto, 2 cks., £19.

POTASSIUM CYANIDE—
Malacca, 1 cs., £10.

POTASSIUM IODIDE—
Alexandria, 1 cs. (pt.), £10. ; Bangkok, 2 cs., £185. ; Bombay, 2 cs., £175. ; Calcutta, 2 cs., £176. ; Durban, 1 cs. (pt.), £6. ; Lyttleton, 1 cs., £88. ; Madras, 1 cs., £88. ; Melbourne, 1 cs., £98. ; Pt. Elizabeth, 1 cs., £40. ; Rockhampton, 1 cs. (pt.), £26. ; Singapore, 1 bx., £17.

POTASSIUM METABISULPHITE
Brisbane, 5 pkgs., £20.

POTASSIUM NITRATE—
Colombo, 1 ck., £6.

POTASSIUM PERMANGANATE
Paris, 30 kgs., £130.

POTASSIUM PRUSSIATE—
Antwerp, 5 cks., £89. ; Bangkok, 1 cs., £6. ; Kobe, 150 kgs., £650. ; Tarragona, 1 ck., £25.

POTASSIUM SALTS (*otherwise undescribed*)—
Cape Town (F.), 1 ck., £16.
Malta, 1 kg., £6.

POTASSIUM SODIUM NITRATE—
San Jose (Guatemala), 1 t., £20.

PRUSSIAN BLUE—
Paris, 4 cks., £78.

SALAMMONIAC—
Cape Town, 6 pkgs. (pt.), £8. ; Ceara, 1 ck., £32. ; Madras, 1 ck., £12. ; Rockhampton, 7 cs., £29.

SALICYLATES (*otherwise undes.*)—
Montreal, 3 cs. (pt.), £35.
New York, 1 cs., £10.

SALICYLIC ACID—
Toronto, 2 cs., £12.

SALTPETRE—
Cape Town, 5 c., £10. ; Copenhagen, 3 c., £12. ; Irish Free State, 10 c., £20. ; Rio de Janeiro, 2 t. 9 c., £101.

SHEEP DIP—
Colombo, 3 t. 19 c., £170. ; Puerto Deseado, 3 t. 19 c., £170. ; San Julian, 3 t. 19 c., £170.

SODA ASH—
Townsville, 2 t., £18.

SODA CRYSTALS—
Bermuda, 1 t., £6.

SODIUM ACETATE—
Melbourne (F.), 1 cs. (pt.), £8.
Sydney, 4 t. 18 c., £113.

SODIUM ANTIMONY TARTRATE
Calcutta, 1 cs. (pt.), £8.

SODIUM ARSENITE—
Durban, 4 t. 9 c., £308.
Pt. Elizabeth, 9 c., £36.

SODIUM BENZOATE—
Cape Town, 3 c., £35. ; Jaffa, 1 c., £9. ; Paris, 1 t. 10 c., £390.

SODIUM BICARBONATE—
Alexandria, 6 c., £12. ; Cairns, 1 t., £15. ; Calcutta, 1 t. 3 c., £71. ; Constantinople, 3 c., £26. ; Durban, 10 c., £84. ; Jamaica, 1 c., £6. ; Montreal, 10 c., £24. ; Penang, 6 c., £7. ; Pt. Sudan, 2 c., £5. ; Townsville, 9 t., £98.

SODIUM BISULPHATE—
Buenos Ayres (F.), 1 c., £9.

SODIUM BISULPHITE—
Toronto, 4 c., £30.

SODIUM CARBONATE—
Benkoelen, 6 c., £8.
Santos, 4 cks., £21.

SODIUM CITRATE—
Bombay, 1 cs. (pt.), £6.

SODIUM HYPOPHOSPHITE—
Bombay, 1 c., £27.
Sydney, 3 c., £64.

SODIUM HYPOSULPHITE—
Pt. Elizabeth, 5 c., £5.

SILVER NITRATE—
Auckland, 1 cs. (pt.), £5.

SODIUM PERBORATE—
Irish Free State (F.), 1 c., £23.

SODIUM SALICYLATE—
Bombay, 1 c., £16.
Colombo, 1 t. 8 c., £148.

SODIUM SULPHIDE—
Calcutta, 10 c., £8.
Wellington, 24 t. 8 c., £317.

SODIUM SULPHITE—
Lyttleton, 1 t., £26. ; Melbourne, 1 t., £26. ; Sydney, 1 t., £26. ; Wellington, 3 c., £12.

SULPHUR—
Durban (F.), 2 c., £5.

SULPHURIC ACID—
Benkoelen, 20 t., £315. ; Buenos Ayres, 2 t. 19 c., £104. ; Christchurch, 4 c., £7. ; Jaffa, 6 c., £30. Penang, 1 c., £11. ; Pt. Sudan, 1 t., £27 ; Pt. Swettenham, 1 c., £5.

TARTARIC ACID—
Bombay, 1 c., £9. ; Bucare 6 c., £59. ; Cairns, 7 c., £42. ; Calcutta, 2 c., £19. ; Dunedin, 1 t., £120. ; Durban, 2 c., £14 ; Irish Free State, 3 pkgs. (pt.), £7. ; Limassol, 3 c. (F.), £17. ; Lyttleton, 15 c., £89. ; Mackay, 6 c., £36. ; Melbourne, 8 t., £960. ; Montreal, 2 t. 2 c., £300. ; Pt. Elizabeth, 2 c., £12. ; Riga, 10 c., £55. ; Sydney, 2 t. 10 c., £300. ; Townsville, 5 c., £30 ; Wellington 1 c., £9.

ZINC OXIDE—
Copenhagen, 195 cks., £711. ; Sydney, 20 cks., £88. ; Toronto, 350 cks., £1,347. ; Wellington, 9 bgs., £26.

Week ending December 15.

ANTIMONY REGULUS—
Melbourne, 2 t.

BEESWAX—
Brisbane, 1 t.
Melbourne, 1 t.

CARNAUBA WAX—
Irish Free State, 10 c.

CASEIN—
Rotterdam, 1 t.

FULLER'S EARTH—
Christiania, 30 t. ; New York, 140 t. ; Philadelphia, 25 t. ; Santos, 10 t.

GLUE AND GELATINE
Amsterdam, 1 t. 6 c. ; Auckland, 1 t. 11 c. ; Boulogne, 2 c. ; Calcutta, 4 t. ; Cape Town, 4 c. ; Delagoa Bay, 2 c. ; Durban, 10 c. ; Kobe, 24 t. 17 c. ; Los Angeles, 7 t. 1 c. ; Melbourne, 3 t. 19 c. ; Montreal, 6 t. ; New York, 2 t. 10 c. ; Perth, 1 c. ; Paris, 35 t. 1 c. ; Pt. Elizabeth, 1 t. ; Rotterdam, 1 c. ; Shanghai, 4 c. ; Sydney, 1 t. 16 c. ; Trinidad, 4 c. ; Wellington, 1 c.

MINERAL WAX—
Piraeus, 10 c. ; Sydney, 1 t. ; Trieste, 1 t. 5 c.

PARAFFIN WAX—
Montreal, 1 t.
Rangoon, 5 c.

PITCH (STOCKHOLM)—
Rangoon, 1 t.

PLUMBAGO—
Hamburg, 4 c. ; St. John, N.B., 18 c. ; Sydney, 1 t. 13 c. ; Valparaiso, 4 c.

QUININE—
Bombay, 4,729 oz. ; Calcutta, 23,236 oz. ; Constantinople, 1,024 oz. ; Melbourne, 1,000 oz. ; Piraeus, 1,057 oz. ; Smyrna, 37 oz. ; Sydney, 242 oz.

ROSIN—
Gothenburg, 6 t. 19 c.

SALT—
Basrah, 10 c. ; Cape Town, 14 c. ; Penang, 5 c. ; Pt. Elizabeth, 1 t. 5 c. ; Singapore, 2 c.

SOAP—
Alexandria, 4 c. ; Amsterdam, 3 t. 13 c. ; Antwerp, 11 c. ; Auckland, 10 c. ; Basrah, 4 c. ; Bilbao, 10 c. ; Bombay, 8 t. 9 c. ; Bonny, 1 t. 1 c. ; Buenos Ayres, 5 c. ; Calabar, 5 t. 2 c. ; Calcutta, 3 t. 7 c. ; Canary Islands, 2 t. 10 c. ; Cadiz, 8 c. ; Cape Town, 1 c. ; Christiania, 1 c. ; Christchurch, 1 t. 5 c. ; Cologne, 6 t. 17 c. ; Colombo, 1 t. 2 c. ; Demerara, 1 c. ; Delagoa Bay, 1 c. ; Grenada, 2 t. 4 c. ; Hong Kong, 14 c. ; Irish Free State, 3 t. 5 c. ; Kobe, 6 c. ; Lagos, 2 t. ; La Libertad, 2 c. ; Larache, 5 t. ; Lisbon, 3 c. ; Malta, 1 c. ; Madras, 17 c. ; Malacca, 1 c. ; Monte Video, 7 c. ; Melbourne, 5 c. ; Mormugao, 2 c. ; Montreal, 9 c. ; Opobo, 17 t. 18 c. ; Paris, 1 t. ; Penang, 16 c. ; Perth, 2 c. ; Portland (Maine), 4 t. 2 c. ; Pt. Said, 13 c. ; Pt. Elizabeth, 12 c. ; Pt. Swettenham, 6 c. ; Pt. Harcourt, 9 t. 4 c. ; Rabat, 9 c. ; Rangoon, 12 c. ; Rio de Janeiro, 1 c. ; Rotterdam, 8 c. ; St. John, N.B., 2 c. ; St. Kitts, 6 c. ; Shanghai, 2 t. 7 c. ; Singapore, 10 c. ; Stockholm, 2 c. ; Sydney, 9 c. ; Tangier, 1 c. ; Teluk Anson, 2 c. ; Toronto, 9 c. ; Trinidad, 9 c. ; Valparaiso, 1 t. 5 c. ; Victoria, B.C., 1 c. ; Wellington, 1 c.

STEARINE—
Rotterdam, 55 t. 3 c.
Shanghai, 1 t. 11 c.

TALLOW—
Hamburg, 5 t. ; Harlingen, 1 t. 11 c. ; Rotterdam, 14 t. 9 c.

WHITE LEAD—
Adelaide, £106. ; Auckland, £445. ; Barbados, £38. ; Brussels, £41. ; Hobart, £133. ; Irish Free State, £113. ; Jamaica, £42. ; Madras, £12. ; Melbourne, £120. ; New York, £13. ; Paris, £112. ; Penang £13. ; Pt. Elizabeth, £143. ; Rangoon, £288. ; Shanghai, £188. ; Timaru, £180. ; Wellington, £217.

ZINC ASH—
Matadi, 7 t.

MANCHESTER.

Week ending December 12.

ALBUMEN—
Antwerp, 7 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
Paris, 10 cks.

ANTHRAQUINONE—
Basle, 12 cks.

BLEACHING POWDER—
Basrah, 40 drms.

CAUSTIC SODA—
Hamburg, 340 drms.

CHEMICALS (*otherwise undescribed*)
Bombay, 14 drms. ; France, 1 brl., 2 crts. ; Gothenburg, 55 drms., 28 brls., 10 kgs.

COAL TAR PRODUCTS
Creosote
U.S.A., 35 drms.
Pitch
Dunkirk, 795 t.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 193 cks.

NITROBENZOL—
Basle, 20 drms.
Unspecified
Alexandria, 2 cs. ; Australia, 2 drms., 2 kgs. ; Basle, 33 pkgs., 15 cks. ; Belgium, 1 kg. ; Bombay, 15 pkgs. ; Gothenburg, 6 cks. ; Malta, 1 cs. ; Melbourne, 11 drms. Rouen, 3 cs., 2 kgs., 2 cks. ; Sydney, 8 drms.

GLUE—
Bagdad, 10 bgs. ; Bombay, 50 bgs.

MINERAL WHITE—
India, 60 bgs.

POTASSIUM BICHROMATE—
France, 7 cks.

SALT—
Ghent, 3,000 sks.

SALTCAKE—
Gothenburg, 404 t. 16 c.

SIZE—
France, 39 brls. ; Holland, 22 cks.

SOAP—
Bombay, 87 cs., 1 cs. (pt.) ; Holland, 25 cs. ; India, 18 brls. ; Sydney, 1 cs. ; Tuticorin, 125 cs.

SODIUM BICHROMATE—
France, 26 cks.

SULPHURIC ACID—
France, 14 drms.

TALLOW—
Bombay, 47 brls.

ZINC CHLORIDE—
Bombay, 3 cs.

NEWCASTLE-ON-TYNE

Week ending December 15.

AMMONIA—
Bergen, 10 kgs.
Copenhagen, 10 cks.

ANTIMONY—
Copenhagen, 9 cks.
Gothenburg, 31 cks.

BLEACHING POWDER—
Gothenburg, 123 cks.

CARBON DIOXIDE—
Bergen, 9 cylds.

CAUSTIC SODA—
Bergen, 2 cks. ; Christiania, 62 drms. ; Copenhagen, 131 drms. ; Gothenburg, 145 drms.

COAL TAR PRODUCTS—
Benzol
Rouen, 109 drms.
Pitch
Christiania, 1 pcl.

GLUE (MARINE)—
Bergen, 57 cs., 10 tins.

LITHARGE—
Christiania, 6 cks.
Copenhagen, 2 cks.

RED LEAD—
Christiania, 16 cks. ; Copenhagen 22 cks. ; Gothenburg, 31 cks.

SODIUM SULPHATE—
Skoghall, 357 t.

WHITE LEAD—
Copenhagen, 10 cks.

N. & S. SHIELDS.

Week ending December 15.

NIL.

PRICES CURRENT.

WEDNESDAY, DEC. 19. 1923.

Prepared by Messrs. Higginbottom & Co., 21, Spring Gardens, Manchester.

The values stated are f.o.r. at makers' works, but it must be understood that the prices in different localities may vary.

	£	s.	d.
ACIDS.			
Acetic, 40% and 80% ..*cwt.	23- / &	46/-	
Acetic, (Glacial, B.P.) in carboys ..*ton	70	0	0
Arsenic, S.G. 2.000 .. .. .. ton	80	0	0
Boric (crystals) .. ..†ton	48	0	0
Citric .. .. lb.	0	1	4½
Formic, 80/85% .. ..*ton	49	0	0
Hydrofluoric, 59/60% .. .. ..*lb.	0	0	7½
Lactic, 50% .. .. ton	43	0	0
Muriatic (Tower Salts), 28° Tw. ..*carboy	0	3	6
Nitric, 80° Tw. .. ..*ton	21	10	0
Oxalic .. .. lb.	0	0	5¾
Phosphoric, 1,500° tech. .. .. ..*ton	33	0	0
Sulphuric (168°) .. ..*ton	7	10	0
Sulphuric (140°) .. ..*ton	3	15	0
Sulphuric (free from Arsenic, 144°) ..*ton	4	10	0
Tannic (commercial) .. .. .. lb.	0	1	6
Tartaric (crystals) .. .. lb.	0	1	1
COAL TAR PRODUCTS.			
Aniline Oil .. ..*lb.	0	0	8½
Aniline Salt .. ..*lb.	0	0	8½
Anthracene, 40/45% "A" .. .. unit	0	0	4
Benzol, 90% .. ..*gallon	0	1	3
Carbolic Acid (crude 60%) .. .. gallon	0	3	4
Carbolic Acid (crystals 40°) .. .. lb.	0	1	0
Creosote .. ..*gallon	0	0	9¼
Cresylic Acid, 97/99% .. .. ..*gallon	0	2	0
Naphtha, crude, 30% .. .. ..*gallon	0	0	8½
Naphtha, solvent (90/160) .. .. ..*gallon	0	1	3
Naphthalene, refined .. .. .. ton	17	10	0
Pitch (f.a.s. Liverpool) .. .. .. ton	5	15	0
Pyridin .. .. gallon	1	2	6
Tar, crude .. .. ton	4	10	0
Tar, refined .. .. barrel	2	0	0
Toluol .. ..*gallon	0	1	9
Xylol, (pure) .. ..*gallon	0	2	3
GENERAL CHEMICALS.			
Acetone .. ..*ton	124	0	0
Alum, loose lump (delivered) .. ..*ton	10	10	0
Aluminium Sulphate, 17/18% .. .. ton	10	10	0
Aluminium Sulphocyanide .. .. .. lb.	0	0	7
Aluminoferric (in slabs) 20° Tw. .. .. ton	7	0	0
Ammonia, anhydrous .. .. ..*lb.	0	1	4
Ammonia, .880 .. ..*ton	22	10	0
Ammonia, .920 .. ..*ton	14	10	0
Ammonium Carbonate (lump) .. .. lb.	0	0	4
Ammonium Muriate (grey) .. ..†ton	30	0	0
Ammonium Nitrate .. .. .. ton	35	0	0
Ammonium Phosphate .. .. .. ton	60	0	0
Ammonium Sulphate, 25¾% delivered ..†ton	14	16	0
Ammonium Sulphocyanide, 95% .. .. lb.	0	1	3
Antimony (Golden Sulphide) .. .. lb.	0	0	9
Arsenic (Cornish White) .. .. .. ton	68	0	0
Barium Carbonate (native), 92/94% .. ton	5	15	0
Barium Chlorate .. .. lb.	0	0	7
Barium Chloride (in casks) .. .. ton	14	10	0
Barium Sulphate .. .. ton	£5	to	£7
Barium Sulphocyanide, 95% .. .. lb.	0	0	9½
Bleaching Powder, 35% .. .. ..*†ton	10	0	0
Bleaching Liquor, 7% .. .. ..*ton	4	10	0
Calcium Chloride .. ..†ton	5	10	0
Carbon Bisulphide .. ..*ton	26	0	0
Casein (commercial) .. .. ton	81	0	0
China Clay (at Runcorn), in bulk .. ton	50/-	to	90/-
Chromium Acetate (crystals) .. .. lb.	0	0	8
Copper Sulphate .. .. ton	25	0	0
Formaldehyde, 40% .. .. ton	63	0	0
Glycerine (chemically pure, S.G. 1,260) ..*ton	85	0	0
Glycerine (crude), 80% .. .. ..*ton	60	0	0
Iodine .. ..*oz.	0	1	0
Iron Nitrate, 80° Tw. .. .. ..*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk*ton	2	2	6
Iron Sulphide (lumps) .. .. .. ton	6	0	0
Lead Acetate (white) .. .. .. ton	46	0	0
Lead Acetate (brown) .. .. .. ton	45	0	0
Lead Carbonate (White Lead) .. .. ton	47	0	0
Lead Nitrate .. .. ton	43	0	0
Lime Acetate (brown) .. .. ..*ton	14	10	0
Lime Acetate (grey), 80% .. .. ..*ton	22	0	0
Lime Bisulphite (S.G. 1,070) .. ..*ton	8	0	0
Lime Superphosphate, 30%, ... ton	3	5	0
Litharge (British) .. .. ton	43	0	0
Magnesite, Calcined (delivered) .. .. ton	11	0	0
Magnesite, Raw .. .. ton	3	0	0
Magnesium Carbonate (light) .. .. cwt.	1	16	0
Magnesium Chloride (solid) .. .. ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.) ton	4	10	0
Magnesium Sulphate, B.P. .. .. .. ton	6	10	0
Manganese Borate, 85% .. .. .. ton	105	0	0
Manganese Sulphate, 90% .. .. .. ton	45	0	0
Methylated Alcohol, 64° (industrial) .. gallon	0	3	1
Naphtha (Wood), Solvent .. .. ..*gallon	0	5	6
Naphtha (Wood), Miscible, 60° p. .. gallon	0	5	6
Potassium Bichromate .. .. .. lb.	0	0	5¾
Potassium Carbonate, 90% .. .. ton	29	0	0
Potassium Chlorate .. .. lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%ton	34	0	0
Potassium Hydrate (Caustic Potash), 75/80%ton	30	0	0
Potassium Hydrate (liquid), 50° Bé. .. ton	19	0	0
Potassium Chloride 80% .. . .. ton	8	10	0
Potassium Nitrate (refined) .. .. ton	25	0	0
Potassium Permanganate (commercial) .. lb.	0	0	8½
Potassium Prussiate (yellow) .. .. lb.	0	0	9½
Potassium Prussiate (red) .. .. .. lb.	0	2	6
Potassium Sulphate, 90% (ex ship) .. ton	11	0	0
Potassium Sulphocyanide .. .. .. lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd .. cwt.	55/- &	52/3	
Sodium Acetate .. .. ton	24	0	0
Sodium Arsenate, 45% .. .. .. ton	64	0	0
Sodium Borate (Borax), Crystals .. ..†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags) ..†ton	10	10	0
Sodium Bichromate .. .. .. lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags ..†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd. †ton	5	5	0
Sodium Chlorate .. .. lb.	0	0	3
Sodium Cyanide (100% basis) for export lb.	8d.	to	8½d
Sodium Hydrate (76% C. Soda), f.o.r. ..†ton	19	7	6
Sodium Hydrate (70% C. Soda) .. ..†ton	17	17	6
Sodium Hydrate (60% C. Soda) .. ..†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.) ..†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%) †ton	22	0	0
Sodium Hyposulphite (commercial) ..†ton	9	10	0
Sodium Hyposulphite (photographic) .. ton	15	10	0
Sodium Manganate (basis 25%) .. .. ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool .. ton	13	5	0
Sodium Nitrite, 100% basis .. .. ton	28	10	0
Sodium Perborate .. .. lb.	0	0	11¼
Sodium Phosphate .. .. ton	14	10	0
Sodium Prussiate .. .. lb.	0	0	5¼
Sodium Silicate (glass), Alkaline .. ..†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.).. ..†ton	9	0	0
Sodium Sulphate (Saltcake) .. ..†ton	4	10	0
Sodium Sulphate (Glauber's Salt) .. ton	3	10	0
Sodium Sulphide (conc.), 60/65%.. .. ton	14	10	0
Sodium Sulphide Crystals (casks) ..†ton	9	0	0
Sodium Sulphocyanide (liquid) .. .. lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian .. ton	8	0	0
Sulphur (Roll Brimstone) .. .. .. ton	8	0	0
Sulphur (Texas Gulf) .. .. .. ton	5	5	0
Tartar Emetic, 43/44% .. .. .. lb.	0	1	0
Tin Crystals .. .. lb.	0	1	3½
Tin Perchloride fused .. .. .. lb.	0	1	10
Titanous Chloride .. .. lb.	0	1	0
Zinc Chloride (solution, 102° Tw.).. ..*ton	20	0	0
Zinc Sulphate, Crystals .. .. .. ton	13	10	0
METALS.			
Aluminium (Ingot Metal 98/99%) .. ton	115	0	0
Antimony .. .. ton	44	10	0
Copper .. .. ton	62	7	6
Lead (Chemical Sheet), delivered .. .. cwt.	1	17	6
Lead (Foreign Pig) .. .. ton	31	7	6
Nickel .. .. ton	130	0	0
Silver .. .. oz.	0	2	9 11/16
Tin, English Ingots .. .. .. ton	235	0	0
Zinc (Spelter) .. .. ton	32	11	3
Zinc Dust, 90/92% .. .. .. ton	45	0	0
OILS.			
Cottonseed .. ..*ton	46	0	0
Linseed, Raw .. ..*ton	45	10	0
Stearine, 115-120° M.P. .. .. .. ton	48	0	0
Tallow .. .. ton	42	0	0
Turpentine .. .. cwt	3	12	6

* *Packages extra or returnable; otherwise prices usually include packages*

† Makers' prices for home consumption only

THE

CHEMICAL TRADE JOURNAL

AND

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CONTENTS.

	PAGE
Current Topics:—	
The Fertiliser Situation	759
Powdered Fuel in Chemical Works	760
Low Temperature Carbonisation	760
The Cuban Alcohol Industry	760
Dyestuffs Corporation Reconstruction	760
Fuel Economy in Chemical Works	761
The Rosin Industry and Trade	763
The Uses of Kieselguhr	765
Acid Transport in Carboys and Drums	766
The Nickel Industry	767
Sizing Materials for Cotton Textiles	768
The Oil Situation in Canada	769
Items of Interest	770
Coming Events	771
Ramsay Chemical Dinner	772
Correspondence	772
Legal Intelligence	772
South Wales Notes	772
Resins from Eastern Asia	773
Sulphur in Organic and Inorganic Compounds	773
Patent Rights in Ja an	773
Imports of Chemicals and Allied Products in November	774
Reports of Companies	775
Cumberland Coking and By-product Industries	775
Exports of Chemical and Allied Products in November	777
Trade Inquiries	777
Thirty-five Years Ago	777
Gazette News	778
New Companies	778
The Patent List:—	
Applications for British Letters Patent	778
Complete Specifications Accepted	778
Complete Specifications Open to Public Inspection before Acceptance	778
Abstracts of Latest Complete Specifications	778
Abstracts of Latest Specifications Open to Public Inspection before Acceptance	779
Publications Received	780
Market Reports:	
London "Open Market" Report	780
London Metal Market	782
Manchester Chemical Market	782
Swansea Market Report	782
Liverpool Chemical Market	782
West of Scotland Chemicals	783
Imports of Chemical Products	783
Exports of Chemical Products	786
Prices Current	790

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CURRENT TOPICS.

THE FERTILISER SITUATION.

DEVELOPMENTS in the fertiliser industry during the year which is now rapidly drawing to a close have been most interesting. The position of the nitrogenous fertilisers has strengthened considerably, while, on the other hand, the superphosphate industry is in worse straits than ever before. All hopes of immediate protection for the latter having vanished, the outlook for the British manufacturers of this material is very black. In this country, despite the critical state of agriculture generally, consumption of artificial nitrogenous fertilisers has increased, and this increase has taken place in face of a reduction in the area of arable land and a continued drop in the prices of produce and livestock. Imports of nitrate of soda have steadily risen, and although comparison with pre-war years shows that the total imports are smaller since the war, yet the proportion of the importation used solely for agricultural purposes has risen from about 65 per cent. to approximately 85 per cent. British trade in this particular fertiliser, of course, is very small when viewed in the light of the world consumption of the product, but the general trend of the market is unmistakable. Turning to sulphate of ammonia, the home trade, which absorbed during the year about 40 per cent. of the total output in this country, increased its takings by three or four per cent. on the previous year. This favourable result is due, in a large measure, to the active propaganda work carried out by the Federation of British sulphate makers. Trial plots instituted by the Federation have interested and impressed farmers to an extent much greater than is revealed in the published figures; for there is little reason to doubt that, were it not for the considerable difficulties now being experienced by the agricultural class, the use of fertilisers would be much larger than it is at the present time. But it is in the larger markets of the world that the success of the British sulphate makers is most pronounced. Exports have almost doubled in the past twelve months, the largest individual increase being in the case of Japan, a country which has purchased very large quantities during 1923. It is doubtful whether we shall maintain our supremacy in the Far East, however, when American production is resumed at full capacity, with resulting lower prices. The question of price is the main factor influencing the world's markets at this time, and the high rates quoted in the United States have

resulted in fair quantities being imported from Canada at prices competing with the American product, even after allowing for the tariff. When lower prices prevail, therefore, we may expect to encounter serious competition from the other side of the Atlantic. Nevertheless, it is an encouraging fact that the use of fertilisers is expanding in all parts of the world, and an outlet is assured for all material which can be put on to the market at a reasonable and competitive price.

POWDERED FUEL IN CHEMICAL WORKS.

Powdered fuel and its utilisation, particularly for steam-raising purposes in power plants, is at present attracting a considerable amount of attention in this country. Mr. David Brownlie, in his comprehensive paper read before several sections of the Institution of Electrical Engineers, has summarised admirably the progress made both here and in the United States, and has presented a closely reasoned argument why, in his opinion, the use of coal in the pulverised form is a development in fuel technology destined to make still greater strides in the future than it has done in the past. We understand that the detailed information given by Mr. Brownlie on the use of powdered coal in power-stations is to be supplemented during the spring or early summer by a similar detailed account of the performance of the pulverised fuel installation at the Hammersmith Electricity Works, where, as is now generally known, the central system of coal pulverisation and distribution has been very successfully adopted. The use of powdered fuel firing is not, however, confined to power-generating stations, but considerable progress has also been made towards the modification of the system to meet the needs of ordinary industrial establishments. Some account of this progress is given in the article by Mr. H. W. Hollands and Mr. C. Elliott, which we publish on another page. Particulars are given of the use of powdered coal in Lancashire boiler-firing, and also of the proposal under consideration by one of the largest chemical works in the country to convert their boiler installations to the new system. During the next few weeks we shall publish a further detailed article dealing exclusively with the value of powdered fuel in an average chemical works for purposes other than power generation.

LOW TEMPERATURE CARBONISATION.

The report and accounts just published by the directors of Low Temperature Carbonisation, Ltd., leave little room for doubt that both the commercial and technical success of the undertaking have been realised. During the first seven months of this year there has been a profit of £101,700., and if a similar rate of progress has been maintained during the past five months, the debit balance of £187,700. remaining at the end of last year should now be more than cancelled. For over two years the company has been producing the high-grade smokeless fuel, "Coalite," and it appears that the entire output has been sold at prices equal to that of the best domestic coal. The most illuminating portion of the report is the statement that the company has contracts for forward delivery of 250,000 tons of "Coalite" per annum for four years, and that the purchasers are prepared to increase their contracts to a million tons per annum as soon as that amount can be produced. The marketing of the residual solid fuel at a remunerative price is the most serious problem confronting all low-temperature carbonisation undertakings, and the successful solution of this problem by the Barnsley establishment has been a natural result of the long series of technical improvements that has marked the development of the company. It has been known for some time that the Barnsley plant is being extended so as to be capable of carbonising 500 tons of coal per 24 hours, and that it is also the directors' intention to erect similar 500-ton plants in different industrial centres, so as to supply the local demand for smokeless fuel, motor spirit, liquid fuel, and ammonium sulphate. The information contained in the present report makes it evident that justification exists for these large schemes of development.

THE CUBAN ALCOHOL INDUSTRY

Some interesting figures on the Cuban alcohol industry are contained in a report just issued by the Department of Overseas Trade. The production of alcohol from molasses, both as the pure product and as a fuel for internal-combustion engines, is rapidly becoming a very important item of Cuban industry. This is evidenced by the facts that Cuba contains 37 distilleries, with a capital of over 25 million dollars, and that the industry employs nearly 3,000 men. Most of the industrial undertakings of Cuba are controlled by American or British capital, but it appears that the capital of the alcohol industry is entirely Cuban. In the year 1919 the output of alcohol was in the neighbourhood of 23 million litres, but so rapidly has the industry expanded that in 1922 the total output of alcohol was almost 50,000,000 litres, of which some 18,000,000 litres were converted into motor spirit. At the present moment, however, the industry is passing through a period of depression, owing to the difficulty encountered in obtaining supplies of the raw material—molasses. The gradual rise in the price of sugar, which has been a pronounced feature of the present year, has naturally influenced also the price of molasses, and producers are able to obtain better prices for the sugar residues from overseas customers than from the alcohol distillers. The present supplies of molasses are all in the hands of exporters, and the distillers have been forced to ask for Government support, in the form of partial prohibition of export of molasses.

DYESTUFFS CORPORATION RECONSTRUCTION.

Another step in the reorganisation of the British Dyestuffs Corporation was taken on Thursday, when meetings were held in Manchester of creditors of the Huddersfield and Blackley companies, which are in voluntary liquidation. These meetings were purely formal, and only called for the purpose of complying with statutory provisions.

FUEL ECONOMY IN CHEMICAL WORKS.

WHERE POWDERED FUEL HAS PROVED ITS VALUE.

By H. W Hollands, B.Sc., and C. Elliott, B.Sc.

In a recent article (*Chemical Trade Journal and Chemical Engineer*, November 23, page 605) attention was drawn to the great neglect with which the boilers and steam mains in the average works are treated, but only general remarks were made concerning the heavy item of expenditure, coal, and the equally important matter, the efficient combustion of the coal. In the following article these very vital points are dealt with in somewhat greater detail, and the possibilities of employing powdered fuel firing are examined in the light of the experience that is now available.

Both with hand firing and mechanical stoking several factors affect the efficiency of combustion. The first is the amount of ash, which not only tends to prevent the combustion of the combustible part of the coal, but also renders the combustion incomplete. As a result very large amounts of unburnt carbon are left in the ashes and clinker, and it is by no means uncommon to find very considerable losses in this way, even up to as much as 7 per cent. of the coal bill. W. S. Patterson (*J.S.C.I.*, 1923, 42, 904) gave the results of his examination of the ash from fifteen different mechanical stoker installations. He found that the amount of carbon in the ash varied from 5 to 40 per cent. or from ¾ to over 19 per cent. of the original carbon in the coal.

Another factor affecting efficient combustion is the amount of excess air required over that theoretically necessary. With hand firing and mechanical stoking, the amounts of excess air employed average about 100 per cent. and 40 to 50 per cent. respectively, but considerably higher figures are reached with careless working. The effect of this excess air is to dilute and cool down the furnace gases.

In the opinion and experience of the writers powdered fuel firing offers many advantages in these respects, and will certainly be adopted when its uses are more appreciated and understood. Although powdered coal was first used commercially about thirty years ago in connection with the manufacture of Portland cement and is now almost exclusively used in that industry, it is only within comparatively recent years that the possibilities of applying the system to steam generation and other purposes have been considered. In general there are two systems in use:—(1) The central system, much favoured in America; (2) the unit system which has been developed in England and in France.

The Central System and its Disadvantages.

In the central system the coal is pulverised at a centre and transported as a powder to any number of furnaces that may be included in the installation, the detailed series of operations being as follows: The coal is first crushed roughly, and then passed over a magnetic separator where the whole of the tramp iron is removed. The next operation is that

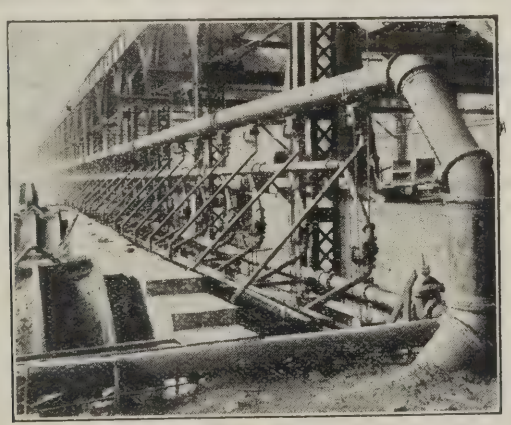

Fig. 1.

of drying the coal, which is effected in various ways. After drying, the coal is passed by means of suitable automatic conveyors to the mills, where it is reduced to the requisite degree of fineness. The actual degree of pulverisation is a debatable point and will be dealt with later, but in general the amount is about 90 per cent. through 100 mesh and 80 per cent. through 200 mesh. After the air has been separated from the coal in suitable separators, the fuel is stored and has to be distributed either by low-pressure air, as illustrated in Fig. 1 (Holbeck System), by screw conveyors, or by high-pressure air. Fig. 2 shows a type of ball mill which is used for grinding the coal, and is included by permission of Messrs. Edgar Allen and Co., Ltd., Sheffield. There are, of course, many types of mill suitable for this purpose. In

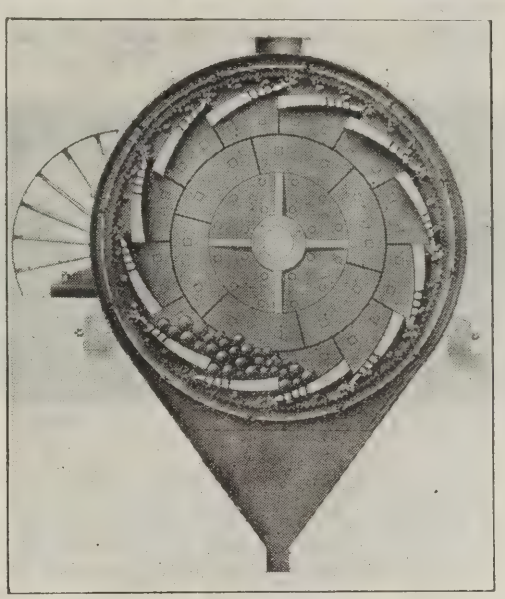

Fig. 2.

the case of the two latter methods it is necessary to have some form of powdered fuel storage at the units being fired, and Fig. 3 shows a typical arrangement. The central system

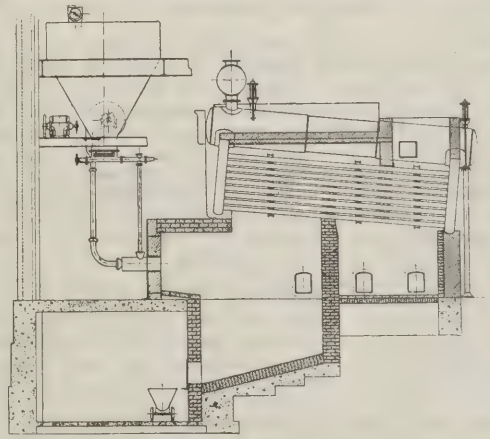

Fig. 3.

from many points of view gives entire satisfaction, and we believe that the plant on the Holbeck System at the Hammersmith Corporation Electricity Works, where three boilers are evaporating 130,000lb. of water per hour, is running with a constant efficiency of about 84 per cent. We would add that this plant is the only one on the central system at present running in England.

The central system of powdered coal firing is, however, open to some disadvantages,* the chief of which are as follows:—(1) Dry powdered coal when stored is liable to spontaneous combustion, and many disastrous explosions have already taken place in America. By taking great precautions, this danger has been lessened, but will probably never be eliminated entirely. (2) In the event of failure of any part of the plant, the entire boiler-house is usually shut

* We note that Mr. G. G. Bell, engineer manager to the Hammersmith Electricity Works, in a letter to *Engineering* of October 21, states: "I am convinced that powdered fuel has a great future. There is a place for each system, but for large-scale operations, such as power stations, the central pulverising house, run as a separate factory for the preparation of the fuel, will prove to be the correct solution."—Ed., *C.T.J. and C.E.*

down since it is not advisable to store more than 15 hours supply on account of the danger mentioned in (1). (3) The plant is very costly and, inasmuch as it is necessary to have dryers, mills, cyclone fans, balloon collectors, etc., it occupies a large area of ground—much more than is usually available in this country, and certainly more than is found in the average chemical works.

The Unit System and the Moisture-Content of the Coal.

The unit system, as its name implies, means one pulveriser per boiler or furnace, and a battery of this type of pulveriser

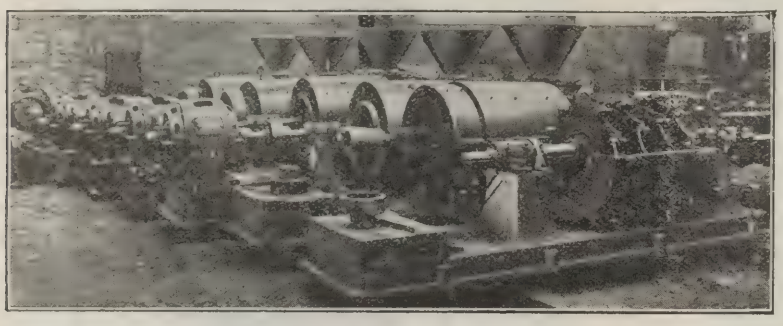

Fig. 4.

is shown in Fig. 4. The pulveriser itself consists of a rotor, a casing with three or more compartments, and a fan. The coal is fed continuously and automatically into one end of the machine, and is rapidly crushed by the revolving blades of the rotor. The fan which is carried on the same shaft as the rotor is at the other end of the machine in a separate compartment. It creates a draught which moves the particles of coal from one compartment to the other, the heavier particles of course moving more slowly than the finer, so that they are completely pulverised. The fan finally mixes the dust with air and sends it to the burner. Air is admitted at the feed end, and another inlet is provided near the fan.

One of the most striking differences between the unit and the central system is the amount of moisture allowable in the coal. In the central system, it is necessary to dry the coal down to about 1 per cent. to prevent choking of the grinding mills. The writers have heard of one Bonnet mill taking coal with 3 per cent. of moisture, but this is an exceptional figure and would certainly represent the largest possible moisture content. On the other hand, the unit type pulveriser can deal with coal containing about 8 per cent. of moisture while, by introducing preheated air from the combustion chamber into the machine along with the coal, coals with moisture contents of 12 to 15 per cent. have been dealt with successfully. Obviously this is a most important advantage as it does away with the necessity for dryers, which are costly and unpleasant machines to work near.

With regard to power consumption the unit pulveriser compares very favourably with the mills when it is remembered that the machine supplies its own air for combustion. There is no doubt that in theory the finer the coal can be pulverised, the more efficiently it will burn, but it is found that, actually, there is a point beyond which any advantage due to increase fineness is more than outweighed by the greatly increased horse-power required. This is shown in the following table:

Output of Coal per hour. lbs.	Horse power.	Fineness. Through 100 Mesh Sieve. Per cent.	Through 200 Mesh Sieve. Per cent.
1,000	21.46	96	82
1,000	13.70	94	75

If the coal will ignite quickly, burning with the minimum of excess air—say 15 per cent.—and leave no trace of CO in the flue gases and no trace of unburnt carbon in the ashes, then the coal is sufficiently fine. As regards the average power for a Turbo pulveriser expressed as a percentage of the power developed by an efficient boiler plant 2 per cent. is a fair figure to take.

Working of the Turbo Pulverisers.

The working of the unit pulverisers presents no difficulties, and they do not call for elaborate precautions to ensure that maximum efficiency is being attained. The coal feed is automatic and can be adjusted easily and rapidly from the machine's smallest output to a heavy overload. On the unit plant a magnetic separator is not required, as a relief pocket is provided in the machine itself into which tramp iron drops by gravity. Fig. 5 shows the tramp iron collected from this pocket after 70 tons of Midland coal had been passed through the pulveriser. The first cost of these units

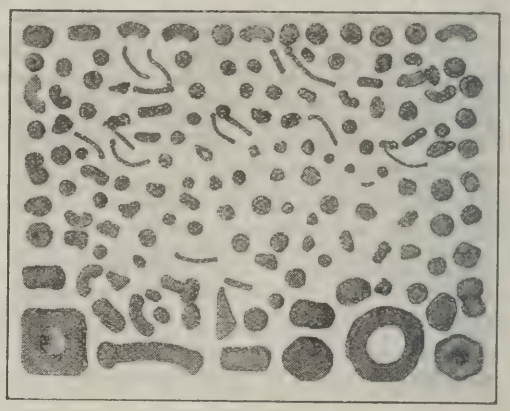

Fig. 5.

is low, the space occupied is small, there is no risk of explosions since the powdered coal is used as it is made; and lastly, if the machine or motor breaks down, only one small unit is shut down instead of, as in the case of the central system, the whole plant.

The application of powdered fuel is probably the most difficult of all its branches. It is not enough, having made a machine which will give the required degree of fineness, to blow the coal *via* a burner into a firebrick chamber. The shape and volume of the combustion chamber, the direction and length of the flame, the position of the ash and slag doors have all to be considered. A large combustion chamber is always required, but in order not to lose much by radiation, due regard must be paid to its arrangement.

As already stated, the unconsumed carbon in the ash taken from a stoker or a hand-fired furnace is usually high and averages 12 to 15 per cent., and cases have been known where this figure has been as high as 40 per cent. In a powdered coal-fired furnace the carbon content of the ash should never exceed 2 per cent., and should usually be under 1 per cent.

No Trouble from Damaged Brickwork and Ash Slag.

A number of objections have been raised to powdered coal firing, on the ground that it causes serious damage to the brickwork. In early days this was possibly a fact, due entirely to the too high velocity of the coal entering the combustion chamber. Experience has shown, however, that not only are these high velocities unnecessary, but that they are certainly detrimental to the efficient working of the boiler and to the life of the refractories, since apart from all other reasons, they cause impinging on, and thus serious scouring of, the furnace walls. The velocity should be such that it is just high enough to prevent deposition of the heavier particles of coal in a main, and further it should allow the flame more or less to meander into the combustion chamber and through the tubes.

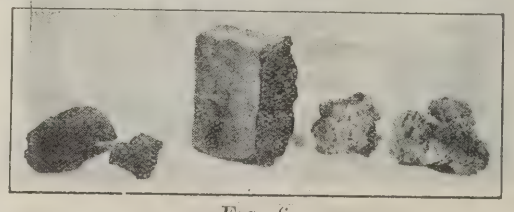

Fig. 6.

In a properly-designed combustion chamber, the dust or incombustible ash will be deposited either completely dry or slightly nodulised, and can be raked out at any convenient time without stoppage of plant. Fig. 6 shows some samples of nodulised ash, together with a brick taken from the arch of a powdered coal-fired furnace, and it will be noticed that

the brick has taken on its surface a natural coating of slagged ash which forms a very good protection. To illustrate how completely immune are modern plants from damaged brickwork and slag ash troubles, the writers recently inspected in London a B. and W. boiler which has been fired with a turbo pulveriser for two and a half years. No money had been spent on this combustion chamber for the last 22 months, and yet this was still in most excellent condition. The life of the tubes in a water tube boiler fired with powdered coal is certainly as long as in a boiler fired by any other means. "Bird nesting" or the deposition of a sticky mass of unconsumed carbon on the water tubes should never take place, and although there is usually a small deposit of very fine dry dust on the first row of tubes, this can easily be removed by means of a steam blower.

Tests at Large British Chemical Works.

Probably the biggest saving in the use of powdered coal is the ability to burn, efficiently, a very cheap form of fuel—that is, one usually too small to use on a mechanical stoker or hand-fired grate. Tests have been made on a coal containing 43.7 per cent. ash and costing 2s. at the pit and a temperature of over 1,400° C. was obtained, using this coal in a welding furnace. In this connection it is interesting to examine the proposal which is at present being considered by a large chemical works in this country. Their existing plant consists of 6 B. and W. boilers, five of which are running at an average efficiency of 75 per cent. Each boiler burns 100 tons of coal per week, the total weekly coal bill being in the neighbourhood of £600. The proposal is to equip these boilers with turbo pulverisers with a guaranteed efficiency of 82 per cent. Coal is available at 10s. a ton, and the total cost of the coal into the boiler comes to 12s. per ton, including grinding, maintenance, etc. The total overall cost of the plant including dismantling and equipping with combustion chambers, pulverisers, motors, etc., comes to £8,500. The gross saving amounts to no less than £224. per week or £11,650. per annum. Thus allowing 10 per cent. interest and depreciation, the net saving would be £10,800. per annum or in other words the expenditure would be recovered in 10 months.

Powdered Fuel in Lancashire Boiler Firing.

So far the remarks on the application of powdered fuel have been confined to water tube boilers, since any difficulties in this connection have been overcome. The firing of Lancashire boilers has presented considerably more trouble, and it is only with recent months that a successful application has been achieved. In the following table the efficiencies obtained with two water tube boilers and two Lancashire boilers are given, and these are typical of unit pulveriser installations. Attention should be paid particularly to the Lancashire boiler efficiencies, as a great many chemical works—probably the majority—use this type. An efficiency of 68.1 per cent. with 9,050B.Th.U. refuse-tip coal and 71.4 per cent. with dried washery slurry of 9,720B.Th.U. is well worth consideration, especially as neither economisers nor superheaters were used.

Type boiler	B. & W.	B. & W.	Lancashire	Lancashire
Type pulveriser	Turbo C.R. 2	Turbo C.R. 4	Turbo C.R. 2	Turbo C.R. 2
Heating surface of boiler	2,690 sq. ft.	5,764 sq. ft.	28 × 7	30 × 8
Heating surface of superheater	248 sq. ft.	1,864 sq. ft.	none	none
Fuel used	Fine slack	Durham splints	Dried slurry	Refuse Tip Dust
Grade	⅜ inch	½ inch	—	
Moisture	10·7 per cent.	0·93 per cent.	1·0 per cent.	10·1 per cent.
Ash	12·8 ,,	33·16 ,,	24·0 ,,	22·2 ,,
Fixed carbon	55·0 ,,	41·24 ,,	50·0 ,,	—
Volatile	22·5 ,,	24·67 ,,	25·0 ,,	—
B.Th.U., per lb.	10,788	9,550	9,720	9,050
Pressure (lb. per sq. in.)	99	180	86	120
Feed temperature	106° F.	142° F.	59° F.	128° F.
Superheat temperature	424° F.	644° F.	—	—
Efficiency, boiler	—	—	71·4 per cent.*	68·2 per cent.*
Efficiency, boiler and superheater	77 per cent.	74·2 per cent.	—	—
Efficiency, boiler, superheater, and economiser	86 per cent.	83 per cent.	—	—

* This efficiency includes the water-cooled neck. It should be explained that the external combustion chamber is connected to the flues of a Lancashire boiler by means of a neck. This neck is water-cooled, the water passing into the feed pump.

In a further article the writers will deal with the application of powdered fuel-firing to processes in chemical works and other kindred industries. The writers are indebted to J. S. Atkinson, The Powdered Fuel Plant Co., Ltd., London, for some of the information in the present article.

THE ROSIN INDUSTRY AND TRADE.*

A SURVEY OF THE WORLD'S RESOURCES AND POSSIBILITIES.

THE chief districts of the United States, where the rosin industry is carried on, are located in the South-East corner, including: North Carolina, South Carolina, Georgia, Florida, and Alabama. The industry may be said to have started in 1584, when Philip Amadas and Arthur Barton landed on the shores of North Carolina, and in their report to Sir Walter Raleigh they emphasised the importance of the pine forests of species unknown to Europe, which they found in the immediate vicinity of their landing. It was twenty-two years after Raleigh's first expedition came to the islands off the coast of Carolina, that the French, in an amateurish, and certainly a small way, began what was probably the first Naval Stores operations in America.

Early Days of the American Industry.

In 1664, to encourage the production of tar, and pitch, in both Virginia and Maryland, these commodities were ordered to be admitted into England for five years without being subjected to any duties—England at that time importing tar and pitch, together with other tree products, from Denmark, Norway, Sweden, and Russia. In 1753 the exports from North Carolina plantations had risen to approximately 10,500 barrels of gum, or, as it was termed at that time, turpentine. Prior to 1764 inspection laws had not been formulated. A law of this date conveys an adequate idea of the endeavours to ensure proper packages and maintain the quality of their contents. This act to "prevent the exportation of unmerchantable commodities," provided that no tar, pitch, or turpentine should be exposed for sale for exportation until duly inspected under the regulations. Various Justices of the Inferior Court were directed to appoint inspectors throughout each producing district. Barrels were made standard, and the contents in each case were to be weighed in the inspector's presence, and every 322lb. weight, including the cask, and so in proportion, should be accounted a lawful barrel. Also every barrel found cleaned, well filled and truly made merchantable, and passed by the inspector, should be by him branded. Many attempts were made to avoid inspection, and consequently much inferior rosin and gum was exported.

In 1778 the newly formed American Commonwealth charged a fee of 2d. per barrel for inspection of pitch and turpentine. From this point the industry developed with remarkable speed, so that by 1840 the production of crude turpentine and rosins for the State of North Carolina was given as 593,451 barrels. In 1840, there were 1,526 turpentine stills in the State. In 1890, the number had dropped to 174 plants, and in 1905 only 87 plants, with an output of 65,000 barrels of rosin per year, were in existence. The industry in North Carolina is almost now non-existent.

Extraction of the Gum from the Tree.

The chief trees from which rosin is obtained are: Douglas Fir, Maritime Pine, Cuban Pine, Slash Pine, Loblolly Pine, Longleaf Pine, Shortleaf Pine, Pitch Pine, and the Western Yellow Pine, also the Scotch or Wild Fir. The Shortleaf and Loblolly Pine are sometimes referred to as North Carolina Pines, and the Longleaf, Shortleaf and Cuban Pines as Southern Yellow Pines.

The general method of extraction in use is to open a face on the tree at the base, and fix a metallic apron, which would divert the exuding gum into a small cup placed below it. The cupping is done in the winter months, between November and March, when the sap is dormant. Sometimes a box system is used, which means cutting into the stump at the base of the tree, to collect the gum from the prepared face immediately above. The cup method, although more expensive than the old box method, is preferable both to the turpentine operator and the lumberman, for the reason that the incision required for the cup is only a slight one, and by no means damages the tree in the slightest degree, where it is properly and judiciously operated. It also produces a better yield, in quantity, and higher grades of rosin.

The gum is removed from the cup or box by means of a "dip iron," which is somewhat similar to a large tablespoon,

* Abstract of paper read by Mr. B. L. Morgan to the Manchester Division of the Paper Makers' Association of Great Britain and Ireland on March 9, 1923. From the *Proceedings* of the Technical Section of the Association (Sept., 1923, Vol. IV., Part I.).

and transferred into a bucket or similar container, from which it is emptied into barrels, and taken to the distillery.

American Rosin Distillery Practice.

The copper kettle and worm, and general arrangement of the average distillery, have been substantially the same for the past seventy-five years. The still itself ranges in capacity from 400/1,000 gallons—the average size being seven feet at its greatest diameter, and about five feet high, with a concave bottom and semi-spherical top connected to the worm. The diameter of the worm is 6/8in., tapering to 3in. at the outlet. The total length is approximately 140ft., comprised of seven turns, and is about 6ft. in diameter and 7ft. high. The kettle is set in a circular brick furnace, fitted with proper flues, and is generally fired direct with wood. In the base of the still is an opening of about 8in. wide, to which is attached the tail pipe or outlet for the residue or rosin, extending through the furnace wall, and is fitted on to the outside end with a quick-opening slide valve, where connection is made by a trough to a succession of wire cloth filters placed over the rosin reception vat.

Except at the most advanced plants, the basic features of the distillation are the same everywhere. The kettle being filled with crude rosin or gum to about 75 per cent. of its capacity, the furnace is fired up, and the distillation started as soon as the temperature of the mass reaches the boiling point of water. A small continuous stream of water is introduced in the still after about one-third of the distillate has come over. A good fire is kept under the kettle until the percentage of turpentine coming over with the water, or low wine, as it is then called, is too small to justify further firing. The water is now cut off, the fire withdrawn, the still uncapped, and the charge run out into the strainers through the filters to the rosin vat.

Much depends on the ability and knowledge of the man in charge of the still as to what grade of rosin is produced. The pine rosin, as it comes to the still, contains more or less water, depending upon the amount of exposure the gum has had and the rain that has taken place prior to the dipping. The man in charge of the still, by constant practice, is able to tell the height of the mass in the still by what is termed "sounding," and he endeavours by adjusting the water supply, or the heat supply, to keep the mass regular. At the same time, if he does not keep enough fire the cooling mass becomes more viscous, thus imprisoning more vapour, and increasing the volume, and finally causing the still to boil over, with loss of rosin, and a danger by fire.

Factors Influencing Quality of the Rosin.

Many influences have to be counteracted in the production of rosin, and amongst them are the following:—1. The exposure of the gum to atmospheric conditions. 2. The amount of dirt, wood particles, and other foreign matter in the gum, mixing low-grade with high-grade gum. 3. The colouring matter that is introduced from metal aprons and cups and the chemical action which takes place between the gum and these receptacles. 4. Distillation: (*a*) By heating too fast at the time of firing up; (*b*) delaying too long in the introduction of water; (*c*) by a constant fluctuation of the temperature and corresponding rise and fall in the mass in the kettle; (*d*) by prolonged heating; (*e*) overheating or carbonising; (*f*) by "holding" the charge at too high a temperature. 5. In handling by bad straining through faulty, dirty, or torn batting: (*a*) By turning into the rosin vat, that has recently held a charge of lower-grade product; (*b*) delaying dipping rosin or dipping at too low a temperature.

The French Rosin Industry.

The main difference between the tapping methods in France and America is that the width of the face and the annual rate of increase in height and the number of faces per tree are increased by the French method. There are three methods of distillation in France. Crude distillation, which consists of heating by an open fire of the receptacle into which the gum has been poured, just as it arrives from the forest. The result is the best as regards quantity, but the quality is not so good. The turpentine is satisfactory, but the better pale rosins cannot be obtained by this process. Steam distillation differs from the process above, inasmuch as the necessary temperature is obtained either by hot water under pressure, or by a steam under high pressure, or by super-heated steam. The boiler also serves for reheating and filtering the gum, and tends to improve the colour of the rosin. Distillation by vacuum is an improvement on the preceding process. Its principal advantage is a great economy in fuel and labour, and further it gives better pale rosins. The rosin is run into barrels which are made at the works, and contain about 40 gallons—or the liquor, still hot, is poured into large shallow trays and exposed to the sun, with the object of bleaching it. This, however, is done with rosin that is already pale, and not with anything inferior to "N" and "W.G.," except in very rare instances when the difference in price makes it worth while.

The Mining of Old Rosin Dumps.

Turning again to the American supplies, from the day the distillation of turpentine from the crude gum began, until as late as 1892, the molten rosin from the still, instead of being run into barrels, was frequently turned into a channel that led it into a convenient pool, or river, or to a hollow in the land. It is one of the romances of the rosin industry that the inception of rosin mining came from a Federal soldier of Sherman's army, when on a march to North Carolina he learned of a large bed of rosin near Angier, and returning some time after the cessation of hostilities, bought the right to work this rosin, and had the distinction, as far as is known, of being the first man to become a rosin miner. Prices at this time had risen high enough to make the venture profitable. How many thousands of barrels of rosin were mined, nobody can guess, but a rough estimate would show well over 100,000 barrels. Mining is still carried out, and within a few miles of Jacksonville, N.C., along the curve of a lake near by, the Federal Forces, during the Civil War, found thousands of barrels of rosin had accumulated, and one day an order came from the Confederate Commander of the district that all turpentine and rosin not removed within ten days to a place of safety would be destroyed. As it was impossible to convey the rosin across miles of country, the amount was set fire to, and the heat caused the rosin to melt and find its way into the lake, and soon a perfect river was pouring into the water and becoming a solid mass. To-day it awaits the construction of a dam, and the pumping of the water that conceals it, and it will soon be available for straining and placing on the market. One thousand five hundred barrels of rosin have already been taken from this one particular bed, but the main source is believed not yet to have been touched.

Commercial Customs in the Rosin Trade.

Prior to the recent war the world's consumption of rosin was approximately 2¾ million barrels of 500lb. each. Of these the United States had approximately supplied 2,150,000, with France next on the list, followed up by Spain and Portugal, Greece and India. The rosin trade may be considered a most interesting one, although not as "spectacular" as that of its sister product "turpentine," but considerably larger in its volume of actual consumption. As is well known, rosin is imported into this country by numerous firms, and sold either ex ship on c.i.f. terms or ex wharf. Until the Government control, which became necessary during the war, the article was subject to 2½ per cent. discount on ex wharf terms, but since that time, I believe, all prices have become strictly net.

The grades most sought after are grades "B" and "C," known as "common strained," "F" and "G" known as "medium," "N," "W.G.," and "W.W.," known as "three tops." Competition is keen between America and France, also Spain, for the better or paler qualities, although during recent times France has become a powerful rival in "F" and "G" grades, both for home consumption and export. The general terms on which these rosins are sold differ in one or two respects only from the American method—the allowance for tare being only 7 per cent. in casks, as against 20 per cent. by the American, in barrels six to the ton net.

Relevant Statistics.

A glance over a period of twenty-five to thirty years will show the wonderful advance which has taken place in the production and consumption of rosin. Round about 1895 it was quite an easy matter to buy rosin at £3. to £5. per ton, according to quality, but since that time, owing, of course, to exceptional circumstances, the price rose to £70. to £75. per ton.

Relative imports of rosin from a few countries in 1920 show as under:—

	Tons.
United States	31,250
France	22,500
Spain and Portugal	4,800
Other sources	1,800

These are approximate figures. In 1913 the imports were:—

	Tons.
United States	66,700
France	9,700
Spain and Portugal	8,400
Other sources	3,300

It will be noticed that the American rosin has decreased by 50 per cent. The French imports have increased over 100 per cent. Of course, besides the competition between America and France, trade conditions have played a very important part, and the consumption of rosin generally has been lower since the war than immediately prior to it.

In 1900 we imported over			90,000	tons.
,, 1905	,,	,,	80,000	,,
,, 1910	,,	,,	75,000	,,
,, 1915	,,	,,	102,000	,,

which marks the high level of rosin imports, whilst in 1920 the imports were round about 60,000 tons.

Germany's War-time Efforts.

At the outbreak of war it appeared that the supply of rosin, in Germany, was comparatively small, and that the production of that country, from the pine tree, was insufficient to cover the requirements of their industries. Attempts were therefore made to produce rosin from the fir tree, and as the American method could not be considered under the prevailing conditions, a method which is used in Austria was adopted. Although the result at the beginning was not a bad one, methods were attempted to increase the production by means of a brush-hook. This is an instrument which scratches the face of the tree in a so-called "Fish-Bone" manner. Heavy cuts in the tree are thereby avoided, and cups are used to catch the gum at the base. In some instances more rosin was produced in various areas than had previously been done, but nevertheless the supply was less than the demand. Numerous substitute rosins were manufactured, and tree roots and light wood, or stumps, in the occupied territories, were taken for the manufacture of rosin from various pine oil extracts. During the war special distillation plants were sent to the forests of Poland, Austria, and Russia.

The Future of Russia as a Rosin Producer.

It is evident that when the paper and allied trades do pick up, and resume their former prosperity, that new areas for the production of rosin will be looked for, and not only will new sections be developed in America, but also, I think, it is quite possible that Russia will, in the near future, become one of the first sources of rosin.

It has been said in some quarters that the supplies from the United States are decreasing rapidly, but I might say that although the supplies of timber available are certainly decreasing slightly, strong efforts are being made by the various Forestry Commissions to resuscitate the timber wealth of America by planting new areas, and so prolonging the life of America as a rosin producing country, than would be the case if re-afforestation did not take place. The idea of a rapid decrease in the supply of rosin from America twenty years hence must, therefore, be taken as erroneous. In Russia labour will doubtless be fairly cheap in the coming years, and there lies before the prospector huge territories of rosin-bearing trees. With a stable Government re-established, and outside capital absorbed and protected, as it must be some day, and modern scientific methods brought in, Russia will surely hold her own as a producer of rosin. In the Archangel district of Russia, prior to 1914, approximately 80,000 barrels of heavy pitch and tar were exported. The method of manufacture was almost entirely in the hands of the peasants, and the method of extraction was very different to that in use in America. It is interesting to know that the tapping of the common pine began in Russia in 1780, on the initiative of an Englishman, and developed at first in the Vel district of the Vologod Government, and then in the Shenkur district of the Archangel Government, which is now called the "Vazh" area. Now a large quantity of American rosin and turpentine is imported into Russia, notwithstanding the high duties on the product of tapping. The Russian methods generally were very crude, and attempts were made to improve the methods, and to a certain extent tapping is being resorted to. The rosin thus produced is said to be as good as French or American rosin. In view of the enormous area of the pine forests in Russia, it is a deplorable fact that modern methods have not been brought into play in that direction. One great difficulty met with in Russia is that the final product varies much in quality.*

Discussion.

The Chairman, Mr. T. N. Nuttall, in opening the discussion, said: The author rather indicated that there was some kind of control adopted in tapping in the United States, but he did not make that point quite clear. The paper might have been a little clearer as to how we get the various grades of resin. From the small samples shown it was evident there was a very wide range of grade and quality, and it would be very interesting to know how that grading is carried out and what really causes the difference, and how the difference in the colouring of the resin comes about. I find in 1915 that we imported 102,000 tons of resin; that in 1920 we only imported 60,000 tons.

Mr. R. H. Parker said he had always understood that the colour of resin depended on the period when the trees are tapped, the early tappings giving the pale resins, and the late tappings yielding the darker grades.

Mr. Morgan, replying, said the tapping control was worked chiefly under the United States Department of Agriculture and the Forest Service, along with the Bureau of Chemistry. Inspectors were also present at Savannah, the chief point of export, and they worked under State Regulations. Inspectors were also present at Jacksonville and Brunswick and New Orleans. Sales were chiefly controlled by the Savannah Board of Trade. Inspectors worked under licence. Grading is carried out under the supervision of State officials, and the colour, which is the chief factor, is determined by means of a Lovibond Tintometer. Over-boiling causes partial carbonisation, and so deepens the colour of the resin produced. He recently visited a paper mill where trouble was being experienced owing to the machine wire being clogged with a dark organic substance which was found to be pitch, due to over-boiling of the resin in the still. He agreed with Mr. Parker's remarks that the early tappings give the pale resins, and the later ones the darker grades, which is due to the more viscous gum from the heartwood coming forward.

THE USES OF KIESELGUHR.

Diatomaceous earth, when properly prepared, finds a use in a number of industries. Its value depends on its silica content and the shape of the individual skeletons. Its three largest uses are probably (1) as an abrasive material; (2) as a heat insulator; and (3) for filtration.

As an abrasive material it has found considerable favour on account of the extreme hardness and minuteness of the grains, as well as their sharp cutting power. In this connection it is used extensively in metal polishing, and in soaps for scouring.

The great porosity of diatomaceous earth makes it a non-conductor of heat, and this property, together with its extreme lightness, has caused it to be employed extensively as an insulating material, for covering high pressure steam pipes, for linings of furnaces, and in many places where a high grade fire-resisting insulating material is required. As a filtrant it may be used directly as the filter body or added to the filtering medium to keep it porous. It has also been found to have considerable decolourising power, and has been employed to a small extent like fuller's earth, in the filtering and decolourising of vegetable or mineral oils.

Owing probably to the fact that a considerable portion of the silica present in diatomaceous earth is present in a form soluble in alkali, the purer varieties are used in the manufacture of silicate of soda (water glass) in preference to the less easily soluble powdered quartz. For this purpose however, only the purest grades, free from iron, are suitable. To a small extent, it is employed in the manufacture of dynamite as an absorbent of nitroglycerine. It enters as a methods, and to a certain extent tanning is being resorted be some day and modern scientific methods brought filler into the composition of rubber, sealing wax, phonograph records, fertilisers, and wherever a light and inert filling agent is required.

* In this connection see also the series of articles entitled "Russian Turpentines," by B. A. Smirnoff, in the *Chemical Trade Journal and Chemical Engineer*, April, 1923.—Ed., *C.T.J. and C.E.*

ACID TRANSPORT IN CARBOYS AND DRUMS.*

SAFETY METHODS IN AMERICAN PRACTICE.

TO one of many years' experience in the handling and use of sulphuric acid in various industries, the crudity of the methods sometimes used is indeed surprising. I am impressed as a safety and operating man with the fact that a great deal in the way of education should be done by the chemical companies in promoting the best possible methods of handling sulphuric acid not only in the producing but also in the consuming plants. Apparatus used by many consumers of acid, not only sulphuric but other acids as well, is very crude and constitutes in many cases a direct risk to human life.

A great bulk of the hydrochloric acid handled in the United States is by means of the carboy, despite the use of transportation tanks by some of the large users. A great deal of the sulphuric acid goes out from the producers in carboys. It is, therefore, important to the acid industry that the handling of carboys and the perfection of the carboy package should receive due consideration. During the past year one of our large railway systems has endeavoured to cut down the 12½-gal. carboy to a 5-gal. package, with intent to reduce the risk of handling.

The chemical industry cannot effect improvement in the package methods or handling methods without the aid of those who use as well as of those who produce the acid. Safety in the chemical industry is not only safety in the chemical plant itself. Consumers are urged, especially small users, that, prior to the return of empty carboys, they be washed out with water.

Containers used for the transportation of acids must combine in themselves the necessary strength to endure reasonable transportation strains and ability to withstand the action of the product. Glass bottles come within the latter range and the jacketed carboy is generally used because it meets the two requirements mentioned. The carboy cannot be considered a fragile container, but there are definite limits to its shock-resisting strength. A broken carboy *en route* means possible damage to merchandise as well as danger to workmen who may not be informed as to the proper method of dealing with such leakage.

Machine to Determine Carboy Strength.

The insistence, therefore, has been for a stronger, bettered-conditioned carboy and the adoption of regulations which would automatically eliminate the unfit. The Manufacturing Chemists' Association of the United States, upon invitation by the Bureau of Explosives, undertook a study of the problem. Up to this time the Bureau required semi-annual dropping and swinging strain tests, but these were shown to be ineffective because, with the old type swing apparatus, the tests were susceptible of such manipulation as to make them unreliable. As a result some carboys were in use which could not be considered other than below standard. The Investigating Committee devoted much time, pains and money in determining: (1) a machine that would give an approximately perfect swing strain test; (2) in making experiments to determine a reasonable strain test requirement; and (3) in the study of the conditioning of carboys, perfecting of seals, etc.

After exhaustive tests a swing test machine was developed that is practically fool-proof in operating, giving an accurate gauge of the shock-resisting strength of the package. This machine became officially operative on January 1 of this year. With a standardised testing machine so developed, it became necessary to determine the shock to which carboys should be subjected as a minimum requirement. This was a difficult matter, for it was necessary to consider: (1) the elimination of a large number of carboys in circulation, which were not equal in strength to other or better-conditioned types; and (2) the reasonable average strain to which these better-conditioned types should be subjected.

In approaching this problem the committee synchronised, by means of service tests, reasonable shocks sustained by railroad cars with shocks sustained on the swing testing machine. This information was obtained by loading a car of carboys (carboys filled with water) braced according to the best practice and bumping it at varying speeds against a substantial semi-rigid obstacle consisting of a string of cars with brakes tightly set. The test car was provided with a sensitive shock-recording machine. The speed of the test car was accurately determined for each shock test, so that the records were obtained at speeds ranging from five to nearly ten miles per hour. The results of these tests, when applied to the carboy swing testing machines, was the determining of a swing test component of 55 inches—equivalent to a railroad speed or collision shock of nearly eight miles per hour.

The Sealing of Carboys.

It had been definitely determined through study of actual practice over an extended period, that much of the material damage, as well as most of the burns sustained by workmen, were caused by defective or inadequate seals. The old method of placing a vitrified stopper on the lip of a carboy bottle, covering it over with a cast made of plastic clay or calcined plaster, and then covering it over with burlap secured with twine, no longer sufficed. This seal had the appearance of solidity, but not the necessary strength; it also was convenient as a hand rest for moving the carboy, and so added to its risk.

After careful and exhaustive tests a new type of seal was developed which has been made standard. This may be described briefly as follows: A compressible gasket of acid-resistant material; a porous earthenware stopper, which is acid-leakage proof, but permits of no pressure being built up in the carboy; and a metal mechanical seal, which effectively secures the stopper in place. This gives a seal which is strong, safe and reasonably free from damage, at a nominal cost.

A further source of danger to both workmen and merchandise is in the use of carboys with chipped lips, as such a carboy cannot be sealed with entire safety. A machine has been developed which will surface away the depression in the lips,† thus leaving a perfect surface on which to seat the stopper gasket. The time is very close at hand when damaged lip carboys will be barred for transportation service. Conformity to Interstate Commerce Commission regulations governing the conditioning and sealing of carboys is now assured by the revised regulations, which became operative on January 1, 1923, which provide that one of the semi-annual service tests required shall be made in the presence of a Bureau of Explosives inspector. These tests are mandatory at all plants or stations where carboys are repaired and filled.

Safety Precautions for Transport in Drums.

It might be supposed that a steel container would represent the maximum of strength and efficiency in the course of transportation. There are, however, many variables, which must be taken into consideration:—(1) The drum must be made of metal of sufficient thickness to withstand severe strains and the deterioration incident to its service; (2) it must be free from carbonised or oxidised spots in the welded seams; and (3) the inspection and testing service before filling should be efficient and carefully supervised.

Occurrences are exceptional where a drum sheet or head gives way in the metal. The 12-gauge requirement for 110 gallon and 14-gauge for 55-gallon 5-A drums are deemed ample protection. Careful operators, however, provide for natural wear and tear by placing a minimum weight at which drums are automatically withdrawn from acid service. This should be common practice. It has been found that drums constructed of dissimilar metals are subject to electrolytic action, which greatly accelerates deterioration of the metal. It is, therefore, important that the drum sheet, welding metal, collars and plugs be of similar metal. A smooth inside surface, free from corrugations for rolling hoops, is desirable as these depressions tend to hold drippage from emptied drums and thus to localise deterioration. Coarse threads should be cut for plugs and drum collars as a better resistant against acid action and providing a stronger seal. Gaskets made of acid resistant material, such as asbestos, should invariably be used under the plugs.

All users of acid in drums should observe scrupulously the rule of storing filled drums in a cool place and never expose to the direct rays of the sun. Full drums when stored for any length of time should be stored with plugs on top and loosened frequently to release any pressure which may have accumulated. Many explosions have resulted through neglect of these simple rules.

* An address by Maurice F. Grass (of the Grasselli Chemical Co.) before the Chemical Section of the National Safety Congress, Buffalo, N.Y., Oct. 3, 1923. Abstracted from the *Chemical Age* (New York), Nov., 1923.

† See also the *Chemical Trade Journal and Chemical Engineer*, January 12, 1923, p. 44, and April 6, 1923, p. 419.

Many concerns who store drums, wash them out in slack periods. As regards those used for the shipment of sulphuric acid, washing, often imperfect, serves to dilute the acid, whereby the metal is attacked. Investigation of accidents arising from drum explosions often reveals that the drums were beneath standard. An ordinary drum will weigh about 21lb. When that drum deteriorates to around 19lb., danger is imminent. Repaired drums should be subjected to a hydrostatic pressure of 15lb., which will compensate for any ordinary expansion of acid due to change of temperature.

THE NICKEL INDUSTRY.*

PRODUCTION, METALLURGY AND USES.

THE nickel industry is of comparatively recent date. Although alloys of nickel have been found as Bactrian coins of the year 235 B.C. and ancient Chinese alloys of unknown age containing nickel and copper exist, the metal itself has only been produced on any considerable scale since the early part of the nineteenth century. Indeed, until after the discovery of the New Caledonian nickel deposits (about 1890) nickel was regarded as a somewhat rare metal, and its high cost prohibited its use except for a few special purposes.

The progress of the industry in later years is indicated by the fact that whereas the world's total production of metallic nickel for the year 1900 was given as 7,526 metric tons, the production of Canada alone, estimated at 80 to 85 per cent. of the world's output, for 1918 amounted to 48,886 short tons. As to the many uses for nickel, it is stated that upwards of 75 per cent. of the total output is employed in the production of the various kinds of nickel-steel alloys known under the general term of "nickel steel." The value of nickel steels in industrial engineering is rapidly becoming more appreciated, and it is safe to anticipate a progressive increase in their employment, as their cost of production is cheapened.

The cost of metallic nickel is high, owing to the comparative scarcity of nickel ores, their low nickel content, and the somewhat costly metallurgy of the extraction of the nickel from them. On the other hand, certain nickeliferous iron ores contain nickel in sufficient quantities to yield ultimately a low nickel steel of good quality, the value of which is enhanced by the presence of chromium, which almost invariably accompanies the nickel. Such ores exist in enormous deposits in various parts of the world, the most notable being in Cuba, Greece, Borneo and Celebes.

The Most Important Nickel Ore Deposits.

Another possible source of low nickel steel, which has not yet been exploited, is in the blast furnace slags resulting from the smelting in Ontario of the Sudbury nickel ores. Of all known deposits of nickel ore these Sudbury deposits are by far the most important. At the end of 1916 it was stated that the ore which might ultimately be obtained from them would probably exceed 150 million tons, which would be sufficient to maintain the normal annual output for a century.

Other known deposits of nickel ore within the Empire are in Tasmania, South Africa, India and Egypt. So far as they have been explored, they appear to be comparatively small, and as sources of supply of nickel ore are not likely to be seriously exploited so long as the large Sudbury deposits are available. Nevertheless, they constitute a useful mineral asset. Of nickel deposits in foreign countries those of New Caledonia are second in importance in the world to those of Sudbury. For some years past Norway has produced appreciable quantities of nickel from native ores, but so far as is known the ore reserves are not large. A considerable tonnage of low-grade ore is mined in Germany, and it is reported that in Austria during the war old mines were reopened, and, although the ore available was also low-grade, a large quantity was mined.

The Metallurgy of Nickel.

The ores of nickel, whatever their type, do not readily lend themselves to ordinary methods of concentration. The usual metallurgical practice is first to smelt partially roasted ore directly in blast furnaces to obtain a matte of iron, copper and nickel, which practice, while costly, has the advantage of a high recovery of the nickel content, and also of collecting the greater portion of any precious metals the ore may contain. The second stage consists of smelting the partially roasted material with due proportions of coke and flux in a blast furnace. The pyrrhotite in these ores is almost entirely converted to silicate of iron in the blast furnace. The matte now consists of a mixture of practically iron-free copper and nickel sulphides.

The treatment of enriched matte to produce refined nickel has hitherto been carried out by three principal methods known respectively as the Orford, the Mond and the Hybinette methods. Only the outlines of each process are given here.

Orford Process.—The matte is fused with a given quantity of sodium sulphide, the result of which is that the upper and more fusible layer will contain most of the copper and the iron, if any, and the bottom layer, nickel sulphide chiefly. The separation can be made practically complete by one or two repetitions of the fusion. The two products are tapped separately from the melting furnace. The nickel sulphide is washed, dried and roasted with salt. By this treatment it is converted into insoluble oxide, while the copper is converted into a soluble chloride and can be dissolved out. The nickel oxide is reduced to a form of nickel suitable for marketing. The process is said to yield nickel 99 per cent. pure, but is believed to result in the sacrifice of a large proportion of the precious metals. It is by a modification of this process that the valuable alloy of nickel and copper known as monel metal is produced.

Mond Process.—The Mond process is one of great ingenuity, and depends upon a series of remarkable chemical reactions. The bessemmerised or converter matte is roasted down to about 2 per cent. sulphur. This treatment is followed by a leach with a 10 per cent. solution of sulphuric acid, by which about 70 per cent. of the copper content is dissolved out, but very little of the nickel. The solid residue, washed free of acid, is transferred to the top of a "reduction" tower, in which it slowly descends, meeting in its passage an upward stream of water gas. This gas reacts on the nickel oxide at a temperature of about 350° C., and reduces it to metallic nickel. The reduced material is then passed to another tower known as the "volatiliser," in which a temperature of 50° to 80° C. is maintained, and it is here brought in contact with producer gas rich in carbon monoxide. The carbon monoxide reacts with the finely-divided metallic nickel to form the volatile nickel carbonyl, $Ni(CO)_4$, which passes out of the tower mixed with the producer gas. This mixture is led through "decomposing" towers, heated internally to 200° C. At this temperature the nickel carbonyl dissociates into nickel and carbon monoxide. The nickel is collected by passing the heated gas, containing nickel particles in suspension, through a mass of nickel granules, on which the nickel deposits in concentric layers. The granules, which have reached a given size, are removed by screening and are marketed as such. The process yields a very pure nickel; the whole of the precious metals in the matte is recovered and the copper finds a market as copper sulphate.

Hybinette Process.—The Hybinette or electrolytic nickel-refining process originated in Norway, and by this method the concentrated matte is roasted and extracted with acid as in the Mond process. The solid residue contains about 65 per cent. nickel, 3 to 8 per cent. copper and traces of iron, and is melted down and case into anodes. Cathodes consisting of iron plates coated thinly with graphite are used, and an electrolyte, which is a solution of 45 grammes of nickel sulphate per litre, practically free of copper.

The current employed is a direct one, and the voltage is 160 to 170. As electrolysis proceeds the electrolyte becomes enriched in copper and requires treatment for its removal. This consists of transferring the solution into other vats in which are placed broken pieces and the short ends of anodes, the nickel in which has a similar action in precipitating copper as metallic iron. At the same time the solution takes up nickel and is thus restored to its original nickel strength. The nickel deposits on both sides of the cathode, and when it has reached a thickness of ⅛in. it is stripped off in sheets which weigh about 20 to 30lb. each. The nickel is about 99 per cent. pure, but a higher degree of purity can be reached if desired. The precious metals pass into the anode slimes, and are recovered. The copper is recovered partly as cement copper as mentioned above, and partly as electrolytic copper. The process has been adopted by the British American Nickel Corporation.

* From introductory chapter to Monograph on Nickel Ores by W. G. Rumbold, published by the Imperial Institute (London, John Murray, 5s. net). The chapter contains an excellent account of the nickel steel alloys.

The Uses of Nickel.

One of the most largely used of the less common non-ferrous metals, nickel is employed mainly in the form of alloys with other metals, but also, to a much lesser extent, in the form of metal. Owing to its non-corrosive properties nickel is used for cooking utensils, and for evaporating basins, crucibles and other small articles used in chemical laboratories and works. Larger pieces of apparatus are sometimes made of iron with a nickel lining, while a further quantity of metal is employed for electroplating articles of iron, steel, zinc, brass and many other alloys. Latterly it has been found possible to electroplate aluminium with nickel, which formerly could not be done. A large number of small articles of general utility are made of nickel, and several European and other countries employ unalloyed nickel for coinage.

Nickel is also used as an anode in storage batteries of the Edison type; in the production of malleable steel tubes; as wire and sheet for the construction of the electrodes in certain wireless valves; as a wire for making the points of sparking plugs; as a gauze in the construction of atmospheric burners of the Mecker type and for furnaces; and as one of the elements of thermo-electric pyrometers used for rough industrial purposes.

Nickel is also employed as a catalyst in hydrogenation operations, and in the enrichment of water-gas; in the presence of nickel, and at 250° C., the carbon monoxide and hydrogen constituents interact to form methane and water, thus producing a gas of smaller volume, but with a much higher calorific value.

The chemical compounds of nickel of industrial importance are not numerous. The oxide is used in the manufacture of glass, in the ceramic industry and for a few minor purposes; the oxide and some other compounds are sometimes used as catalysers; nickel sulphate and the double sulphate of nickel and ammonium are largely used in nickel electroplating.

Composition of Commercial Nickel.

Commercial nickel is marketed in several forms: (*a*) As grains, cubes, rondelles or powder reduced from nickel oxide below the fusing-point of nickel; (*b*) as concentric layers deposited, round a nucleus, from nickel carbonyl; (*c*) as cathode sheets resulting from electrolytic deposition; (*d*) in the form of blocks made by reducing nickel oxide above the melting-point of nickel; (*e*) as malleable nickel, obtained as in (*d*) but with magnesium or some other deoxidiser added to it before being poured into ingots. The metal is prepared in the forms of rods, sheets, wire, etc. Most of the nickel produced falls under class (*d*). The International Nickel Co. of Canada supply the following grades of nickel:

Description.	Nickel. Per Cent.	Iron. Per Cent.	Sulphur. Per Cent.	Silicon Per Cent.	Carbon. Per Cent.	Manganese Per Cent.	Copper, Arsenic, etc., Per Cent.
1. Malleable Nickel Rods "A"	99·00	0·55	0·025	0·10	0·15	0·15	—
2. Ditto "B"	98·75	0·50	0·025	0·20	0·15	1·75	—
3. Ditto "C"	96·75	0·75	0·030	0·20	0·15	1·75	—
4. Nickel Castings	98·95	0·50	0·035	—	0·16	—	—
5. Orford Electrolytic Nickel	99·84	—	0·005	—	0·025	—	0·03
6. Nickel Shot "A"	98·65	0·50	0·060	0·15	0·45	—	1·25
7. ,, "X"	99·05	0·47	0·040	0·10	0·18	—	1·25

Generally, shot metal is the form in which nickel is used in the nickel steel industry, and electrolytic nickel is the material used for producing high-grade "nickel silver" and for cupro-nickel alloys. Anodes for nickel electroplating may contain 88 per cent. and upwards of nickel. Impurities in the anodes facilitate the dissolution of the metal and the maintenance of the correct nickel concentration in the plating bath.

World's Production of Nickel.

No reliable statistics of the total world production of nickel metal can be obtained, as only in the case of Canada are official returns published of the amount of nickel in the ores mined and treated. But inasmuch as the Canadian production of nickel is considered to be 80 to 85 per cent. of this total, a close approximation to the correct amount may be estimated. The only large producer of nickel other than Canada is New Caledonia. During the war years transport difficulties and other circumstances connected with the war seriously reduced the New Caledonian output, but for the four years ending in 1914 an average annual output of 7,000 to 8,000 tons of nickel was obtained from about 100,000 tons of ore containing 5 to 6 per cent. nickel and about 5,000 tons of matte containing approximately 45 per cent. nickel.

World's Production of Nickel (Metal).

(Metric tons.)

Country of Refining.	1913.	1914.	1915.	1916.	1917.	1918.	1919.	1920.
England	5,000	5,000	5,600	4,500	5,000	5,000	2,200	3,200
Germany	5,200	4,200	900	400	1,300	1,000	1,000	1,000
France	1,500	3,400	2,200	2,400	1 900	700	500	600
Norway	700	800	900	800	400	100	—	100
Europe	12,400	13,400	9,600	8,100	8,600	6,800	3,700	4,900
U. S. A. and Canada	18,200	16,700	25,000	30,400	30,800	33,700	13,800	19,200
World Production	30,600	30,100	34,600	38,500	39,400	40,500	17,500	24,100

In the table given above, taken from *Metallgesellschaft*, 1922, the world's production of nickel is arranged according to countries in which the metal is actually refined. *Metallgesellschaft* estimates that the world's production of nickel in 1921 did not exceed 5,000 metric tons.

SIZING MATERIALS FOR COTTON TEXTILES.*

A REVIEW OF MODERN PRACTICE.

PRIMARILY intended to facilitate weaving, sizing took on another character about the middle of the 19th century, and now includes among its aims the addition of cheap weighting materials to the cloth. This change may be said to coincide with the granting of a patent in 1854 for the use of magnesium chloride in size, and with the award in 1858 of a patent for the inclusion of china clay. According to the amount of size which it is desired to leave on the yarn, the process may be divided into the ill-defined classes of heavy (80 to 100 per cent.), medium, and light (up to 20 per cent.) sizing. Pure sizing is a term employed when the only object is to protect the yarn against the disintegrating action of the loom. All writers are agreed that size should be as adhesive as possible, a property which would aid equally well the functions of laying loose hairs, strengthening the yarn or holding weighting materials. In order to be successful, a size must adequately assist weaving and hold weight, and at the same time must allow the finished cloth to have the requisite "feel," "fulness," and colour. If the woven cloth is to be bleached or dyed, the size must not introduce any material to the prejudice of these operations.

Starch Adhesives.

The materials used in sizing are conventionally considered under the headings of adhesives, lubricants and softening substances, weighting materials, deliquescents, and antiseptics. The order of merit assigned by Moore to common adhesives is glue, dextrin, starch. The first two are too brittle when dry, and on account of its superior flexibility, some form of starch is in universal use for cotton warp sizing. Most generally employed in Great Britain is wheat flour, which is said to give a mellow feel to the cloth, and to be capable of adding as much as 40 per cent. to the weight of the yarn without the use of mineral matter or the loss of weaving qualities. These desirable properties are only to be obtained, however, if the flour has been fermented or steeped with antiseptics for several weeks.

Potato starch (farina) is recommended for all weights of size. It is considered to impart smoothness and pliability to fabrics of light reed and pick; to add greater weight than any other starch; to be whiter and much stronger, and capable of holding more china clay per pound than wheat flour; and to be of good sizing quality even when made from frosted or decayed potatoes. Sizes made from different samples vary in viscosity, low viscosity being attributed to immaturity of the tubers, or to bleaching or overheating in the manufacturing processes.

* From a review of the literature relating to the sizing of cotton by F. D. Farrow, B.Sc., of the British Cotton Industry Research Association. The complete annotated paper is published in the *Journal of the Textile Society*, August, 1923.

Maize starch (corn starch) is widely used in America for the light and medium sizing practised there. Thorough cooking is required in order to prevent the size being rubbed off in the loom, but if well prepared it gives a firm feel to the cloth. It is said to be more uniform and of higher sizing value than other starches. Though too harsh for heavy sizing, it is valuable for this purpose when mixed with wheat flour. Its liability to mildew can be decreased by long boiling. Sago is another starch which requires to be well boiled. It has great strengthening power, and is generally employed for heavily-picked goods of fine count. Rice starch, tapioca, and wheat starch are used for special work. "Soluble starch" possesses the advantage of dissolving readily in warm water, giving a clear solution of low viscosity, and is useful in reducing the consumption of soap and fat.

Other Adhesives.

Dextrin is considered to be a better adhesive than starch, and though too stiff, or too sticky when used alone, is useful in small quantities for correcting the loss of adhesiveness which starch suffers in the presence of fat, or for laying surface hairs. Many other adhesives have been patented for sizing purposes. Of some importance is gum tragasol, a carbohydrate derived from the cotyledons of the carob bean. It is a powerful adhesive, resistant to mildew, and is frequently used for special work.

Softeners and Lubricants.

There is no certainty as to the mode of action of the fats and waxes in common use. Successful sizing has been done without the use of any fat, but the amount encountered in goods for bleaching has been known to be as much as 36 per cent. of the weight of starch. Fat is said to lubricate the healds and reeds, or to increase the flexibility of the starch film. It is generally agreed that any saponifiable fat may be used with safety, but warning is given against the presence of excessive acidity in tallow (5 per cent. or more of free fatty acid), or of adulteration with unsaponifiable material, such as paraffin wax. With regard to the latter substance, there is almost complete unanimity that it is unnecessary, and should be rigidly excluded from any goods which are to be bleached or dyed. Soap is frequently included as a softener for size mixtures. Glycerine is a softener which meets with approval on account of its ready solubility in water, its hygroscopic properties and the absence of any power to cause tendering. If used in excess, the goods become sticky. A suggestion has been made that polyglycerols would be of service, while the use of glycol has been patented for sizing dyed yarn. Castor oil is largely used in India and to some extent in this country, but it must be used with caution, or the size will be sticky. Turkey red oil is considered useful and gives great pliability to the yarn.

Deliquescents.

Deliquescents are hygroscopic substances which are used on account of their power of remaining in solution in equilibrium with air of ordinary humidity. The presence of such solutions in the starch films confers flexibility on the latter, which is particularly useful in heavy sizing where large quantities of starch and clay are put on the yarn. Magnesium chloride is most commonly used, but calcium chloride is also occasionally employed When either of these substances is present, the moist starch film unfortunately becomes a favourable medium for the vigorous growth of moulds, which may be checked, however, by including zinc chloride in the size as an antiseptic. Sizing compounds of unrevealed compositions are often found to contain chlorides. In addition to its use as a softening agent, glycerol is frequently considered as a deliquescent.

Weighting Substances.

China clay is of value in size solely because of its weight, aand has therefore no importance in pure sizing. Magnesium sulphate is occasionally used in heavily-sized goods for producing a special feel, but it is said to crystallise in the yarn. Heavy sizing is sometimes applied to goods which are to be bleached and finished, with the object of ensuring that when the goods are finished at "loom weight" there shall be some starch present to replace the size which has been removed. The heavier the sizing the more is the finishing material required, and, since the starch takes the finish, improved appearance results. Powdered clay and French chalk are sometimes added to size in order to facilitate separation of the ends.

Antiseptics.

As already mentioned, zinc chloride is commonly employed, in spite of its relative inefficiency compared with other substances now available. The following table shows the weight of antiseptic per hundred of wheat flour which is considered to be sufficient in order to ensure safety. (Smith, *Text. Manufacturer*, 1920, 46, 278):—

Zinc chloride	8—10
Sodium silicofluoride	3
Boric acid	3
Copper sulphate	0.5
Salicylic acid	0.5
Phenol	0.5

Pickard has noted that copper sulphate is extensively employed in Germany but very little in England, but he thinks it may be objectionable in bleaching cloths. Stocks and White quote some Alsatian mixtures in which 1.5 per cent. of copper sulphate on the dry starch is used. In spite of its volatility in steam, boric acid is capable of replacing zinc chloride, and even salicylic acid is stated not to be lost in appreciable quantities during the boiling of the size, although there is no information as to its evaporation during drying. In America, turpentine, in amount about 1.5 per cent. of the weight of starch, is included in size mixtures as an antispetic, and has the additional advantage of preventing frothing.

THE OIL SITUATION IN CANADA.

RECENT DEVELOPMENTAL WORK.

THE High Commissioner for Canada has received from the Dominion Department of Mines at Ottawa the following report, prepared by Mr. G. S. Hume, of the Canadian Geological Survey, in regard to the oil situation in Canada, based on information collected by him during the recent summer's work:—

During recent years active drilling operations for oil have been carried on in many parts of Canada, both in well-established oil territory and in new prospective fields. Among these may be mentioned the producing fields of New Brunswick, the south-western peninsula of Ontario, and the Sheep Creek field of Alberta, as well as exploration in the Prairie Provinces, British Columbia, and in the *Mackenzie River* District, North-West Territory. Recent developments concern particularly Ontario, Alberta, and the Mackenzie District.

New Wells in Ontario and Alberta.

The oil fields of the south-western peninsula of Ontario date back to the early days of the oil industry in America. Of late years the production has, as a whole, shown a gradual decline, with sporadic increases as new fields opened up. Late in the summer of 1923 a new oil well was "brought in" in Romney Township, Kent County, the well being 3,560ft. deep, and having an estimated initial producing capacity of two hundred barrels per day.

Active drilling operations were carried on during 1923 near the International Boundary in Alberta, just north of the producing Kevin-Sunburst field of Montana. Two wells found showings of oil, and active drilling is proceeding. No commercial wells have yet been reported. Further north in Alberta, British Petroleums, Ltd., in November "brought in" a well near Wainwright, 120 miles east of the city of Edmonton. The depth of this well is 2,036ft., the oil being of a heavy quality. The well probably has an initial capacity of 60 to 100 barrels per day, but has not yet been thoroughly tested. Several gas-producing areas are located in this part of Alberta, and the results from past drilling are encouraging for further exploration.

Prospects in the Mackenzie River District.

In the Fort Norman area the Discovery well of the Imperial Oil Company, Ltd., "brought in" in 1920, was slightly deepened in 1923, an increase in flow now estimated at 100 barrels per day being secured. Two other wells were drilled in 1923, one of which had a small showing of oil of no commercial value. The Mackenzie River District is far removed from railroad facilities, although three transportation companies operate steamers for three months during the summer on the Mackenzie as far north as the delta of the river at the Arctic Ocean. The possible oil fields in this area may, therefore, be considered of future rather than of immediate commercial importance.

ITEMS OF INTEREST.

British Coal Output.—The coal output for the week ended December 15 was 5,947,900 tons, compared with 5,728,800 tons for the previous week, and 5,741,600 tons a year ago.

Tariff Revisions in 1923.—The *Board of Trade Journal* for December 27 contains a general review of recent tariff announcements abroad, with particular reference to those made during the present year.

Decrease in Unemployment.—The number of persons recorded on the live registers of the Employment Exchanges in Great Britain on December 17 was 1,137,100. This was 43,195 less than in the preceding week, and 348,778 less than the figure recorded on January 1 last.

Reduced Insulin Prices.—In addition to the two firms mentioned in last week's issue of this *Journal*, Burroughs Wellcome and Co. announce that they are making a further reduction in the price of insulin from 1s. 9d. to 1s. 3d. per dose, and the reduced price will come into effect on January 1, 1924.

Home-Grown Sugar.—It is understood that, owing to the situation brought about by the result of the General Election and the uncertainty existing as to the future Government's attitude towards the home-grown beet sugar industry, it has been found impossible to carry out the plans to establish a beet sugar factory in Kidderminster for the 1924 season.

Committee on Food Preservatives.—The Departmental Committee on the use of preservatives and colouring matters in foods which has been sitting at frequent intervals during the past two months and has taken a considerable amount of evidence from manufacturing, commercial, and scientific sources will resume its sittings at the beginning of the New Year.

Dyestuffs Corporation Reconstruction.—An announcement is made by the British Dyestuffs Corporation that the creditors of the Huddersfield and Blackley companies are required, in connection with the voluntary liquidation of these companies, to send all particulars to the liquidator, Mr. D. R. Mackay, 70, Spring Gardens, Manchester, on or before January 14, 1924.

Camphor Refining in Hong Kong.—It is reported that the camphor refinery belonging to A. S. Watson and Co. in Hong Kong, which was wrecked by a heavy typhoon last August, will be replaced by a much larger plant. The new plant will have a capacity of approximately 10 tons of high-grade refined camphor per month. New machinery has been added to the plant to facilitate the manufacture of the tablets and to simplify the refining process, and it is hoped that this new factory will be in full operation by next January.

Exports of Copra and Coconut Oil from Malaya.—The gross exports of copra from British Malaya during the September quarter amounted to 35,960 tons, valued at £756,476.; imports amounted to 15,804 tons, valued at £296,434. Of the gross exports, 9,780 tons, valued at £204,476., were taken by the United Kingdom, and the entire balance of 26,180 tons, valued at £552,000., by European Continental countries. Over the same quarterly period exports of coconut oil amounted to 1,562 tons, valued at £60,776., of which the United Kingdom and other parts of the Empire took only 65 tons, valued at £2,552.

A New Disinfectant. — The Graesser-Monsanto Chemical Works, Ltd., Ruabon, N. Wales, are producing an excellent saponified antiseptic disinfectant and deodorant under the registered trade mark name of "Acrosyl." It is a cresol preparation containing 50 per cent. of tar acids, these acids containing 55 to 60 per cent. of meta-cresol, which is known to be a more powerful antiseptic than phenol or the other cresols. Irritant impurities have been removed from the tar acids in the process of manufacture, and the caustic action of the cresols is reduced by the fatty acids present in Acrosyl. The carbolic acid co-efficient by the Rideal-Walker test is 3. The odour is particularly pleasant for a preparation of this nature. It is made of a uniform quality, has no corrosive effect on instruments, and does not blunt knives. The price is low—namely, 3s. 7d. per gallon in 1 to 50-gallon lots; or 3s. 5d. in 40-200 gallon lots. It is also obtainable in ¼lb., ½lb., 1lb., and 5lb. bottles at a price which is considerably less than the foreign-made preparations.—*Pharmaceutical Journal.*

Obituary.—We regret to announce the death of Mr. C. F. Gerhardt, chairman of C. F. Gerhardt, Ltd., chemical merchants, of 5, Fenchurch Street, E.C., at the age of 84, which occurred on December 19 at Henley.

Tariff Notes.—The tax on sugar imported into or produced in Germany has been increased as from December 13.—Certain modifications in the consumption duties levied in Brazil on certain inks and varnishes have been made.

Institute of Patentees.—The first meeting of the Scottish members of the Institute of Patentees was held on Wednesday (December 19) in the Grand Hotel, Glasgow. Mr. R. O. M'Gowan presided, and resolutions formally approving of the Scottish Branch were passed.

Chemical Worker's Death.—William Stamford (44), chemical labourer, of Ledsham Place, Gordon Road, Leeds, was admitted to the Leeds Infirmary on Friday of last week suffering from severe burns on the legs and arms, caused by falling into a vat of sulphuric acid whilst working at the chemical works of John Nicholson and Sons, Ltd., of Hunslet.

Pig-iron Production in Great Britain.—The production of pig-iron in November amounted to 597,600 tons, compared with 595,700 tons in October, and 493,900 tons in November, 1922. The furnaces in blast at the end of the month numbered 199, an increase of ten during the month. The average monthly production of pig-iron in 1922 was 408,500 tons.

Cement Manufacture in India.—In 1919 an inquiry was set on foot in the United Provinces, under Government auspices, into the possibilities of manufacturing Portland cement in India. The results of this inquiry, now published in a Bulletin of the Government of India Industries Department, go to establish the possibilities of cement manufacture so far as the United Provinces are concerned.

American Chemical Warfare Service.—A grant of 720,760 dollars for the work of the Chemical Warfare Service during the next fiscal year is recommended by the President and the Director of the Budget, in the report submitted to the new Congress. The amount actually granted for the Chemical Warfare Service for use during the current fiscal year was 717,240 dollars.

Lead Poisoning Fatality.—An inquest was held at Kingston, Surrey, on Friday last, on Walter Edward Martin, a house painter, aged 47, of 104, Fulwell Road, Teddington. Dr. Davies, medical superintendent at the Kingston and District Hospital, where Martin died, said death was due to chronic lead poisoning, from which Martin must have been suffering for about a year. It was stated that Martin had been employed during the last two months on external painting.

Coalfields in the North of Ireland.—In a paper read before the Manchester Literary and Philosophical Society on December 4, Mr. W. B. Wright gave an account of the observations which led him in 1917 to the conclusion that valuable areas of unworked coal existed in the counties of Antrim and Tyrone. The margin of one of the coalfields indicated is visible at Coalisland, Co. Tyrone, where the newer rocks have been removed by denudation, and is now being worked by Sir Samuel Kelly some little distance in from the outcrop. An exceptionally rich series of coals have been penetrated and a large output is confidently predicted. An account was also given of the bore put down by the Ministry of Munitions in 1918 by the side of Lough Neagh, and subsequently stopped at a depth of about 2,000 feet.

Personal.—It is reported that Professor A. J. Turner, M.A., Professor of Textile Technology in the University of Manchester, has been appointed Director of the Indian Central Cotton Committee's Technological Research Laboratory now being established in Bombay.—Dr. G. D. Liveing, of Cambridge, who celebrated his 96th birthday on Friday, December 21, may fairly be regarded as the father of chemical studies in the University. Soon after he had obtained the first place in the first-class list of the Natural Sciences Tripos, which was instituted in 1851, he was elected to a Fellowship at St. John's, and in the laboratory which his college established he was the first in Cambridge to teach science experimentally. For 47 years he was Professor of Chemistry, only resigning the chair in 1908, when he was 81 years of age.—Dr. J. A. Hanley has been appointed as Agricultural Information Officer at Bristol University. Dr. Hanley is at present lecturer in Agricultural Chemistry and Advisory Chemist at Leeds University.

Rockefeller Foundation and Toronto University.—The Rockefeller Foundation has granted the University of Toronto a million-dollar Endowment Fund for the maintenance of the Medical Faculty of the University. The Foundation has been giving annually for three years the interest on the million dollars, but has now announced that the principal will be turned over in recognition of the research work of the Faculty, which culminated in the discovery of insulin by Dr. Banting.

Red Stains on Brass.—Mr. E. A. Bolton, of the Metallurgical Department of Birmingham University, reported in a paper before the Birmingham Metallurgical Society on December 14, that he was fully persuaded that the most important cause of staining lay in the use of old-fashioned furnaces in which the flames had direct access to the metal. Red staining was seldom present before the pickling operation; it was formed as the result of reactions between the copper oxides in the scale and the pickling acid. Cupric oxide was as harmful as cuprous oxide.

German Dyestuffs Production.—The total production of eleven German dye plants during October, 1923, was 12,404,112lb., including: Alizarin red, 863,968lb.; indigo paste, 2,539,008lb.; vat colours, except indanthrene blue GCD, 238,032lb.; indanthrene blue GCD, 17,632lb.; alizarin colours other than red, 149,872lb.; direct colours for cotton, 2,680,064lb.; direct colours for diazotisation, 211,584lb.; acid colours for wool, 1,251,872lb.; chrome colours for wool, 670,016lb.; basic colours, 705,280lb.; sulphur colours, 2,777,040lb.; and lake colours, 299,744lb.

Calico Printing Industry in Czecho Slovakia.—Czecho-Slovakia, which contains the greater number of the calico printing establishments of pre-war Austria, is now one of the leading Continental countries in this work. There are about 150 printing machines in the country, states the *Manchester Guardian*, which is more than there are in post-war Germany, whose calico printing industry was reduced by one-half owing to the loss of Alsace. Czecho-Slovakia is dependent chiefly on the export trade, the chief markets being the Near East, Poland, and Austria. The industry was not well employed at the beginning of this year, but for some months all the establishments have been running full time with all their machines, and are said to be well booked up.

Royal Institution Lectures.—An interesting and varied programme of Friday evening discourses and afternoon lectures has been arranged by the Royal Institution for the coming session. The weekly lectures on Tuesdays and Thursdays are to be held at 5.15 p.m., and on Saturdays at 3 p.m. Professor Henry E. Armstrong will open the Friday discourses on January 18 with an account of the scientific work of Sir James Dewar. Sir William Bragg on February 1 will describe details of the work now being carried on in the Davy-Faraday laboratories. Physics will also be represented in the programme by Sir Ernest Rutherford's discourse on April 4 on "The nucleus of the atom." Dr. Jocelyn Thorpe on April 11 will deal with "Colours, Stains, and Dyes," and Dr. Hugh Maclean, Professor of Medicine in the University of London, is to give an address on March 28 on "Insulin."

Food Preservatives and Sterilisation Methods.—The members of the Newcastle Section of the Society of Chemical Industry paid a visit on December 13 to Angus Watson and Co.'s city preserving works; and in the evening Miss C. M. Dugdale, of their laboratory, delivered a lecture on "The Sterilisation of Preserved Foods" in the chemical lecture theatre of Armstrong College. In the course of her remarks, the lecturer explained various processes of sterilisation by heat penetration, and said that a process could be found for preserving every type of food. The Chairman, Mr. A. Trobridge, expressed the thanks of the Section to Miss Dugdale, who, he said, was the first lady member to read a paper before them. Dr. Harold Kerr, Medical Officer of Health for Newcastle, expressed disapproval of the use of chemicals as food preservatives. Borax and boric preparations might be harmless in themselves, but the accumulated doses absorbed from preserved foods in the course of a day could not be other than harmful, particularly to invalids and children; while the use of copper sulphate for colouring peas was absolutely reprehensible. Brawn and corned meat could be counted as among dangerous preserved foods, especially after exposure to air for some days. Dr. Kerr concluded by conveying his assurance that the conditions under which preserved foods were made in Newcastle were much better than in the majority of other places in the country.

Barytes Deposits in Corea.—The discovery of a valuable deposit of barytes at a spot about 25 miles from the town of Kinka, Kogen Province, Corea, has recently been reported in the local Press, says the Acting British Consul-General at Seoul. At present the deposit is being worked from the surface only, the output per month being about 2,000 or 3,000 tons; about 900,000 tons can, it is estimated, be obtained in this way, and further large quantities are said to be available. The quality is said to be good, the average grade of the ore being approximately 91 per cent.

Australian Motor Spirit.—In connection with the manufacture of benzol by the Broken Hill Proprietary Company at its Newcastle steelworks, the initial installation at Newcastle is capable of an output of 1,500,000 gallons of benzol a year. The plant is designed to produce commercially pure benzol, toluol, and xylol, if required; but there being little or no demand for these products at the present stage of development of Australia's chemical industry, the benzol and toluol are being marketed together as motor spirit.

British Empire Exhibition.—In connection with the British Empire Exhibition, the Imperial Mineral Resources Bureau, 2, Queen Anne's Gate Buildings, Dartmouth Street, London, S.W. 1, has in preparation a descriptive handbook and guide in which reference will be made to mineral and metallurgical exhibits. The Bureau cannot accept any responsibility for any omissions from the handbook, but will endeavour to include references to all firms exhibiting crude mineral and semi-manufactured products, if information as to the exhibits is received at the Bureau not later than March 1, 1924.

Electrical Engineering at Wembley.—The Electrical and Allied Engineering Section of the British Empire Exhibition, which occupies a floor space of about 3½ acres in the Palace of Engineering, has been organised by the British Electrical and Allied Manufacturers Association and will possess a completely equipped boiler house, power station of 6,000H.P. together with a sub-station. In the boiler house every appliance available for saving labour will be shown. In the power station are installed three steam turbines with direct coupled generators. Arrangements have been made by which the public will be able to see all the essential details of the plant.

COMING EVENTS.

Society of Chemical Industry (Bristol Section).—Meeting, **Thursday, January 3, 1924,** at **7.30 p.m.,** at the University, Woodland Road. Paper: "The Chemical Technology of Canned Foods," by O. Jones.—**(London Section):** Meeting, **Monday, January 7,** at **8 p.m.,** at the Chemical Society, Burlington House, Piccadilly, W.

Institution of the Rubber Industry (London Section).—Meeting, **Monday, January 7,** at **8 p.m.,** at the Engineers' Club, Coventry Street, W. Paper: "Consistency of Rubber and Rubber Compounds," by Dr. S. S. Pickles.

Hull Chemical and Engineering Society.—Meeting, **Tuesday, January 8,** at **7.45 p.m.,** at Grey Street, Hull. Paper: "X-rays and Their Application," by J. Pryce Jones.

Institute of Metals (Birmingham Section).—Meeting, **Tuesday, January 8,** at **7 p.m.,** at the Chamber of Commerce, New Street. Paper: "Nickel Brasses," by O. Smalley.—**(N.-E. Coast Section):** Meeting, **Tuesday, January 8,** at **7.30 p.m.,** at Armstrong College, Newcastle-on-Tyne. Paper: "The Action of Molten Brass on Nickel-steel," by H. N. Duncan.—**(London Section):** Meeting, **Thursday, January 10,** at **8 p.m.,** at 85-88, The Minories, Tower Hill, E. 1. Paper: "X-rays and Metallurgy," by W. T. Griffiths.—**(Sheffield Section):** Meeting, **Friday, January 11,** at **7.45 p.m.,** at the Albany Hotel, Fargate. Paper: "Influence of Casting Temperature on the Physical Properties of Metals," by F. H. Hurren.

Society of Chemical Industry (Manchester Section).—Meeting, **Friday, January 11,** at **7 p.m.,** at the Textile Institute, St. Mary's Parsonage. Paper: "Fractional Distillation," by C. Elliot.—**(South Wales Section):** Meeting, **Friday, January 11,** at **7.30 p.m.,** at the Technical College, Cathay's Park, Cardiff. Paper and cinematograph exhibition on "Cocoa," by Dr H. W. Bywaters.

Society of Dyers and Colourists (Scottish Section).—Meeting, **Friday, January 11.** Paper: "Dyeing of Artificial Silk," by W. E. Sanderson.

RAMSAY CHEMICAL DINNER.

INTERESTING FUNCTION AT GLASGOW.

UNDER the joint auspices of the local sections of the Society of Chemical Industry, the Institute of Chemistry, the Society of Dyers and Colourists, and also of the Glasgow University Alchemists' Club, the Andersonian Chemical Society, and the Ardeer Chemical Club, the Ramsay Chemical Dinner was held in Glasgow on December 20. Principal Irvine, of St. Andrew's University, presided over a large gathering, and among those present were Professor G. G. Henderson, Mr. David Perry, Councillor Barrie, Councillor Kennedy, Mr. R. B. Pilcher, Professor Thom Gray, Mr. G. A. Mitchell, and Professor T. S. Patterson.

Councillor Kennedy, in proposing the toast of the "Institute of Chemistry," referred to the great progress made in the science of chemistry during the lifetime of the present generation.

Principal Irvine's Tribute.

The Chairman, in responding, said it was well, in their own interest as much as in the interest of the nation, that they should gather together from time to time in a spirit of fellowship, and realise that they were brothers with common aims, common ideals, and a common goal in front of them. That was what a gathering such as was being held that evening effected. He was delighted to think that they had taken the name of a great chemist, a great Scot, and a great Glaswegian, that of William Ramsay, in whose memory they were assembled together. It was impossible to put into words exactly the effect that a tradition such as that must create.

It had occurred to him to inquire why they had not chosen some other notable chemist. Why did they not take Thomas Graham, another chemist who lived and worked in Glasgow. They had preferred Ramsay to Graham, and he thought they were wise, because they had picked a man whose time was not so far away from their own, and they were able to picture the real man and to draw some inspiration from his life and character. What was it in Ramsay that had made his name so well known? It was his versatility. It was also in part his brilliancy. But that did not account altogether for his influence among his fellow-men; nor was it his genius, which was undoubted. Above all, it was his humanity. A magnificent worker, he was an example to all by his industry. One of the keys to Ramsay's success in life was his control and influence over young men and the zeal with which he inspired them. Referring to the future of chemical science, the Chairman said he had great faith in Scotland, and he had little fear for chemistry, but, he asked, were we quite secure in our position regarding physics? He was greatly impressed by what he had seen of the equipment of laboratories in the United States for physical research. In this country, on the other hand, the returns showed that the number of students in physics was much smaller than the numbers going in for chemistry. He thought that such a state of affairs was not to the best interests of the country.

Glasgow and the Institute.

Mr. R. B. Pilcher, who submitted "The City of Glasgow," said he had been asked by the president of the Institute to convey his best wishes to the local section, together with an expression of his high appreciation of the good work which the section had been doing. Referring to the association of Glasgow with the chemical industry, Mr. Pilcher said he was not a stranger to the city, and as registrar of the Institute he could say that that body was grateful to Glasgow for its contribution to the history of chemistry. Glasgow had provided a host of chemists of high competence and not a few of eminence, among whom were William Cullen, Joseph Black, Andrew Ure, Thomas Thomson, Thomas Graham, Thomas Anderson, and William Ramsay, while there were also others who happily were with us. The Institute was, moreover, grateful to Glasgow for three distinguished past-presidents whose services would never be forgotten. He referred to Professor J. Millar Thomson, Sir George Beilby, and Sir James Dobbie. He thought it was a remarkable fact that more candidates had presented themselves for the examination for the associateship of the Institute from the Royal Technical College of Glasgow than from any other college in the kingdom.

CORRESPONDENCE.

**** We do not hold ourselves responsible for the opinions expressed by our correspondents.*

THE CORROSION OF IRON AND STEEL.

To the Editor of "The Chemical Trade Journal and Chemical Engineer."

Sir,—I have read with interest the statement made by Dr. J. Newton Friend, to the effect that "chromates will inhibit corrosion" (*vide C.T.J. and C.E.*, page 734). It is now quite a long time ago that I commenced the series of experiments which culminated in my British Patent No. 188,778, of 1921, and the successful use of "Calmate" Boiler Fluid by various railway companies, chemical manufacturers, cloth mills, etc., is well confirmed by the testimonials and reports I have received.

The treatment of boiler-feed liquor with softening and anti-corrosive salts and fluids containing chromates is fully protected under the Letters Patent referred to above, and I am grateful to Dr. Friend for the publicity he has given to this highly successful method of treatment.—Yours, etc.,

London, S.W. 1. W. Stanley Smith, Lt.-Col.

December 21, 1923.

LEGAL INTELLIGENCE.

BANKRUPTCY OF CHEMICAL MANUFACTURER.

Edmund Herbert Wrigglesworth.

The public examination of E. H. Wrigglesworth, 369, Spring Bank West, late St. Andrew's Works, Mason Street, Kingston-on-Hull, was held on December 17 at the Guildhall, Alfred Gelder Street, Hull. Debtor stated that in 1914 he became a chemical merchant, and in 1918 he commenced to manufacture his own chemicals and was successful. Subsequently the business was converted into a limited company with a subscribed capital of £20,000. and debentures of £5,000. Debtor received 5,000 shares for his interest. In December, 1920, the company went into liquidation and nothing had been paid to the creditors or contributories. He attributed his failure to the loss of £5,000. in the liquidation of the company and to making himself liable for £4,400. in respect of guarantees given to the bank, also for machinery, and to the railway company. The examination was closed.

SOUTH WALES NOTES.

(Specially Contributed.)

In the tinplate trade there is a confident feeling that business, which has been steadily expanding during the last three months, will still further progress early in the new year. The November exports were comparatively high, 27,225 tons more than the corresponding month of 1922. Tin has an easier tendency, and it is fully expected that there will be concessions in steel bars. Outputs are on the increase, and more mills will be started if sufficient skilled labour is available. The galvanised sheet trade has not been so active, and there has been a considerable falling off during the week, but it is anticipated that there will be a change shortly. Exports for November were over 50 per cent. above a year ago. The patent-fuel business continues to improve, a noteworthy feature being the fall in pitch values. For the last four or six weeks prices have experienced a steady reduction, and some transactions have taken place at under £5. per ton. Small coals are plentiful, and the outlook for briquette makers is promising for next year.

The imports for the week were 190 tons phosphate of lime from Antwerp, 10 tons ferro silicon from Fredrikstad, 79 tons calcium carbide from Gothenburg to Swansea; 30½cwt. wood tar from Gothenburg, 20cwt. chemical sheet lead from Antwerp, 297cwt. soap powder from Montreal, 14cwt. olive oil from Genoa, 2cwt. soap from Dublin to Cardiff; 21 tons ferro silicon from Antwerp, 2,940 tons iron ore from Bilbao to Newport. Among the exports were 1,050 tons copper sulphate to Cette from Swansea; 5 tons zinc chloride to Antwerp from Newport; 72 tons copperas to St. John (N.B.), and 114 tons basic slag to Fremington from Port Talbot.

RESINS FROM EASTERN ASIA.

DIRECTIONS OF THE EXPORT TRADE.

THE principal resins produced in Eastern Asia are copal, dragon's blood, gamboge, gurjun-balsam, elemi, and rosin. Copal is collected in the Philippine Islands to a considerable extent, and statistics published in *Finance and Commerce* (Shanghai) show that in 1920 no less a quantity than 1,019,834 kilos. was exported, while in 1921 the total shipments were 542,700 kilos. India, Great Britain, the United States, Belgium, France, Spain, Japan, China, and Australia are the purchasers. Dragon's blood is obtained from the *Calamus draco* which grows in the Dutch East Indies, the Straits Settlements, and the Federated Malay States, Singapore and Batavia being the chief export centres, shipping large quantities to India, China, and Europe. Gamboge is a product of several trees, of which the chief variety is *Garcinia morella*, growing in Siam, the islands on the east coast of the Gulf of Siam, and the southern parts of Cochin China. It is also found in various parts of India. Bangkok, Saigon, and Singapore are the chief export centres. Gurjun-balsam is an oleo-resin obtained from several species of *Dipterocarpus*, of which *D. turbinatus* is found in the Straits Settlements and French Indo-China, and *D. trinervis* in Java and the Philippines. It is exported chiefly from Singapore, although there is a small trade from Siam, the Malay States, and the Philippines.

Rosin Exports from China.

China is the only producer of rosin in Eastern Asia to any important extent. Kwangtung and Kwangsi provinces are the chief sources of supply, and export shipments are made from Kowloon, Canton, Swatow, and Wuchow. Hupeh and Kiangsi provinces also produce rosin and export it through the ports of Hankow and Kiukiang, while Fukien and Chekiang provinces make small shipments through the ports of Foochow and Wenchow. Practically all the rosin exported from China goes to Hongkong. Japan is the next largest buyer, and small quantities are shipped to Macao, French Indo-China, Siam, and the Straits Settlements. The only country in Far Eastern Asia producing elemi is the Philippines, which exports considerable quantities to the United States and Great Britain.—*Chamber of Commerce Journal.*

SULPHUR IN ORGANIC AND INORGANIC COMPOUNDS.

NEW GENERAL METHOD OF ESTIMATION.

A METHOD described by F. Feigl and R. Schorr (*Zeit anal. Chem.*, 1923, 63, 10) is termed "oxidising sintering." According to an abstract in *The Analyst*, the very finely powdered substance is intimately mixed in an iron crucible with 2 grammes of potassium permanganate and 2 grammes of sodium carbonate (both finely powdered and quite dry), and the mixture is covered with 3 grammes of equal parts of the two salts. The covered crucible is heated 20 to 30 minutes over a small flame, then to 30 to 40 minutes at a stronger heat until the bottom of the crucible is red hot. The cold mass is transferred to a beaker, and the crucible cleaned with hot water. Any permanganate (manganate) is destroyed by addition of alcohol. After digestion on a water-bath the liquid is filtered, and the residue well washed with hot water containing a little sodium hydroxide. The sulphate in the acidified filtrate is precipitated as usual with barium-chloride solution. The method gave very good results when applied to various sulphide ores, phenylthiourea, sulphanilic acid, and sulphonal. In the estimation of sulphur in organic substances, the raising of the temperature must take place very gradually, and the oxidising mixture must be very thoroughly dehydrated.

Applicable Also for Arsenic and Antimony.

The above method is applicable to the estimation of arsenic in ores and organic substances (*e.g.*, atoxyl, various substituted phenylarsinic acids, and neosalvarsan); the filtrate containing arsenate is precipitated as usual with magnesia mixture. The precipitate may be ignited and weighed, or dissolved on the filter in 25 per cent. hydrochloric acid, and the solution is treated with 2 to 3 grammes of potassium iodide, and titrated, after 15 minutes' standing, with thiosulphate. For the estimation of arsenic, sulphur, and antimony in ores, the sintered mass is leached with 30 per cent. alcohol, the extract filtered after 24 hours, and the residue washed with alcohol of the same strength. The filtrate is made up to 500 c.c., and the arsenic and sulphur estimated in aliquot portions. The residue is dissolved in dilute hydrochloric acid, and a little oxalic acid; this solution contains the whole of the antimony. The method is being extended to the estimation of chlorine in organic substances.

PATENT RIGHTS IN JAPAN.

EARTHQUAKE EMERGENCY REGULATIONS.

THE following communication has been received from the Japanese Government by the Patent Office through the Japanese Consul-General in London relative to the preservation of industrial property rights in Japan which might be affected by the recent earthquake:—

Owing to the recent earthquake and the fire which followed in Tokyo, the whole of the Registers and almost the whole of the documents in the Patent Office were destroyed. The following is an extract from the laws and regulations promulgated with a view to avoiding any possible detriment or inconvenience to any party whom it may concern:—

Any right or interest, which arose from the decision of any administrative office within the area of the earthquake (such decision having been given prior to September 1, 1923), and which was to expire between September 1, 1923, and March 31, 1924, shall be deemed to expire on March 31, 1924, with the exception of such rights and interests as were granted with a special order as to the period of their duration.

Any person who, prior to September 1, 1923, applied for the prolongation of a patent right and has not yet been granted any decision, shall present to the Patent Office not later than December 31, 1923, the copies of the application and other documents related thereto, together with a written statement declaring the date of the original application.

Attention is drawn at this opportunity to the fact that according to a provision in the Patent Law a person who is not resident within the Empire of Japan cannot make an application to or take any other steps at the Patent Office except through a representative who is resident in the Empire.

THE TREATMENT OF SPENT OXIDE.—According to *Das Gas- und Wasserfach*, the Rhenania Company, of Mannheim, have patented a new process for recovering from spent oxide cyanogen compounds and high-percentage sulphur, leaving the oxide fit for further use. It consists in treating the spent oxide with a hot solution of sulphides or polysulphides of alkaline earths, and subsequently decomposing with sulphurous acid the polysulphide liquor formed. The result is a mixture of sulphur and sulphites of alkaline earths, while the cyanogen compounds remain in solution in the form of their earth-alkali salts, and can be worked-up by known methods. The separation of the sulphur from the sulphite follows by treatment with acid, and thus sulphurous acid is formed, which is used again in the process. The lixiviated oxide is regenerated as usual, and is then available for further purification work. The following example is given to illustrate the working of the new process: 2,000 kilos. (about 2 tons) of spent oxide with about 50 per cent. of sulphur content are mixed into 6,000 litres of barium-sulphide solution, which should contain more than 300 grammes BaS to the litre, and treated with heat. The lixiviated oxide is then separated by filtration from the barium polysulphide liquor which has formed, and the latter is treated with strong sulphurous acid. During this process, besides the sulphur extracted from the oxide, a considerable quantity results from the action of the sulphurous acid on the barium sulphide. Also the total barium separates out in the form of barium sulphite, while the cyanogen compounds remain in solution, and can be filtered off. The mixture of sulphur and barium sulphite is now stirred with hydrochloric acid. In this way sulphurous acid and barium chloride are formed, while the sulphur remains undissolved, and by filtration and washing can be prepared for whatever purpose required. The barium chloride is worked-up to a solid salt, and the ferrocyanide salts are taken out of the solution in the usual way, and worked-up to potassium ferrocyanide. The sulphurous acid is used again in the process.—*Gas Journal.*

IMPORTS OF CHEMICALS AND ALLIED PRODUCTS IN NOVEMBER

(Concluded from page 744.)

THE following returns, which are taken from the import statistics of the United Kingdom, give the amount and value of chemicals and allied products imported during the month of November, 1923, compared with 1921 and 1922. As from April 1, 1923, the import trade of the Irish Free State is excluded from the Returns.

ARTICLES.	QUANTITIES. Month ended November 30.			VALUE. Month ended November 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
GUMS and RESINS:						
Arabic and Tragacanth ..... cwts.	7,025	4,608	6,705	34,700	14,014	21,370
Kauri ..... ,,	2,877	8,277	5,511	17,320	34,017	23,794
Rosin..... ,,	73,627	129,312	134,570	59,438	88,102	85,232
Shellac, Seedlac, and Sticklac ... ,,	2,952	3,750	4,907	55,740	58,850	71,881
OILS, FATS and GREASES:						
Animal (except Marine Animal): Not Refined Tallow:						
From France .... tons	—	—	—	—	—	—
,, China ..... ,,	10	—	—	410	—	—
,, U.S.A. ... ,,	200	80	2	10,181	3,264	90
,, Uruguay .. ,,	24	176	99	1,280	6,221	3,788
,, Argentine Republic ,,	883	573	622	39,368	21,482	23,543
,, Australia .. ,,	2,535	1,880	339	112,100	69,545	13,350
,, New Zealand ,,	2,124	1,339	1,468	94,615	48,856	53,586
,, Other Countries ,,	936	455	387	40,249	17,854	14,1.4
Total ..... ,,	6,712	4,503	2,917	298,203	167,222	108,557
Fish (and Marine Animal)..... ,,	1,690	2,455	4,629	72,284	90,833	162,626
Mineral, Crude Petroleum..... galls.	5,156,295	18,674,321	21,375,599	79,689	258,324	345,406
Vegetable, other than Essential:						
Castor Oil ..... tons	76	230	229	4,340	8,927	11,838
Coconut Oil, Unrefined ..... ,,	3,520	1,551	808	172,526	58,882	34,757
Cotton-seed Oil, Unrefined ..... ,,	130	385	203	5,200	10,855	6,895
Linseed Oil .... ,,	8	1,546	295	388	58,083	11,922
Olive Oil, Unrefined ..... ,,	295	201	217	20,691	13,261	12,810
Palm Oil, Unrefined ..... ,,	8,066	1,603	5,503	265,221	53,931	198,644
Palm Kernel Oil, Unrefined ..... ,,	—	—	7	—	—	331
Rape-seed Oil ... ,,	30	8	12	1,700	465	597
Soya Bean Oil .. ,,	733	1,174	1,971	32,990	29,188	65,233
All other Sorts .. ,,	1,999	122	345	112,695	6,634	24,407
SOAP STOCK ..... ,,	56	8	102	1,652	378	2,586
STEARINE:						
From Belgium .. ,,	29	51	90	2,096	2,508	4,756
,, Other Countries ,,	216	155	184	14,062	7,837	8,354
Total ..... ,,	245	206	274	16,158	10,345	13,110
BONES for Manure tons	981	580	460	6,938	4,675	3,650
TANNING SUBSTANCES, not elsewhere specified:						
Barks for Tanning cwts.	15,979	40,023	32,624	8,075	15,008	12,259
Sumach ..... ,,	10,515	11,493	9,410	8,503	7,690	7,850
Gambier ..... ,,	9,358	6,535	5,851	13,611	11,172	12,494
Myrobalans ..... ,,	30,764	41,834	18,505	11,178	14,330	7,223
Valonia ..... ,,	18,669	20,422	12,591	10,351	15,501	8,421
Other Sorts ..... ,,	743	970	80	455	607	50
BORON MINERALS (including Borate of Lime, Borate of Magnesium, and Boracite ... tons	500	860	1,938	10,000	17,200	29,214
FERTILISERS:						
Guano, Raw .... ,,	—	3,751	207	—	36,468	1,997
Phosphate of Lime and Rock Phosphate ..... ,,	27,421	39,096	36,696	94,525	93,968	55,742
SULPHUR, CRUDE.. ,,	—	6,751	2,181	—	26,830	8,838
FERTILISERS, not elsewhere specified:						
Basic Slag..... tons	5,493	7,142	8,898	32,320	15,279	26,706
GELATINE, GLUE, and SIZE..... cwts.	1,774	9,334	11,383	48,885	41,747	41,204

ARTICLES.	QUANTITIES. Month ended November 30.			VALUE. Month ended November 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
				£	£	£
STARCH, DEXTRINE, FARINA, and POTATO FLOUR:						
Rice Starch .... cwts.	5,369	6,570	8,501	9,687	11,572	11,196
Other kinds of Starch ..... ,,	65,609	123,076	113,564	50,985	87,186	81,006
Dextrine and Farina or Potato Flour cwts.	45,467	58,754	88,377	51,107	54,955	67,818
Total ..... ,,	116,445	188,400	210,442	111,779	153,713	160,020
COPPER ORE (including Regulus, Matte, Precipitate, Cement, Copper, and Scale):						
From Portugal... tons	20	—	—	600	—	3
,, Spain ..... ,,	1,320	3,148	79	81,559	170,137	3,560
,, Mexico ... ,,	—	—	—	—	—	—
,, Peru ..... ,,	—	—	2	—	—	27
,, Chile ..... ,,	17	183	—	231	6,469	—
,, Cape of Good Hope ... ,,	—	—	—	—	—	—
,, Australia .. ,,	12	—	—	150	—	26
,, Other Countries ,,	—	—	165	—	—	6,812
Total ..... ,,	1,369	3,331	246	82,650	176,606	10,368
IRON PYRITES (including Cupreous Pyrites) tons	34,464	28,712	15,510	82,000	58,216	27,344
MANGANESE ORE . ,,	6,174	44,951	31,199	36,433	130,513	103,906
SILVER ORE, including the value of the Silver contained in Argentiferous Ores and Metals ..... val.	—	—	—	67,481	58,398	48,408
TIN ORE and CONCENTRATES:						
From S. America tons	1,673	5,014	4,872	132,725	453,295	564,838
,, Brit. South Africa ... ,,	—	29	10	—	2,900	1,250
,, Other Countries ,,	461	1,105	1,097	41,399	100,551	132,276
Total ..... ,,	2,134	6,148	5,979	174,124	556,746	698,364
LEAD, PIG and SHEET:						
From Spain ..... tons	2,743	4,104	3,645	66,551	103,290	104,061
,, U.S.A. .... ,,	1,949	650	2,853	46,732	16,711	78,883
,, Mexico ... ,,	—	—	4,000	—	—	118,000
,, Australia .. ,,	1,545	3,924	8,253	37,689	99,804	235,277
,, Other Countries ,,	2,615	1,751	3,838	58,766	48,069	109,341
Total ..... ,,	8,852	10,429	22,589	209,738	267,874	645,562
MERCURY ..... lb.	—	130,457	131,298	—	20,310	13,984
TIN: Blocks, Ingots, Bars and Slabs:						
From Straits Settlements and Federated Malay States ... tons	715	450	874	113,560	75,109	195,372
From Australia .. ,,	185	—	124	29,125	—	27,315
,, Other Countries ,,	912	13	260	143,990	1,895	56,100
Total ..... ,,	1,812	463	1,258	286,675	77,004	278,787
ZINC, CRUDE (*i.e.*, Cakes Slabs, Blocks, etc.) tons	8,241	5,843	10,862	211,272	186,436	352,128
Manufactures, not elsewhere specified (including Rolled Sheets, Plates, and Discs) tons	972	1,036	1,403	31,522	40,953	53,929

THERMAL PROPERTIES OF ETHYL CHLORIDE.—The Department of Scientific and Industrial Research have issued a special report by the Engineering Committee of the Food Investigation Board on "The Thermal Properties of Ethyl Chloride." The report is priced at 1s. 6d. net, and may be purchased through a bookseller or from H.M. Stationery Office, 120, George Street, Edinburgh.

REPORTS OF COMPANIES.

Sulphide Corporation, Ltd.

The annual meeting was held in London on Thursday, December 20, Lord Kintore (chairman) presiding. The Chairman, in moving the adoption of the report and accounts, said that at their Cockle Creek establishment, owing to the suspension of smelting, productive work had been confined to the manufacture of superphosphates and sulphuric acid, both of which were produced last year on a considerably smaller scale than in the previous year. They started the past year with a considerable stock of superphosphate on hand, and owing to a severe drought which affected the agricultural districts of New South Wales the demand was on a much reduced scale. The plant was, therefore, closed down for a portion of the second half-year, with the result that on June 30 last the stock was considerably reduced, the sales during the year having amounted to 20,984 tons. The plant was now capable of producing about 40,000 tons a year. As to sulphuric acid, there had also been special reasons during the past year for an exceptionally low production. Sulphuric acid was an essential ingredient in the manufacture of superphosphates, and owing to the smaller tonnage of superphosphates they used last year only 8,415 tons of acid for this purpose, as against 15,187 tons in the previous year. A third section of acid plant was completed during the year, and they were now capable of producing about 35,000 tons of chamber acid a year, while a contract plant for producing concentrated acid was also nearing completion.

The English works of the Corporation at Seaton Carew had had quite a satisfactory year. Construction work had been on a considerable scale. Last year they produced 3,791 tons of zinc, as against 967 tons in the previous year, 2,365 tons of silver lead residue concentrates, against 528 tons, and 11,462 tons of sulphuric acid, against 3,139 tons. In the current year they expected to see the production of zinc and residue concentrates again largely increased, while, as soon as the new sulphuric acid unit was available, their sulphuric acid production would be doubled, and their hydrochloric and salt-cake plant would at once be put into operation.

After dealing with the accounts the Chairman said that unfortunately the present conditions were very far from normal, and until the fire at the Central Mine was extinguished it was impossible to give an even approximately correct forecast of what the current year's results were likely to be.

Low-Temperature Carbonisation, Ltd.

The report for the period ended July 31, 1923, states that sales contracts for the forward delivery of 250,000 tons of "Coalite" per annum over the next four years have been made with one of the leading firms of coal distributors in the United Kingdom, who are prepared to increase their contracts to 1,000,000 tons a year as soon as plants have been erected to fulfil this demand. To cope with these sales contracts, the works at Barnsley are being enlarged to produce 150,000 tons of "Coalite" per annum, and the directors state that they have been able to complete the necessary financial arrangements on satisfactory terms for this further extension, and also for the erection of similar plants in Staffordshire and other coal-producing counties. Not only has the production of domestic smokeless fuel been commercially proved, but the company is also actively engaged in producing smokeless fuel in industrial form for burning under boilers, or in pulverised or powdered "Coalite" condition. The directors have now succeeded in firmly establishing the business on sound commercial lines, and the company has now entered the profit-earning stage. The accounts show a debit balance as at December 31, 1922, of £187,718.; less credit balance for seven months to July 31, 1923, £101,106.; debit carried forward, £86,612.

Kaye's Rubber Latex Process, Ltd.

Presiding at the first annual meeting on Thursday (December 20), Mr. D. F. L. Zorn said that they had used up the cash in hand, and it would be necessary to call up the remaining 5s. per share upon the ordinary capital. Considering the difficulty of establishing a new process the progress made was satisfactory. Licences covering 21 mills had already been granted, and he thought they might say that the making of latex paper had passed beyond the stage of merely supplying a demand created among rubber shareholders. Nothing had yet been accomplished as to the sale of foreign patents, but the conditions prevailing in Europe did not make for enterprise, and people on the Continent were very shy of putting up money for new departures. They had now obtained patents in 28 separate countries as compared with eight countries at the date of incorporation.

Corocoro United Copper Mines, Ltd.

Profit on trading for year to June 30 last, £43,852., plus for bearer warrants and transfer fees, £105., and sundry interest, etc., £812.; total, £44,769. After deducting all charges and expenses, £7,804.; royalties and taxes, £5,861.; interests and discounts, £15,989., etc., together, £30,204., balance, £14,565.; applied as follows: Writing off one-third expenses on issue of preference shares, £5,636.; provision for reserve for doubtful debts, £5,000.; additional depreciation written off, £3,929.; equal total £14,565. Accounts will henceforward be closed on December 31 each year, as from December 31, 1923, and next account will, therefore, be presented for only six months, from June 30 to December 31, 1923.

DIVIDENDS.

BRITISH CYANIDES COMPANY, LTD.—No interim dividend will be paid on the ordinary shares.

BROUGHTON COPPER COMPANY, LTD.—Interim dividend of 2½ per cent. (actual) on the ordinary shares.

JOSEPH NATHAN AND COMPANY, LTD.—Half-year's dividend on the 7 per cent. "A" preference shares.

LEEDS FIRECLAY COMPANY, LTD.—Dividend of 6 per cent. on preference and 4 per cent. on ordinary. For past year profits were £38,197. Debenture interest took £11,319., and after providing for dividends there is £4,877. to be carried forward.

BRITISH PLATINUM AND GOLD CORPORATION, LTD.—After allowing for depreciation, the accounts for the year to July 31 show a net profit of £33,385. (against £1,064. for the preceding year). With £18,198. brought forward, the profit and loss shows a total credit of £51,583. It is not proposed to make a distribution of profits at the present time.

KILLIFRETH MINE, LTD.—Report for period to June 30 last states that accounts show a debit balance of about £34,505., but it may be considered desirable later to submit some suitable scheme for reduction of capital whereby this loss may be disposed of. Present rate of arsenic production is between 40 and 50 tons per month. All the marketable arsenic produced and being prepared has been sold.

VAR OIL AND COAL COMPANY, LTD.—The accounts for the year show a debit balance of £1,681. The advances to the French company during the year amounted to £30,456., making a total of £146,608.

CUMBERLAND COKING AND BY-PRODUCT INDUSTRIES.

[SPECIALLY CONTRIBUTED.]

There has been such keen pressure upon the coal trade during the past fortnight that it has been difficult to give the coke ovens all the supplies they need to maintain the supply of coke wanted by the smelters of ordinary iron. What would have been the position had there been more furnaces blowing and had the coking plants been working at their full capacity it is difficult to say. Such a situation, however, may arise sometime in January or February, for when the steel rail mills at Workington begin rolling three weeks in four it is certain that additional furnaces will be blown in and that a bigger output of coke will be necessary. No doubt East Coast coke could be got in greater quantity the weekly supplies are now over 10,000 tons,—but the whole aim of the ironmasters is to reduce costs, and of course that cannot be achieved if East Coast coke at 43s. per ton delivered is to take the place of local coke at 25s. to 27s. per ton, according to carbon content. More than ever the importance of the developments that are taking place to obtain a larger production of coal in Cumberland is realised. The Irish market has hitherto been the mainstay of the Cumberland coal trade, and owners would be reluctant to abandon it to any competitors. But if it is to be retained in periods when the iron and steel industries are busy, it can only be retained by having at command an output considerably in excess of that at present being won. There is very little change to record this week. The Continental demand for coke at 35s. per ton is small, and the whole of the make is passing to the local furnaces. Residuals are a fair market. A good deal of the tar is going to Sunderland. Sulphate of ammonia is being stocked.

WELDED STEEL BARRELS DRUMS AND KEGS.

WILL NOT LEAK EVEN WHEN BADLY KNOCKED ABOUT.

IN ACCORDANCE WITH BRITISH RAILWAY CLASSIFICATION.

HUNDREDS OF THOUSANDS USED BY THE LEADING OIL COMPANIES, PAINT AND CHEMICAL MANUFACTURERS.

BRITISH MANUFACTURE THROUGHOUT.

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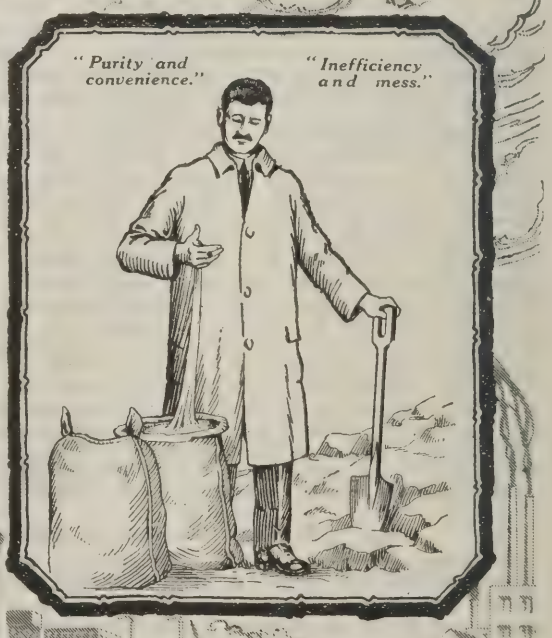

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T.A.S. 130

EXPORTS OF CHEMICALS AND ALLIED PRODUCTS IN NOVEMBER.

(Concluded from page 745.)

THE following returns, which are taken from the export statistics of the United Kingdom, give the amount and value of chemicals and allied products exported during November, 1923, compared with 1921 and 1922. As from April 1, 1923, the export trade of the Irish Free State is excluded from the Returns.

ARTICLES.	QUANTITIES. Month ended November 30.			VALUE. Month ended November 30.		
	1921.	1922.	1923.	1921.	1922.	1923.
OILS, FATS and GREASES:				£	£	£
Animal (except Marine Animal), not refined .... tons	1,659	1,475	2,091	65,238	46,714	69,090
Vegetable, other than essential:						
Castor Oil ..... ,,	202	504	263	12,871	25,812	16,756
Coconut Oil, unrefined ..... ,,	53	43	520	2,797	1,592	21,521
Cotton-seed Oil, Unrefined ..... ,,	91	34	218	3,928	1,394	9,599
Linseed Oil .... ,,	4,842	1,766	1,771	183,261	89,204	90,181
Olive Oil, unrefined ,,	—	2	6	39	118	381
Palm Oil, unrefined ,,	268	79	68	10,850	2,838	2,718
Palm Kernel Oil, unrefined ..... ,,	2,485	2,385	2,193	107,600	83,056	85,596
Rape Seed Oil ... ,,	155	498	264	8,382	19,758	11,290
Soya Bean Oil .. ,,	1,409	342	703	77,840	14,796	30,371
Other Seed Oils .. ,,	38	455	21	1,629	18,233	909
Other Vegetable Oils, not elsewhere specified . ,,	119	182	238	4,954	7,207	7,619
TAR, Coal Tar .... tons	253	95	242	2,475	814	2,173
PITCH, Coal Tar Pitch ,,	29,545	39,054	36,005	105,402	161,903	234,612
CEMENT, Calcareous, for Building and Engineering purposes:						
To Netherlands .. tons	1,508	1,904	5,901	4,068	3,309	9,322
,, France..... ,,	4	4	524	184	140	1,254
,, Brazil ..... ,,	1,423	2,435	710	6,711	8,009	1,713
,, Argentine Rep. ,,	181	1,191	1,363	466	3,071	3,423
,, Brit. S. Africa ,,	104	1,949	1,123	537	5,183	2,729
,, Brit. East Indies ,,	8,803	12,906	15,377	40,591	41,354	41,464
,, Australia..... ,,	287	4,408	2,407	1,550	12,282	6,456
,, New Zealand . ,,	19	1	—	113	68	—
,, Other C'tries . ,,	5,517	14,380	25,529	29,593	44,138	73,679
Total ..... ,,	17,846	39,181	52,934	83,813	117,554	140,040
FERTILISERS not elsewhere specified:						
Basic Slag..... tons	1,103	153	882	1,527	617	2,602
Superphosphates ,,	344	659	547	1,660	2,872	3,168
Guano, Manufactured and Compound Manures (including Bone Meal, and other Manufactured Fertilisers) ..... tons	3,275	5,024	4,024	35,248	43,709	33,752
GELATINE ..... cwts.	415	700	71	6,499	7,792	1,978
GLUE and SIZE .. ,,	9,228	14,376	15,875	20,881	27,830	26,228
LEAD:						
To Russia ..... tons	—	80	115	—	2,410	3,252
,, Sweden ..... ,,	16	63	77	486	1,790	2,484
,, Germany..... ,,	928	1,367	239	15,224	23,167	6,915
,, France..... ,,	551	553	347	13,317	13,909	8,938
,, China (including Hong Kong) ,,	14	7	9	600	361	363
,, Japan ..... ,,	—	8	21	5	320	799
,, U.S.A. ..... ,,	—	1	—	41	55	17
,, Brit. S. Africa ,,	32	48	18	1,275	1,846	878
,, Brit. E. Indies ,,	180	172	248	6,802	6,763	9,063
,, Canada ..... ,,	8	40	4	292	1,262	177
,, Other C'tries . ,,	359	672	346	10,856	21,840	13,018
Total: Pig ..... ,,	1,777	2,217	680	36,183	41,437	18,275
Total: Sheet .... ,,	219	546	578	8,211	19,545	19,583
Total: Pipes .... ,,	56	130	101	2,388	4,250	3,967
Total: Foil ..... ,,	2	10	6	167	617	494
Total: Manufactures not elsewhere specified ,,	34	108	59	1,979	4,874	3,615
Total ..... ,,	2,088	3,011	1,424	48,928	73,723	45,934
TIN: Blocks, Ingots, Bars and Slabs:						
To Russia ..... tons	—	—	110	—	22	23,473
,, Sweden ..... ,,	39	44	28	6,532	7,188	5,779
,, Germany..... ,,	88	50	55	13,896	8,814	10,835
,, France..... ,,	264	217	240	41,500	37,435	49,158
,, Turkey ..... ,,	7	—	10	1,061	—	2,142
,, U.S.A. ..... ,,	25	260	655	4,000	45,564	134,554
,, Canada ..... ,,	55	49	69	8,578	8,311	14,539
,, Other C'tries . ,,	370	349	526	58,008	58,815	106,016
Total ..... ,,	848	969	1,693	133,575	166,149	346,496
ZINC, Crude, and Manufactures thereof ,,	429	947	394	10,954	32,756	16,764

TRADE INQUIRIES.

The following inquiries have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W. 1, whence, unless otherwise stated, further information may be obtained:—

British India.

The Director-General, Indian Store Department, Branch No. 10, Belvedere Road, Lambeth, S.E. 1, invites tenders before January 8, 1924, for the supply of 6 tons of potassium permanganate, required by March 1, 1924. Further information to be obtained direct from the Director-General.

South Africa.

The Municipal Council of Johannesburg is calling for tenders, to be presented by January 29, for the supply and delivery at Vredeorp store of 135 tons (each 2,000lb.) of creosote in steel drums. (Ref., D.O.T. 12794/E.D./C.C./2.)

Austria.

An agent in Vienna with good knowledge of the local market desires to secure the representation on a commission basis of British manufacturers and exporters of chemicals. (Ref. No. 671.)

Spain.

A commission agent of Barcelona is desirous of obtaining the representation of British manufacturers of sodium sulphide, chloride of barium, oxalic acid, lead acetate, and sodium bicarbonate. (Ref. No. 676.)

A commission agent of Bilbao is desirous of securing the representation of a British firm with head office in the United Kingdom exporting copra direct from the Federated Malay States. Copra from other sources is not desired. (Ref. No. 678.)

Central America.

A British commission agent, experienced in the Latin-America market, proposes to leave at the end of January for a business trip to Mexico and Central America. In addition to the lines which he already handles he desires to secure agencies for paint, proprietary medicines, etc. (Ref. No. 687.)

Turkey.

A merchant firm, of Turkish nationality established in Constantinople, is desirous of getting into touch with British pharmaceutical chemical manufacturers. (Ref. No. 680.)

THIRTY-FIVE YEARS AGO.

(From the "Chemical Trade Journal," December 29, 1888.)

A New Field for Chemists.—It should be the practice for any student intending to enter upon a certain craft or profession to understand clearly what his prospects for the future are likely to be; and if everyone studying chemistry at the present time in the laboratories of the United Kingdom were to ask himself that question, we are afraid the answer would not be very encouraging. For some years past we have been producing chemists at a remarkably rapid rate, and the cry is now a serious one that many who have been thus educated cannot find any work to do. If everyone now studying in British laboratories intends to enter manufacturing establishments as chemists earning fair salaries, we feel sure the majority will be grievously disappointed. There is an outlet for talent in the direction of well-informed superintendents, and it is in that direction that we urge the attention of the rising generation of chemists. Education is a good thing in its way, but it will neither clothe the back nor minister to the pangs of hunger. Excessive education is apt to engender false pride, and to make the brain-worker look down upon the toiler with his hands, and that bad example, which has been set in many of our schools and colleges, has tended in no small degree to check that flow of scientific talent into channels which under ordinary circumstances the natural course of trade would have led it. Some chemists may, perhaps, think it a mean thing to be called a foreman; let masters then consult their pride by coining a special designation to suit their idiosyncrasies. From a monetary point of view the chemist would be the gainer; pride without a salary is a very hollow show, and while some chemists are now to our own knowledge existing on £60 per annum, the foreman is flourishing on £3 per week, and even much more.

GAZETTE NEWS.

MORTGAGES AND CHARGES.

African Manganese Company, Ltd., London, E.C.—Registered December 5, £16,000. debenture stock, part of £600,000.

Harding Chemical Company, Ltd., Manchester.—Registered December 6, £2,000. debentures (filed under sec. 93 (3) of the Companies (Consolidation) Act, 1908), present issue £1,300.

Organam, Ltd. (late Elstree Chemical Works (1922), Ltd.).—Registered December 3, £2,000. debenture, to Branch Nominees, Ltd., 15, Bishopsgate, London, E.C.

Pottsghyll Barytes Mining Company, Ltd., London, E.C.—Registered November 30, £4,760 19s. 6d. 1st debenture, to C. H. Pryor, 222, Strand, London, W.C.

Spooner and Bailey, Ltd., Eling, Southampton, chemical manufacturers.—Registered December 5, £500. (not ex.), £12,000. (not ex.), and £100. (not ex.) morts., to Lloyds Bank, Ltd.

Sydbie, Ltd., London, E.C., glass manufacturers.—Registered December 7, £2,300. debenture, to Baron Somers, Eastern Castle, Ledbury.

United Chemical Corporation, Ltd., London, S.W.—Registered December 5, £2,000. debenture, to A. Moray, 44, Fitz George Avenue, Kensington.

SATISFACTIONS.

Organam, Ltd. (late Elstree Chemical Works (1922), Ltd.).—Satisfactions registered December 3, £550.; registered November 3 and November 8, 1923.

LIMITED COMPANIES. — Appointments of Receivers; Resolutions and Notices as to Winding-up; Petitions; Orders; and Official and Other Notices.

Hightensite, Ltd., London, E.C., rubber manufacturers.—C. Comms ceased to act as receiver. November 28.

COUNTY COURTS' JUDGMENTS.

(The following returns are taken from the Registry of County Courts' Judgments. Publication does not imply inability to pay. Many Judgments may have been settled between the parties, or paid. Judgments settled otherwise than through the Court may appear unless "Satisfaction" is entered up within twenty-one days from Judgment. Registered Judgments are not necessarily for debts. They may be for damages or otherwise, or they may be against defendants liable in a representative capacity, and not personally. Judgments are not returned to Registry if satisfied in Court Books within twenty-one days.)

Florey, Hartley, 32, Great Tower Street, London, E.C.; chemical merchant; £29. 13s. 6d. October 11.

Lambert (Samuel) and Co., Ltd. (registered office, 10, Great St. Helens, London, E.C.), druggists and chemical merchants; £13. 6s. 11d., November 2.

NEW COMPANIES.

Kynaston, Ltd.—Capital £50,000., in 45,000 £1. 8 per cent. cumulative participating preference and 100,000 1s. ordinary. Manufacturers of chemicals, drugs, etc., manufacturers of and dealers in mineral waters, etc. Office: Connaught Mansions, 34, Victoria Street, Westminster.

Ciela Photographic Supplies, Ltd.—Private company. Capital £2,000., in 1,995 £1. 10 per cent. cumulative preference and 100 1s. ordinary. Manufacturers of and dealers in chemicals and allied products, etc. Office: P. and O. House, Cockspur Street, S.W.

Enzymetan, Ltd.—Private company. Capital £10,000., in 5s. shares. To acquire rights in a scientific process in connection with the preparation of hides for tanning into leather, etc. Office: 365, Bank Chambers, 329, High Holborn, W.C.

Lanes Lead Patents, Ltd.—Private company. Capital £500., in 1s. shares. Solicitors: Claremont, Haynes and Co., Vernon House, Sicilian Avenue, W.C.

M.F.W. Syndicate, Ltd. — Private company. Capital £100. 2s. in 1s. shares. To acquire a secret preparation for the cleaning of buildings, etc. Solicitor: J. Lee Smith, 119, Moorgate, E.C.

Metal Treatment Company, Ltd. — Private company. Capital £2,000. Electro chemists and metallurgists, etc. Office: Fitzalan House, Arundel Street, Strand, W.C.

Tarrant and Co., Ltd. — Private company. Capital £10,000. Manufacturers of boot, furniture, and metal polishes, etc. Office: 14, Rafter Street, Enniscorthy, Ireland.

THE PATENT LIST.

APPLICATIONS FOR BRITISH LETTERS PATENT.

December 10 to 15 (inclusive).

Catalysts for Synthesis of Ammonia. Ammonia Casale Soc. Anon. 31,168.
Hardening Colloids. Bloxam, A. G. (*Akt.-Ges. für Anilin-Fabrikation*). 31,033.
Azo-dyestuffs. Bloxam, A. G. (*Chemische Fabrik Griesheim-Elektron*). 31,359.
Barium Cyanide. Deguide, C. 30,988.
Mixing and Stirring Apparatus. Easterbrook, F. A. 31,102.
Effecting Intimate Contact between Liquids and Gases. Hersey, S.; and Kirkham, Hulett and Chandler, Ltd. 31,256.
Sulphuric Acid. Jackson, W. J. Mellersh- (*Hurt Engineering Corporation*). 31,118.
Pneumatic Manipulation of Liquids. Mauclère, P. A. P. V. 31,250.
Dyestuffs. Morton Sundour Fabrics, Ltd.; Thomas, J.; and Wylam, B. 31,264.
Decolourising Carbon. Naamlooze Vennootschap Algemeene Norit Maatschappij. 31,451.
Centrifugal Separators. Plauson's (Parent Co.), Ltd. 31,355.
Electrolytic Apparatus. Scott, J. P. 31,015.
Grinding-mills. Sedberry, J. B. 31,013.
Continuous Rectification of Hydrocarbons. Soc. des Etablissements Barbet. 31,145.
Conservation of the Pellicles of Hydrate or of Hydrated Ethers of Cellulose. Soc. Française des Crins Artificiels. 31,444.
Decolourising Petroleum Distillates. Union Oil Company of California. 31,017.
Chlorination of Raw Cellulose. Vains, A. R. de. 31,362.

COMPLETE SPECIFICATIONS ACCEPTED.

Readers desiring to peruse any of the following specifications in the original can obtain a copy by sending 1s. in stamps to the Comptroller, Patent Office Sales Branch, 25, Southampton Buildings, Chancery Lane, W.C.

1922.

Leaching of Caliche and Recovery of Nitrate Therefrom. Guggenheim Brothers. 18,460. **188,634**
Dyestuff Intermediates. Thomas, J.; and Scottish Dyes, Limited. 18,804. **207,840**
Methane. Farbwerke vorm. Meister, Lucius, and Brüning. 23,674. **186,900**
Combustible Gases. Broadhead, C. F.; Barker, F. G.; and Hunt, P. C. H. 23,761. **207,851**
Cellulose Esters. Soc. de Stearinerie et Savonnerie de Lyon. 24,153. **201,510**
Pipes for Use when Immersed in Chemical Liquids. Judson, F. (legal representative of *Judson G. R.*, deceased); Gibson, J. M.; and Galloway, H. 24,974. **207,902**
Paints. Plauson's (Parent Co.), Limited (*Plauson, Dr. H.*). 25,813. **207,919**
Ozone-generators. Hartman, H. B. 28,032. **207,946**
Treatment of Asbestos. Hydroloid, Ltd. (*Exportingenieure für Papier und Zellstofftechnik Ges.*). 29,059. **207,958**
Gas Purification. Davidson, W. B. 32,317. **207,995**

1923.

Vulcanisation of Rubber. Naugatuck Chemical Co. 2,778. **200,788**
Glycerine and Alkali Soaps. Schmidt, L. 4,129. **196,579**
Sluphate of Chromium. Nydegger Dr. O 4,509. **198,645**
Colloidal Solutions of Ferric Oxide. Aktieselskabet Hydropeat. 7,747. **195,089**

COMPLETE SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

1923.

Nitrate of Potassium. Michael and Co., J. 19,229. **208,114**
Evaporating-apparatus. Metallbank-und Metallurgische Ges. Akt.-Ges.; and Gensecke, W. 29,481. **208,130**
Albumen Compounds Containing Arsenic. Haco Ges. Akt.-Ges. Bern. 30,193. **208,143**
Organic Mercury Compounds. Albert, Dr. A. 30,611. **208,151**
Chlorinating Benzene. Farbwerke vorm. Meister, Lucius, and Brüning. 30,645. **208,155**
Disazo Dyestuffs. Durand and Huguenin Akt.-Ges. 30,838. **208,162**
Continuous Rectification of Liquids Containing Constituents of High Boiling-point. Soc. des Etablissements Barbet. 31,145. **208,175**

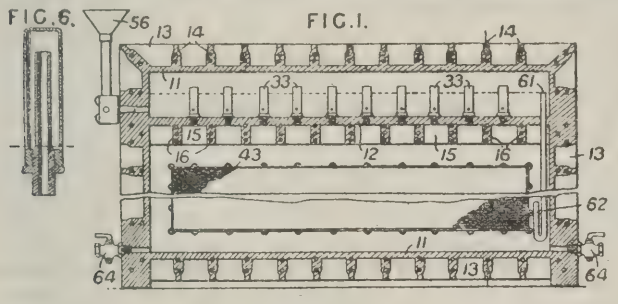
ABSTRACTS OF LATEST COMPLETE SPECIFICATIONS.

p-Phenetol-carbamide. A. Sonn, Königsberg, Prussia, Germany. British Patents **206,083,** of 1923.

p-Phenetol-carbamide is produced by adding a concentrated aqueous solution of potassium cyanate to a solution of *p*-phenetidine in an excess of diluted acetic acid. The reaction may be combined with the production of phenacetin, in which dilute acetic acid forms a by-product.

Electrolytic Oxygen and Hydrogen. J. P. Scott, Toronto, Ontario, Canada. British Patent **205,884**, of 1922.

A cell comprises a pair of rectangular cast iron or steel frames, such as 11, Fig. 1, each divided into two parts by a bridge-piece 12, the two frames being insulated from one another and separated in the upper part by an impermeable partition and in the lower part by a diaphragm, and enclosed by side plates, the lower of which support wire-gauze electrodes 43, spaced from the plates so as to be substantially in contact with the diaphragm. The bridge-pieces 12 are provided with a number of devices 33, shown in detail in Fig. 6, which allow the evolved gases to bubble up through water in the upper chambers for the purpose of washing, but prevent return flow of gas or electrolyte. Water is supplied to the upper chambers by a funnel 56, and is maintained at



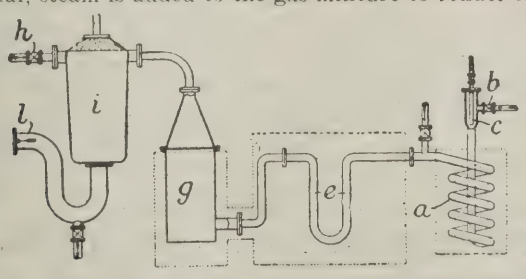
a predetermined level by overflow pipes 61 provided with bent ends 62 within the electrode chambers to prevent escape of gas. The bridge-pieces 12, being of heat-conducting material, allow pre-heating of the water in the upper chambers. The frames 11 and the bridge-pieces 12 are provided with pairs of flanges 13, 15 connected by webs 14, 16 which receive screws securing the side-plates, and insulated screws joining the frames. Taps 64 are provided at the bottom for removing sludge. Any number of cells may be connected in series or parallel by conductive strips or by contact of their side-plates.

Electrolytic Production of Carbonates and Sulphites. Plauson's (Parent Co.). Ltd., London. (H. Plauson, Hamburg, Germany.) British Patent **205,955**, of 1922.

Alkali carbonates, sulphites, and the like, are obtained by electrolysing a solution of an alkali sulphate, and allowing the acid produced to react with an insoluble carbonate, sulphite, etc., for instance, of calcium, barium, or lead, situated below the cathode, so that the carbonic acid, etc., produced combines with the alkali generated by the electrolysis. In one method the anode of carbon, coke, graphite, etc., is placed at the bottom of the cell and covered with lumps of the insoluble carbonate. Above the cathode is a porous iron or other cathode through which the alkali carbonate solution is withdrawn; it usually contains some caustic alkali. Fresh sulphate solution is introduced below or through the anode. Barium carbonate may alternatively be supplied in the form of a suspension in the entering liquid. Calcium sulphate may be dried and burnt

Ammonia Oxidation. J. R. Partington, London. British Patent **205,856**, of 1918.

In the oxidation of ammonia by passing it in admixture with oxygen or air enriched with oxygen over a catalytic material, steam is added to the gas mixture to render it non-



explosive. Ammonia solution is sprayed through a nozzle *c* in the presence of oxygen or a gas rich in oxygen admitted by a pipe *b* and becomes evaporated in a heated spiral *a*, preferably of aluminium and packed with aluminium turnings; the resulting gas mixture passes to a preheater *e*, consisting of a number of aluminium pipes heated by hot gases; the gas mixture then proceeds to the converter *g* containing the catalyst, such as heated platinum gauzes; the products are cooled and absorbed in a vessel *i*, any remaining nitrogen oxides passing by the outlet *l* to an absorption tower. The original gas mixture may be enriched with either oxygen or ammonia by admitting a supply through an inlet pipe between the evaporator and the preheater; alternatively, water may be sprayed or steam admitted into the evaporator and ammonia gas then introduced by the intermediate inlet pipe. Also, a further supply of oxygen may be admitted by the pipe *h* into the cooler *i*, if the higher oxides of nitrogen are to be produced.

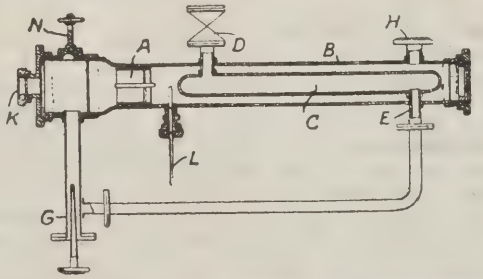
ABSTRACTS OF LATEST SPECIFICATIONS OPEN TO PUBLIC INSPECTION BEFORE ACCEPTANCE.

Bacteria for Indigo Dyeing. Farbwerke vorm. Meister, Lucius, and Brüning, Hoechst-on-Main. Germany. British Patent **205,834.** Convention date, October 23, 1922.

Cultures of bacteria, suitable for use in the reduction of the indigo vat, are obtained by selecting aerobic or anaerobic bacteria contained in substances in which reducing processes caused by bacteria are occurring or have occurred, for example, the contents of the intestines, natural rotting substances such as manure, garden soil, or humus, mud from brackish water, hay, or even natural indigo, and continuing to cultivate those which have a particularly great reducing power. It is advantageous to carry on the cultivation in the presence of indigo, and also to select those species which are resistant towards heat and drying.

Formaldehyde. Soc. des Etablissements Barbet, Paris. British Patent **206,158.** Convention date, October 30, 1922.

An apparatus for the manufacture of formaldehyde by the catalytic oxidation of methyl alcohol vapour comprises a tube B having inlet and outlet passages G, H, and an internal concentric tube C with inlet and outlet passages D, E. Air is admitted to the tube C, and becoming heated by the flow of the hot exit gases around the tube, passes through



a branch pipe to the inlet G for the methyl alcohol vapour; the resulting hot mixture of methyl alcohol vapour and air then flows through the copper catalyst A and the hot reaction products pass around the tube C to washing and condensing apparatus. K is a peephole for viewing the catalyst and L is a pyrometer. The reaction is started by withdrawing the plug N and heating the catalyst. A number of the elements described may be combined into a battery.

Naphthoquinone Derivatives. Soc. Anon des Matières Colorantes et Produits Chimiques de St. Denis, Paris; A. Wahl, Enghien, Seine-et-Oise, France; and R. Lantz, Paris. British Patent **206,142.** Convention date, October 30, 1922.

4-Arylamino-1-arylimino-2-naphthoquinones (1, 4, diarylimino-2-naphthols) are produced by reacting upon 1-arylimino-2-naphthoquinones with a primary aromatic amine. According as the latter is in excess or not, the products contain two aryl radicles which are the same or different. In the former case the initial product reacts with a further molecule of the primary amine. The oxyarylnaphthylamine, which occurs as a by-product, may be treated, either with an oxidising agent or in contact with air and a catalyst, in presence of a primary amine to produce a further quantity of 4-arylamino-1-arylimino-2-naphthoquinone. Alternatively the original reaction may be carried out in presence of oxidising agents. When metallic oxides, such as lime, baryta or copper oxide, are employed as catalysts, the naphthoquinone derivatives generally forms a compound therewith,

Deodorising Fumes. M. Donkervoort, J. L. van der Voorden, and A. Donkervoort, Rotterdam. British Patent, 206,118. Convention date, October 27, 1922.

Fumes from the treatment of animal products such as bones are deodourised by passage through a chimney or other conduit containing wires heated to incandescence by electricity or by gas flames. In a form shown a ventilating chimney, through which the fumes are forced by an electric fan, is fitted with two horizontal wire nets attached to the walls of the chimney by insulators and heated by the passage of an electric current.

Granulating Slag. Soc. Anon. des Chaux et Ciments de Lafarge et du Teil, Le Viviers, Ardèche, France (assignees of M. Maguet). British Patent 206,132. Convention date, October 26, 1922.

Molten slag is granulated by the action of a gaseous or liquid fluid under pressure playing uniformly on the jet of molten slag, in the direction of flow of the latter, from the periphery to the centre of the slag jet and at a determined point in the course of this jet, the axis of flow of the slag coinciding with the axis of the cones of convergence and dispersion of the projected fluid.

Chlorine-containing Perylene Vat Dyes. H. Pereira, Vienna. British Patent 206,133. Convention date, October 28, 1922.

Perylene vat dyes are produced by treating perylene quinone with chlorine. A chlorine addition product is first formed which, on treatment with agents fixing hydrochloric acid, is transformed into a chloroperylene quinone. According to the examples (1) a suspension of perylene quinone in nitrobenzene is heated with chlorine in the presence of a trace of iodine; the chlorine addition product formed is precipitated by the addition of light petroleum and is recrystallised from nitrobenzene; (2) the chlorine addition product of the preceding example, dissolved if desired in nitrobenzene, is boiled with aniline; on cooling chloroperylene quinone separates out; it dyes cotton greenish yellow from a cherry red vat. The colours obtained by the use of the chlorine addition product are not so fast towards chemical reagents as those of the chloroperylene quinone.

Preserving Latex. N. S. Bostock, Aiken, Spence and Co., Colombo, Ceylon. British Patents 206,163, 206,164, and 206,165. Convention dates, October 30, 1922.

Caustic soda, quicklime or slaked lime, or sodium carbonate, with or without known preservatives, such as phenol, formaldehyde, or ammonia, are added to latex to prevent coagulation.

PUBLICATIONS RECEIVED.

Arsenic, Calcium Arsenate, and the Boll Weevil.—Articles and addresses by Howard W. Ambruster. Barr-Erhardt Press Inc., 205, West 19th Street, New York, U.S.A. 1923. Pp. 42. Price 50 cents.

Mechanisch - und Physikalisch - technische Textiluntersuchungen.—By Dr. Paul Heermann. Second Edition. Julius Springer, Linkstr. 23-24, Berlin, W. 9. Price (bound) three dollars.

Department of Overseas Trade Reports.—Published by H.M. Stationery Office, London. **Cuba** (to September, 1923), by Mr. D. St. Clair Gainer, Acting British Consul-General, H.M. Legation, Havana; price 1s. net.—**Peru** (to August, 1923), by Mr. A. J. Hill, British Vice-Consul, Callao; price 1s. net.

MARKET REPORTS.

LONDON "OPEN MARKET" REPORT. Monday.

It is recognised that in many cases the prices quoted show little relation to makers' prices to domestic consumers on contract. They will, however, serve as a useful indication of current values on the open market for spot supplies. Attention is drawn to the fact that the British Chemical and Dyestuffs Traders' Association, whose Secretary compiles this report, is prohibited from trading or profit-making in any form; consequently, the market information given may be taken as impartial and unbiassed. Prices quoted ex wharf, except where otherwise stated.

Industrial Chemicals.—There is little change to report on the past week. Business has been quiet on account of the seasonal dullness due to stocktaking and holidays. The Continental position is still very strong. The complete stoppage of business with Germany continues. **Acetic Acid,** 80% technical, £47. 10s.; 80% pure, £50. to £51.; 98% glacial, £60. in casks, and about £73. per ton in glass demijohns, ex wharf London; spot supplies are running short, the prices are dearer, with the market firm; still higher prices are expected for the 80% pure grade. **Acetone** British Government specifications, about £124. per ton, in drums; the spot position holds very steady. **Alum,** lump, in casks, £10. to £10 10s. per ton; dealers continue to quote at these figures, with the market quiet. **Arsenic,** Cornish white powdered, £68. per ton, ex wharf; at the figure quoted the market is firm; business, however, has again been poor; the price stated appears to be too high for buyers, but there is little evidence of any easier conditions. **Anhydrous Ammonia,** 99.95%, about 1s. 5d. per lb.; this item has been again quiet, and dealers' prices are unchanged. **Bleaching Powder,** 35—37%, £10. to £10. 10s. per ton; very little interest is shown in dealers' offers of Continental material at these rates. **Barium Chloride,** 98—100%, £14. 10s. to £15. per ton. **Borax,** commercial, granulated £24. 10s., crystals £25., powder £26., extra fine £27. B.P. crystals £29., powdered £30., extra fine £31. per ton, in free 2cwt. bags, carriage paid to any station in Great Britain. British makers' prices, for home trade only, are kept at these levels; their prices for export vary as to destination; dealers are quoting under similar conditions for home trade at: Commerical, granulated £23. 10s., and powdered £25. per ton. **Borax Glass,** lump, £70.; powdered, £71 per ton, in tin-lined cases; British makers quote at these prices, for home trade only, packages free, carriage paid in Great Britain. **Boric Acid,** commercial, granulated £48., powdered £50., extra fine £52.; B.P., crystals £54., powdered £58., extra fine £60. per ton, in free bags, carriage paid to any station in Great Britain; British makers' prices are unchanged as quoted for home trade; their prices for export vary according to destination; dealers are offering some grades at competitive prices. **Citric Acid,** B.P. crystals, about 1s. 4½d. per lb., less 5%; spot supplies are offered at about this figure, with little or no demand. **Cream of Tartar,** B.P., 99—100%, 86s. to 87s. 6d. per cwt., less 2½%; dealers continue to quote close up to these rates; the market is steady. **Epsom Salts,** commercial quality, about £4. 15s. per ton, in bags; there is little interest shown in this item, and dealers' prices for Continental material are unchanged. **Formaldehyde,** 40% volume, £64. to £65. per ton; quotations on spot for this article are rather irregular, and it may be possible to place orders at lower figures. **Glauber's Salt,** commercial quality, £3. 10s. to £3. 15s. per ton, in bags; dealers' prices are round about these rates, with business dull. **Lead Acetate,** brown, about £43.; white, £44. per ton; material in limited quantities is available on spot; the market is fully maintained. **Litharge,** imported, about £37. 10s. per ton, on spot; slightly cheaper to arrive; dealers are quoting at these prices, with occasional business being done. **Lithopone,** 30% Continental red seal, £23. to £24. per ton; dealers' prices as quoted are supported by Continental offers. **Ammonium Chloride,** grey galvanising, £31. to £31. 10s. per ton; spot supplies are available at the prices mentioned; the market is very steady, with a rising tendency. **Nickel Sulphate,** home trade, single and double salts, £38. per ton, delivered; export, single and double salts, £38. per ton, f.o.b.; British makers continue to quote at these unchanged rates. **Oxalic Acid,** about 5¾d. per lb.; there is still but poor business for this article; prices are about the same,

with market unsteady. **Carbonate of Potash,** 90—92%, about £25. 10s. to £26.; 96—98%, £28. to £28. 10s. per ton: this item is quite firm on spot, with dealers holding spot supplies doing a fair business. **Chlorate of Potash,** crystals and granular, about 3d. per lb.; business, so far as merchants are concerned, remains dull; quoted values unchanged. **Caustic Potash,** 88—92% solid, fully £33. per ton; during the past week there has been only a small call for this article, but, owing to the much firmer conditions on the Continent, spot values are fully maintained, and may advance. **Permanganate of Potash,** commercial quality, about 9d. per lb.; dealers report a week of slow and small business; prices well maintained. **Prussiate of Potash,** yellow, about 10½d. per lb.; only small business is reported, with dealers offering British material quoting at about this figure. **Sulphate of Potash,** 90%, £11. per ton; this market shows no change on the week. **Mercury,** about £9. 17s. 6d. per bottle of 75—76lb.; the spot market has been rather quiet again, but so far prices are being maintained. **Red Lead,** imported, about £37. 10s. per ton on spot; slightly cheaper to arrive; dealers continue to quote at about these rates. **Salammoniac,** dog-tooth crystals, fully £50.; medium, £44. to £45.; fine white crystals, £28. to £29. per ton; dealers holding spot supplies are firm at about these figures; supplies are now limited, and the market has a rising tendency. **Saltcake,** ground and unground, about £4. 10s. per ton, delivered; supplies available are fully taken up to the end of the year. **Caustic Soda,** 70—72%, £17. 10s.; 76—77%, £19. 10s. per ton, in drums, ex wharf shipping port; merchants are offering at about these prices, with still but small inquiry. British makers' prices for domestic consumers on contract are unchanged at: 70—72%, £17. 17s. 6d.; 76—77%, £19. 7s. 6d. per ton, in drums, carriage paid to any station in Great Britain; their prices for export vary as to destination. **Bicarbonate of Soda,** £10. 10s. per ton, in bags; this figure is quoted by British makers for home trade only, packages free, carriage paid. **Bichromate of Soda,** home trade, about 4½d. per lb.; British makers continue to quote at this figure for home trade only; dealers are offering at cheaper prices to arrive. **Cyanide of Soda,** export, 8d. to 8½d. per lb.; British makers continue to quote at these rates, and slightly more for home trade. **Soda Ash,** 58% light alkali, £7. 10s. per ton, in bags; British makers' price, for home trade only, is unchanged, packages free, carriage paid to any station in Great Britain. **Hyposulphite of Soda,** pea crystals, about £15. 10s. per ton, in 1cwt. kegs; commercial quality, about £10. to £10. 10s. per ton, in casks; spot prices show a further slight hardening, and the market stands quite firm; Continental prices are dear. **Nitrate of Soda,** 96%, £13. 5s. per ton, f.o.r. or f.o.b.; prices quoted here are very steady. **Nitrite of Soda,** 100%, £28. 10s. per ton; no further change in quotations is recorded, with market steady. **Prussiate of Soda,** about 5½d. per lb.; only small business is being done; dealers continue to offer British material at about this figure. **Sodium Sulphide,** 60—62%, about £14. 10s.; ditto, broken, £15. 10s. per ton, in drums; dealers are finding but small business; their prices, however, are fully maintained. **Tin Crystals,** 1s. 3½d. per lb.; this market shows no change on the week. **Tartaric Acid,** B.P., crystals, about 1s. 1½d. per lb., less 5%; although business is just as poor, the market seems a little steadier; spot supplies are freely offered. **White Lead,** imported, about £41. to £42. per ton, on spot; dealers are quoting at these prices, and slightly less to arrive; business is quiet. **Zinc Oxide,** B.P., £52.; white seal, £44. 10s.; green seal, £37. 10s.; red seal, about £36. per ton, f.o.r. makers' works; British makers' prices remain at these levels.

Pharmaceutical Chemicals.—The tone of this market continues firm. The position on the Continent, especially in Germany, indicates nothing in the way of easier conditions in the near future. **Acetanilid,** crystals and powder, up to 4s. per lb.; spot offers are now made up to the higher figure quoted, and supplies are very short. **Acetyl-Salicylic Acid,** B.P., 3s. 9d. to 4s. per lb.; holders of spot supplies of good material are quoting at about these rates, according to quantity. **Benzoic Acid,** B.P., 4s. to 4s. 3d. per lb.; nominal; it is doubtful if there are any supplies available; licences to import in sufficient quantity are still being refused by the Board of Trade. **Diethylbarbituric Acid,** B.P. (barbitone), about 18s. 9d. to 19s. per lb.; although there is little call for this article, the spot price is well maintained. **Salicylic Acid,** B.P., 2s. 6d. per lb.; at this unchanged rate the spot position is very steady. **Tannic Acid,** leviss, 3s. 3d. to 3s. 6d. per lb.; spot values are steady as quoted, with some demand on the market. **Amidopyrin,** about 15s. per lb.; this article is seldom asked for on spot; market steady. **Ammonium Bromide,** B.P., 9d. per lb.; at this figure the spot position is now very steady, and any movement will probably be to higher rates. **Benzonaphthol,** 5s. per lb., nominal; there is little or no demand on spot; dealers' prices are unchanged. **Betanaphthol,** resublimed, about 2s. 6d. per lb.; the market remains dull, and quoted prices by dealers are unchanged. **Benzaldehyde 03,** 3s. 5d. to 3s. 6d. per lb.; a sharp advance in spot values is recorded, with the market quite firm. **Calcium Lactate,** about 2s. 6d. per lb.; spot values are fully maintained, with a fair volume of business being done. **Chloral Hydrate,** duty paid, 4s. 3d. per lb.; this is a very steady market, with business fairly good. **Creosote, B.P.,** about 2s. 6d. per lb.; the market has been rather quieter, but prices are steady. **Creosote Carbonate,** about 6s. 6d. per lb., nominal, there is practically no interest shown in this product. **Guaiacol Carbonate,** about 14s. per lb.; the position here holds very firm at the rate quoted, with supplies on the short side, and Continental offerings small and dear. **Hexamine,** fully 4s. 6d. per lb.; the spot price as quoted is fully maintained, with a fair volume of business being done. **Hydroquinone,** 4s. to 4s. 3d. per lb.; not much actual business has been on the market, but prices from dealers are steady at about these rates. **Methyl Salicylate,** 3s. to 3s. 3d. per lb.; there is little offering on spot below these figures, and business has again been good. **Methyl Sulphonal,** about 25s. per lb.; dealers are quoting up to this figure, but any business would generally be at lower rates. **Paraformaldehyde,** about 3s. 9d. per lb.; it should not be difficult to book orders for early delivery at slightly less than this figure. **Paraldehyde,** about 1s. 7d. per lb.; supplies are being taken up quite well, and are now on the short side; prices are firmer. **Phenacetin,** up to 8s. per lb.; there has been good business for this article, and dealers' stocks are now restricted. **Phenazone,** fully 8s. 9d. per lb.; there is very little offered on spot at below this figure; the tendency is towards higher prices. **Phenolphthalein,** 8s. 6d. per lb.; any supplies about should be worth close up to this quoted figure; the market is firm. **Potassium Bromide,** B.P., crystals and granular, about 8d. per lb.; the spot position is fully maintained at this figure; business continues satisfactory, and Continental offerings are dearer. **Potassium Permanganate,** B.P., about 9½d. per lb.; dealers seem unable to offer below this price, and any fresh imports will have to be well up to this figure. **Potassium Sulphoguaiacolate,** about 7s. per lb.; this market has been idle during the past week. **Resorcin,** about 6s. 6d. per lb.; dealers are asking up to this figure, with the market moderately active during the past week. **Sodium Benzoate,** 3s. 3d. to 3s. 6d. per lb., nominal; supplies are kept very short here, with the result that prices have been forced up. **Sodium Bromide,** B.P., crystals and granular, fully 9d. per lb.; dealers offering spot material at this price are firm; business has again been good. **Sodium Diethylbarbiturate,** about 20s. per lb.; the spot market is well maintained at last week's higher price as quoted by dealers. **Sodium Salicylate,** B.P., crystals, about 3s. powder, about 3s. 2d. per lb.; this article has been in active demand during the past week, and higher prices are now being quoted, with the position generally very firm. **Sulphonal,** about 20s. per lb.; this market has shown but little life during the week; quoted values are easy. **Terpin Hydrate,** about 1s. 9d. per lb.; a steady but not very active market. **Thymol,** about 14s. to 14s. 6d. per lb.; the market is steady, but the demand has been rather quiet.

Coal-tar Products, Etc.—The general tone of this market is rather unsteady, and any movements are likely to be towards slightly cheaper prices. **Aniline Oil,** 9d. to 9½d. per lb., naked, ex works; this item shows no change on the week, with business dull. **Aniline Salt,** 9½d. to 10d. per lb., naked, ex works; the market is steady, with business slow. **Betanaphthol,** 1s. 1d. to 1s. 2d. per lb.; as quoted the market is rather easy, with little doing. **Benzol,** crude 65's, 8d. to 10d.; standard motor, 1s. 1d. to 1s. 4d.; pure, 1s. 6½d. to 1s. 8d. per gallon, ex works, in tank wagons; British makers report no change in their prices. **Carbolic Acid,** crystals, 11½d. to 1s. per lb.; at the lower prices quoted last week this market remains dull and still unsteady. **Cresylic Acid,** 97—99%, 2s. to 2s. 1d. per gallon; this market is slightly firmer, and the demand has improved. **Toluol,** 1s. 9d. per gallon, f.o.r. makers' works, in buyers' packages; 90%, 1s. 3d. per gallon; prices are about the same, with business quiet. **Xylol,** pure, 2s. 3d.; commercial, 1s. 6d. per

gallon; this market remains dull, with no change in quoted values. **Creosote Oil,** about 9¼d. per gallon, f.o.b.; a fair volume of business is reported, with the market well maintained. **Naphtha,** crude, 8¼d. to 8¾d. per gallon; matters have not improved here; market dull. **Solvent Naphtha,** 90/160, 1s. 1d. to 1s. 2d. per gallon; a further reduction in price is recorded, with the market still neglected and far from steady. **Heavy Solvent Naphtha,** 90/190, 1s. 1d. to 1s. 2d. per gallon; this item is again cheaper, but the market seems fairly steady, with but very little business being done. **Naphthalene,** about £19. per ton; this market is slightly easier, and matters have been quiet all round. **Pyridine,** 22s. to 23s. per gallon; spot supplies remain very small, and prices are fully maintained. **Hexamethylene,** 3s. 9d. to 4s. per gallon; this item keeps very steady, with some little business passing. **Pure Methyl Alcohol,** £90. per ton, in drums, ex wharf London; dealers' prices are well maintained at this level. **Pitch,** about 105s. per ton, f.o.b. East Coast; it is not thought that values will go much lower, and with a revival in demand a sharp recovery may take place.

LONDON METAL MARKET. MONDAY.

Copper: Standard brands, £61. 10s. to £61. 12s. 6d., cash; £62. 5s. to £62. 7s. 6d., three months; electrolytic, £67. 15s. to £68. 5s. **Tin**: Standard, £235. to £235. 5s., cash; £236. 10s. to £236. 15s., three months; Straits, £237.; English, £236. **Lead**, soft foreign, £30. 12s. 6d., prompt; English, £32. 5s.; chemical sheet, 37s. 6d. per cwt. for 2-ton lots, delivered. **Spelter**, prompt £32. 12s. 6d.; hard, £27. **Antimony**, English regulus, 99%, £38.; special brands, £44. to £45. **Aluminium**, 98—99%, £115. to £120.; foreign, £110., c.i.f. **Nickel**, £130., delivered; £125. to £130. for export, f.o.b. **Mercury**, £9. 12s. 6d. to £9. 15s. **Bismuth**, 10s. **Platinum**, £29. per oz.; scrap, £27. **Wolfram**, spot, 11s. 9d. per unit, c.i.f. U.K. or Continent. **Zinc Dust**, Beaver brand, 90—92%, £48.; American, 92—94%, £48.; Continental, 83—88% £42. to £46. per ton, delivered.

MANCHESTER CHEMICAL MARKET. MONDAY.

Owing to the Christmas holidays and approaching stock-taking, the demand for heavy chemicals is only small, and business generally is very quiet, with few alterations to record. The current quotations for alkali products are unchanged, and the greater portion of the forward business has now been settled. **Bleaching Powder,** softwood casks, steady at £10. per ton, on rails works. **Chlorates** are quiet at 3d. per lb. for **Potash** and **Soda,** ex store. **Bichromates** unchanged. **Glauber's Salt** easy at 70s. per ton, carriage paid. Roasted **Saltcake** is only in small request, but price firm at £4. 10s., net, carriage paid, in bulk. American rock **Sulphur** £5. 5s., ex store. The demand for **Copper Sulphate** is slow, and price remains nominal at £25., f.o.b. Liverpool. **Phosphate of Soda** easier at £14. per ton. Commercial **Hyposulphite of Soda** £9. 10s., on rails, in bags. **Nitrite of Soda** firmly held at £28. 10s. per ton, ex store, basis 100%. White powdered Cornish **Arsenic** steady at £68. per ton delivered, but there is not much inquiry. Yellow **Prussiate of Potash** weaker at 9½d. per lb.; **Soda** 5d. to 5¼d., and sales are small. **Barium Chloride** firm at £14. 10s., ex store. **Caustic** and **Carbonate of Potash** continue in good request, and prices have an upward tendency. Grey and brown **Acetate of Lime** are unaltered in position or value. **Acetic Acid** and **Acetate of Soda** are moving off better at recent rates. **Miscible Wood Naphtha** dull at 5s. 6d. per gallon. **Acetone** unchanged at £124. per ton. **Lead Salts** continue in short supply, and quotations are firm; white **Acetate** £46., brown £45.; **Nitrate** £43. per ton, all carriage paid. Green **Copperas** meets with steady inquiry, and values are improving. **Oxalic Acid** easy at 5¾d., carriage paid. **Permanganate of Potash,** B.P. quality, 9½d., carriage paid.

SWANSEA MARKET REPORT. MONDAY.

The business done in **Tinplates** was very good considering the season, and buyers continued to offer premiums on the fixed basis price of £1. 3s. 6d. per standard box, f.o.b. **Galvanised Sheets** very quiet at £18. 17s. 6d. per ton. **Copper** easier at £61. 7s. 6d. per ton prompt, and £62. 2s. 6d. three months. **Tin** met with little interest, and quotations irregular at £234. 17s. 6d. prompt, and £235. 7s. 6d. three months. **Lead** much easier, with prompt at £30. 7s. 6d. per ton, and three months £29. 17s. 6d. for soft; English, £32. 2s. 6d. **Spelter** very firm, and good demand at £32. 12s. 6d. per ton prompt, and £32. 17s. 6d. forward. **Zinc Sheets** steady, with English at £39. 2s. 6d. per ton, on rail at makers' works. **Seed Oils** firmly held, and little business transacted: Raw **Linseed** £2. 5s 9d., boiled £2. 7s. 9d. per cwt.; **Cottonseed Oil,** common edible £2. 6s. 1½d., and deodorised £2. 8s. 3d. per cwt. **Rape Oil** firm; refined, prompt, £2. 7s. 3d. per cwt., net, in barrels. **Cod Oil** steady, with Newfoundland at £2. 5s. 3d., and English £1. 13s. 9d. per cwt. **Coconut Oil** quiet, with Ceylon at £2. 7s. 3d. per cwt. **Castor Oil** quiet and steady, with best at £3. 6s. 3d.; seconds, £3. 0s. 3d. per cwt., net, in barrels. **Olive Oil** scarce at £66. 7s. 6d. per ton, ex ship. **Palm Oil** firmer; Lagos, £38. 2s. 6d. prompt, £38. 5s. forward; softs, £37. 12s. 6d. prompt, £37. 10s. forward; mediums, £37. 12s. 6d.; and hards, £37. 12s. 6d., all per ton, at docks. **Turpentine,** £3. 12s. 9d. per cwt. for American refined. **Pitch** prices have again receded, and some transactions have taken place under £5. per ton; spot quotations are about £5. 3s. 6d. **Creosote** not so active at 8¾d. per gallon. **Benzol** in slightly better demand at 1s. 1d. per gallon up to 1s. 4d. **Tar** in fair request at £1. 13s. 4½d. per 40 gallon cask for refined, and about £4. 12s. 3d. per ton for crude, f.o.r. at ovens. **Nitrate of Soda** slow at £13. 7s. 6d. per ton, in cwt. bags. **Sulphate of Ammonia** quiet. **Sulphate of Copper** remains dull at £25. 7s. 6d. per ton, less 5%, in casks, f.o.b. **Bone Meal** dull, with Indian prompt at £9. 2s. 6d. per ton. **Arsenic** in better demand, with white powdered at £68. 12s. 6d. per ton. **Oxalic Acid** very quiet at 6¼d. per lb., f.o.r. **Sulphuric Acid** in good demand, and price unchanged. **Copperas** dull at £2. 2s. 6d. per ton, with free delivery to London or equal. **Coal** market showed very little business: Best Admiralty smokeless £1. 9s., seconds £1. 8s. 6d.; ordinaries, £1. 7s.; Monmouthshire black vein, £1. 8s. 6d., all per ton, f.o.b. **Anthracite** qualities, large £2., seconds £1. 15s., Paris and French Nuts £2. 12s. 6d., all per ton, f.o.b. There was an active call for **Cokes** at former rates. **Patent Fuel** firm from £1. 9s. to £1. 12s. 6d. per ton, f.o.b.

LIVERPOOL CHEMICAL MARKET. MONDAY.

With respect to buying and selling of the heavier chemicals, the New Year may be said to have begun. The business done has been on 1924 account, and, in volume, has been quite as large as could have been expected, with exports steady. The British home trade continues in a very fair condition. **Bleaching Powder** has been quieter; the price of spot and for export is £11. per ton, special prices being quoted for contracts, according to requirements. **Chloride of Calcium** has again been in moderate demand, and is £5. 12s. 6d. per ton. **Caustic Soda** has sold rather freely for use in the U.K., and has had a fairly active shipment; it is £19. 7s. 6d. per ton for 76%, carriage paid, to home-trade buyers; special prices, according to requirements, being quoted for contracts. **Bicarbonate of Soda** has met with a steady and good inquiry for use in the United Kingdom, and has had a very fair shipment to overseas ports; it is £10. 10s. per ton, in bags, carriage paid, for use by the home trade. **Soda Crystals** have again sold rather freely for use in the U.K.; they are £5. 5s. per ton, carriage paid, to home-trade users. **Nitrate of Soda** has had a steady but moderate inquiry, and is £13. 5s. to £13. 10s. per ton. **Borax** has been in very fair demand; commercial crystals are £25. per ton, and powdered is £26.; higher grades are—crystals £29. per ton, powdered £30., and superfine £31. per ton, in 2cwt. bags, carriage paid to the home trade. **Saltcake** has been more in demand; it is £4. 10s. to £5. per ton for use in Great Britain, and £5. to £6. per ton for export. **Bichromate of Soda** has been in fair request, and is 4½d. to 4¾d. per lb. **Ammonia Alkali** has sold with some freedom for use in the U.K., and has had an active shipment on export account; it is £6. 15s. per ton, f.o.r., for the home trade; special prices are quoted for contracts and for export, according to destination. **Hyposulphite of Soda** has been steadily called for; it is £10. per ton, in 2cwt. bags, for commercial, and £15. per ton for photographic. **Sulphide of Soda** has been quieter; it is £14. 15s. to £15. 15s. per ton for solid, and £9. 2s. 6d. to £9. 17s. 6d. per ton for crystals. **Chlorate of Soda** has been very quiet, and is 3d. per lb. **Phosphate of Soda** has had a moderate inquiry, and is £14. 10s. to £15. per ton. **Prussiate of Soda**

has been but little called for, and is 6d. per lb. **Yellow Prussiate of Potash** has been in somewhat freer request, and is 10d. to 10½d. per lb. **Red Prussiate** has been rather more in demand, and is 2s. 8d. per lb. **Carbonate of Potash** has been in good request; it is £25. 10s. to £28. per ton, according to test. **Nitrate of Potash** has had a steady inquiry, and is £29. to £32. per ton. **Chlorate of Potash** has had a very limited inquiry, and is 3d. per lb. **Caustic Potash** has been quieter, and is £32. to £33. per ton. **Permanganate of Potash** has been in fair request, and is 9d. to 9½d. per lb. **Bichromate of Potash** has been in quietly steady demand, and is 5¾d. per lb., c.i.f. to usual ports. **Salammoniac** has been in very fair demand; first quality is £55. per ton, and second quality £52. per ton. **Sulphate of Ammonia** has been quiet on British home-trade account, but has had an active shipment to foreign ports; neutral of 25¾% is £14. 16s. per ton, and ordinary of 25¼% £13. 13s. per ton; for January neutral is £15. 2s. per ton; for February, £15. 3s.; and for March to May, £15. 5s. per ton, for use in the U.K.; the price of ordinary also being slightly increased. **Carbonate of Ammonia** has been in good request, and is 4d. per lb. **Muriate of Ammonia** has been rather more in demand; grey is £32. per ton. **Magnesia** has been in good request; **Carbonate** is £1. 17s. 6d. per cwt., and **Sulphate** from £4. 15s. to £6. 15s. per ton. **Alum** has sold more readily; it is £11. per ton for use by the home trade, and £11. to £11. 10s. per ton for export. **Sulphate of Alumina** has been rather more in demand, and is £8 to £11. per ton, according to quality. **Sulphur** has had a steady and very fair inquiry; flowers are £9. 10s. per ton; roll is £8. 10s.; rock, £8.; and American, £5. 10s. per ton. **Tartaric Acid** has been in fair demand, and is 1s. 1d. to 1s. 1½d. per lb. **Cream of Tartar** has been in good request, and is £4. 6s. to £4. 8s. per cwt. **Boric Acid** has been quieter: commercial is £48. per ton, and powdered £51.; B.P. grades are £54. to £60. per ton, carriage paid, for the home trade. **Citric Acid** continues quiet, and the price has tended to ease; it may be given as 1s. 5d. per lb. **Oxalic Acid** has been but little called for, and is 6d. per lb. **White Acetate of Lead** has had a fair inquiry, and is £44. 10s. to £45. per ton. **Sulphate of Copper** has been but little in demand for use in the U.K., and has been quieter in the export branch; it is £25. per ton, less 5%, in casks, f.o.b. at Liverpool. **Arsenic** has been neglected, the increased price having apparently checked the demand; the high price is still maintained, white powdered being £68. to £69. per ton.

WEST OF SCOTLAND CHEMICALS. Monday.

Business is at a low ebb at the moment of writing, and will continue to be so over the next few days. Dealers are looking forward to the New Year, the better conditions of employment giving rise to hopeful anticipations. Prices generally are steady as follows: **Alum**, lump, £12. 5s. per ton; ground, £12. per ton; these prices are for spot lots, and quotations for new business might be lower. **Arsenic**, white powdered, scarce at £70. 10s. per ton on spot; some resale material is obtainable at this price. **Barium Chloride**, £15. per ton; at this price the market remains steady; foreign imported material offered round £14. to £14. 5s. **Bleaching Powder**, quiet at £11. per ton for spot parcels; there is little doing, and contract business would probably be taken at under this figure. **Boric Acid**, crystals, £48. per ton, carriage paid in the U.K., makers' prices. **Borax**, crystals, fairly steady at £25. per ton, delivered; granulated, £24. 10s. per ton; imported qualities lower. **Calcium Chloride**, 70—75%, solid, £5. 10s. per ton on spot; Continental material quoted below this figure. **Citric Acid**, 1s. 5d per lb., less 5%; business a little firmer at this figure, with some local inquiry. **Copper Sulphate**, £25. 15s. per ton, less 5%. **Cream of Tartar**, £4. 1s. per cwt. for 99% at Glasgow; quotation steady, and inquiry small. **Lead Acetate**, white, £44. per ton on spot; brown, good inquiry at £45. per ton; Continental material offering at slightly cheaper rates. **Magnesium Chloride**, £3. 5s. per ton, ex store; foreign material quoted at much under this figure. **Oxalic Acid**, quiet at 5¾d. per lb.; inquiry in this direction is moderate. **Paraffin Wax**, 2¾d. per lb.; a fair export trade. **Potassium Bichromate**, 5¾d. per lb., delivered; this figure has held steady for some little time now. **Potassium Chlorate**, crystals and powder, 3¾d. per lb.; quietly steady inquiry. **Potassium Prussiate**, crystals, 1s. per lb.; at this price there is only a medium inquiry. **Salammoniac**, first and second lump, £55. and £52 10s. per ton respectively; crystals, £48. 10s. per ton; at these reduced quotations the market is rather inactive. **Saltpetre**, £1. 12s. per cwt., net; a better market, with price unaltered; fresh arrivals are cheaper. **Sodium Bichromate**, 4½d. per lb.; unchanged. **Sodium Chlorate**, 3½d. per lb.; a quiet market, with price unaltered. **Sodium Prussiate**, 7d. per lb., ex store; the spot market remains fairly steady, with but little demand. **Sodium Bicarbonate**, £9. 15s. per ton, in 2cwt. bags; £12. in 1cwt. kegs; in good supply, with steady inquiry. **Tartar Emetic**, 43—44%, 1s. 1d. per lb.; inclined to be dull. **Tartaric Acid**, 1s. 1d. per lb., less 5%, at Glasgow.

IMPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

LIST OF CONTRACTIONS USED IN THE IMPORT AND EXPORT LIST.

Blns.	Balloons.	Cbys.	Carboys.	Gals., Gls., or Glns.	Gallons.	Qnty.	Quantity (otherwise undeclared).	qr.	Quarters.
Bls.	Bales.	Css. or Cs.	Cases.					lb.	Pounds.
Brls.	Barrels.	Cks.	Casks.	Hf. pps.	Half pipes.				
Bgs.	Bags.	Chts.	Chests.	Hhds.	Hogsheads.	Rnlts.	Runlets.		
Btls.	Bottles.	Cylds.	Cylinders.	Kgs.	Kegs.	Sks.	Sacks.		
Bdls.	Bundles.	Drms.	Drums.	Oz.	Ounces.	Slbs.	Slabs.		
Bskts.	Baskets.	Djns.	Demijohns.	Pkgs.	Packages.	Tcs.	Tierces.		
Bxs.	Boxes.	Frkns.	Firkins.	Pns. Puns.	Puncheons.	t. c.	Tons. Cwts.		

Note.—There is no information available as to the net weights of the various items, nor do we recognise in them any standard.

GLASGOW.

Week ending December 22.

BARYTES—
Antwerp, 100 bgs.

BASIC SLAG—
Ghent, 500 bgs.

BONE BLACK—
New York, 20 bgs.

CARBON BLACK—
New Orleans, 110 cs.

CHEMICALS (*otherwise undescribed*)
Hamburg, 52 pkgs.

CREAM OF TARTAR—
Bordeaux, 80 brls., 16 cks.
Marseilles, 99 brls.

DYESTUFFS (ARTIFICIAL)—
Nigrosine
Adelaide, 3 cks.

GLUE—
Antwerp, 371 pkgs.

KIESELGUHR—
Nantes, 400 bgs.

LITHARGE—
Marseilles, 19 cks.

OCHRE—
Marseilles, 40 ck.

POTASSIUM SALTS (*otherwise undescribed*)—
Antwerp, 2,000 bgs. and 50 t.

SOAP—
Marseilles, 60 cs.
Melbourne, 600 cs.
New Orleans, 400 brls.

STEARINE—
Buenos Ayres, 151 cks.
New York, 176 brls.

SUPERPHOSPHATE—
Antwerp, 22 bgs.

TANNING MATERIALS—
Myrabolans
Bombay, 1,280 bgs.
Calcutta, 4,900 pkts.
Quebracho
Buenos Ayres, 9,743 bgs.
Wattle
Durban, 2,540 bls., 5,148 bgs.

ULTRAMARINE BLUE—
Antwerp, 5 cks.

WAX (*otherwise undescribed*)—
Hamburg, 40 bls.
Rangoon, 160 bgs.

GOOLE.

Week ending December 22.

BARYTES—
Antwerp, 100 bgs.

CHLOROPHYLL—
Amsterdam, 10 cs.

COLOURS (*otherwise undescribed*)—
Hamburg, 2 cks.

DEXTRINE—
Hamburg, 200 bgs.

FERRO CHROME—
Antwerp, 56 cs.

FORMIC ACID—
Hamburg, 78 crbys.

GLUCOSE—
Hamburg, 71 cks.

HYDROGEN PEROXIDE—
Ghent, 80 crbys.

KAINIT—
Antwerp, 480 bgs.

KIESELGUHR—
Copenhagen, 250 bgs.

LITHOPONE—
Antwerp, 8 cks.

SILICO FLUORIDE—
Rotterdam, 50 bgs.

WHITE LEAD—
Antwerp, 58 brls., 25 pkgs.

GRANGEMOUTH.

Week ending December 22.

ACID (*otherwise undescribed*)—
Rotterdam, 5 cks.

COPPER SULPHATE—
Antwerp, 50 bgs.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Antwerp, 3 cks.

DYESTUFFS (ARTIFICIAL)
Unspecified
Antwerp, 3 cks.

FERRO SILICON
Antwerp, 220 brls.

POTASH ALUM
Antwerp, 29 cks.

SODIUM CHLORATE
Antwerp, 100 cs.

GRIMSBY.

Week ending December 22.

CHEMICALS (*otherwise undescribed*)
Hamburg, 3 cs.

COLOURS (*otherwise undescribed*)
Hamburg, 5 crts.

DYESTUFFS (ARTIFICIAL)
Unspecified
Hamburg, 50 crts.

GUANO (FISH)
Saadenes, 4,200 bgs.

KAINIT
Antwerp, 206 t., 500 bgs.
Hamburg, 100 t.

POTASSIUM CARBONATE
Hamburg, 2 cs.

SOAP
Antwerp, 2 cs., 5 bxs.

WHITE LEAD
Antwerp, 25 pkgs.

HULL.

Week ending December 22.

CALCIUM CHLORIDE
Amsterdam, 12 t. 10 c.

CHEMICALS (*otherwise undescribed*)
Antwerp, 1 t. 10 c.; Bombay, 5 c.; Copenhagen, 96 galls.; Dunkirk, 5 t., 40 galls.; Ghent, 100 galls.; Hamburg, 4 t.

COAL TAR PRODUCTS
Creosote
Gothenburg, 3 c.
Naphthalene
Rouen, 110 t.

DECOLOURISING CARBON
Amsterdam, 1 t. 18 c.

DEXTRINE
Amsterdam, 24 t. 12 c.

DYESTUFFS (ARTIFICIAL)
Alizarine
Rotterdam, 2,400 lb.

FERRO CHROME
Antwerp, 33 t.; Dunkirk, 27 t.

FERRO MANGANESE
Gothenburg, 60 t.

FERRO SILICON
Christiania, 150 t.; Gothenburg, 33 t.; Gruz, 54 t.; Uddevalla, 110 t.

FERTILISERS (*otherwise undes.*)
Christiania, 10 t.

FULLER'S EARTH
Norfolk, 46 t. 5 c.

GLUE
Antwerp, 6 t. 3 c.

GLYCERINE
Rotterdam, 10 c.

KAINIT
Antwerp, 350 t.

MAGNESIUM SULPHATE
Rotterdam, 3 t.

PARAFFIN WAX
Philadelphia, 2 t. 2 c.

PHOSPHATE (*otherwise undescribed*)
Bona, 2,625 t.

ROSIN
Bordeaux, 25 t. 6 c.; Gothenburg, 12 t.; Pasages, 131 t.; Santander, 9 t. 14 c.

SALTPETRE
Rotterdam, 3 t.

STEARINE
Antwerp, 2 t.

TALLOW
Christiania, 31 t.
Copenhagen, 19 t. 14 c.

TANNING MATERIALS
Wattle
Durban, 1,050 t.

LEITH.

Week ending December 22.

ACETIC ACID
Antwerp and Ghent, 19 cks.
Rotterdam, 5 cks.

ALUMINA
Gothenburg, 52 cks.

BARYTES
Antwerp and Ghent, 250 bgs., 1ck.

COPPER SULPHATE
Antwerp, 20 cks.

CREAM OF TARTAR
Hamburg, 7 cs.

FERRO SILICON
Gothenburg, 220 brls.

FERTILISER (POTASH)
Antwerp, and Ghent, 100 t., 1,500 bgs.

GLUE
Amsterdam, 110 bgs.

METHYL ALCOHOL
Gothenburg, 11 cks.

SALT
Hamburg, 650 bgs.

SOAP
Copenhagen and Christiansand, 8 cs.

SUPERPHOSPHATE
Antwerp, 500 bgs.

LIVERPOOL.

Week ending December 22.

ACETIC ACID
Holland, 25 cks.

ALUNITE
Australia, 160 t.

ARGOLS
France, 110 bgs.

BARIUM SULPHATE
Portugal, 2 cs.

BAUXITE
France, 50 t.

BORATE OF LIME
Argentine, 600 bgs.

CARBON BLACK
U.S.A., 190 cs.

CARNAUBA WAX
Brazil, 119 bgs.

CAUSTIC POTASH
Belgium, 6 drms.

CREAM OF TARTAR
Germany, 80 kgs.; Italy, 100 kgs.

CRYOLITE
Denmark, 200 bgs.

DYESTUFFS (NATURAL)
Hematine
U.S.A., 10 brls.

FERTILISER (*otherwise undescribed*)
French Congo, 3,200 bgs.

ISINGLASS
Brazil, 2 bgs.

LITHOPONE
Holland, 100 cks.

MAGNESITE (CALCINED)
Greece, 750 t.

MAGNESIUM SALTS
Germany, 100 bgs.

MANGANESE ORE
Holland, 71 t.; India, 3,000 t.

MINERAL COLOURS (*otherwise undescribed*)
Czecho-Slovakia, 5 cks.

NAPHTHA (WOOD)
Germany, 21 drms.

OCHRE
France, 6 cks.

PARAFFIN SCALE
U.S.A., 213 bgs., 1,280 brls.

PHOSPHATE OF LIME
Belgium, 750 bgs.

PLUMBAGO
France, 19 c.

POTASSIUM CARBONATE
Germany, 98 cks.

PYRITES
Norway, 1,652 t.

ROSIN
U.S.A., 3,622 brls.

SALAMMONIAC
Germany, 15 cks.

SOAP
Denmark, £16.; France, £42.

STEARINE
Belgium, 76 bgs.

SULPHUR
Italy, 465 bgs.

SUPERPHOSPHATE
Belgium, 50 dble. bgs.

TALLOW
Argentine, 148 tcs.
Holland, 90 brls.

TANNING MATERIALS
Chestnut
France, 70 cks.
Gambier
Straits, 170 cs.
Myrabolans
India, 1,270 bgs., 6,248 pkts.,
Quebracho
Argentine, 26,521 bgs.
Sumac
Sicily, 200 bgs.
Valonia
Smyrna, 811 bgs.
Wattle
Argentine, 60 bgs.
South Africa, 1,286 bgs.

TARTARIC ACID
France, 10 kgs.
Holland, 2 cks., 21 kgs.

TURPENTINE
Portugal, 3 drms.
U.S.A., 590 brls.

ULTRAMARINE
Italy, 16 cks.

WHITE LEAD
Belgium, 66 cks.; Holland, 40 drms.; U.S.A., 66 cks.

ZINC OXIDE
Belgium, 50 brls.
Holland, 25 cks.

LONDON.

OFFICIAL AMENDMENTS.

In return for week ending Nov. 17.

SODIUM BICHROMATE
U.S.A., 11 t. 4 c.
Should read
U.S.A., 5 t.

In return for week ending October 2,

ALBUMEN
Belgium, £60.
Should read
Belgium, £860.

Week ending December 21.

ACETONE
Czecho-Slovakia, 15 t 2 c. V. Blagden
U.S.A., 20 5 ,,

ACID (*otherwise undescribed*)
Czecho-Slovakia, 1 pkg. F. P. Priestley
Germany, 5 Brit. Drug. Houses

ALBUMEN
China, £504.
,, £1,200. Baxter, Hoare
,, £1,818. W. M. Smith
,, £493. A. H. Pickering
France, £1,209. Baxter, Hoare

ALUMINIUM SULPHATE
France, 600 pkgs. J. Bailey

ANTIMONY
China, 10 t. Cookson
,, 7 Hoare, Wilson

ANTIMONY REGULUS
Belgium, 19 t.
China, 2 c. Cookson

ARGOLS
Argentine, 297 pkgs.
France, 950
Italy, 428
Portugal, 346
Spain, 325

ARSENIC
Japan, 8 t 14 c.

ARSENIOUS ACID
Japan, £160. W. S. Bowditch

ARSENIOUS OXIDE
Victoria, £502. Bullard, King

BARIUM CHLORIDE
Czecho-Slovakia, £235. T. P. Priestley

BARYTES
Germany, 266 cks. Pallister, Luck
,, 150 bgs. G. Elliott
,, 65 cks. E. Friedlander
,, 33 Taylor & Cox
Spain, 120 Dexters

BEESWAX
B.W.I., 2 pkgs. Weber, Smith & Hoare
Brit. India, 14 cs.
Egypt, 40 bgs. E. E. Mayer
Pt. E. Africa, 24 pkgs.
,, 220 bgs.

BLEACHING POWDER
Belgium, 5 t.

BONE BLACK
U.S.A., £125.

BORAX
U.S.A., 65 t. C. Christopherson

CALCIUM CARBIDE
Germany, 18 t. 18 c. W. Cannell
Norway, 302 7 J. Spurling

CAMPHOR
China, 150 cs. W. M. Smith
Japan, 50 ,,
,, 50
,, 75 R. Warner

CARBON BLACK
France, 10 cks. Hernu, Peru
U.S.A., 200 bgs.

CARNAUBA WAX
Brazil, 20 bgs. Weber, Smith & Hoare

CASEIN
Argentine, £1,127.
,, £1,152. Duche
,, £25. H. Trengrowse
France, £90. Guesdon
,, £688. W. Bryan
,, £1,680.
N.Z., £700. J. Nathan

CAUSTIC POTASH
Czecho-Slovakia, 40 pkgs.
Germany, 76 J. M. Steel

CHEMICALS (*otherwise undescribed*)
B.W.I., £206. E. A. White
Brit. India, £120. F. A. Hodgkinson
France, £103. Mory
,, £350.
Germany, £27. Schnurmann
,, £49. Scheuer
,, £16. H. Maclaine
,, £71. Hertz
,, £45. Borme
Holland, £50. India Rubber, Gutta Percha & Tel.
Italy, £108. McGregor, Gow & Holland
,, £175.
Sweden, £470.
U.S.A., £52.
,, £476. Morison, Pollexfen & Blair
,, £144. Furness Withy

CHEMICALS (*otherwise undes.*)*
£1,759

COAL TAR PRODUCTS
Unspecified
Belgium, £82. Lazard
Godchaux Dyes
Germany, £323.

CREAM OF TARTAR
Algeria, 100 pkgs. E. W. Taylor
,, 40 McDougall & Brotherton
France, 200 E. W. Taylor
,, 100 R. Warner
Germany, 28 R. Morrison
Spain, 10

* Entered under the Safeguarding of Industries Act.

DEXTRINE—
Germany, 4 t. Pronk Davis & Rushby
Holland, 4 t. 10 c. R. Windmuller
,, 12 4 K. J. Mulded
,, 7 M. V. Thacker
,, 1 F. G. Angel
,, 2
U.S.A., 2 10
,, 4 10 R. Windmuller

DYESTUFFS (ARTIFICIAL)
Unspecified
Germany, 2 pkgs. Pronk, Davis & Rushby
,, 60 Greeff
Switzerland, 2

DYESTUFFS (NATURAL)—
Annatto
Denmark, 4 tanks
France, 7 pkgs. H. Frischmann
Logwood
B.W.I., 191 pkgs. Perkins & Homer

FERTILISERS (*otherwise undes.*)—
Ascunsion Is., 10 t. Ascun. Is. Phos. Guano
Belgium, 40
Brazil, 6 Beresford
,, 33 Renny Forbes

FORMALDEHYDE—
Canada, 196 pkgs. V. Blagden
U.S.A., 250 ,,

FUSEL OIL—
Irish F.S., 2 cks. Honeywill
Spain, 3 Scheuer

GELATINE—
Belgium, €1,320. Duche
,, €270. Soc. des Prod. Chim.
,, €435.
France, €88. Union Glue & Gel.
Germany, €563.
,, €33. W. A. J. Tilleray
Holland, €78. Badham
,, €598. Symons

GLUE—
Belgium, €114. Cazaly, Mills
,, €80. P. Ingenlath
,, €292.
France, €560. J. Maheet
,, €16. Crowe
,, €231. Symons
,, €33. Butcher, Witherley
,, €440.
Holland, €220. P. Ingenlath
Latvia, €800. Neale & Wilkinson
Roumania, €340. Union Glue & Gel.
U.S.A., €99. Knight & Morris

GLYCERINE—
Holland, €152.

GYPSUM—
France, 900 t.

ISINGLASS—
Brit. India, 2 cs. Major & Field
Japan, 15 bls.

KIESELGUHR—
Czecho-Slovakia, 30 t. W. L. Payne
U.S.A., 24 | 2 c. T. Meadows
,, 25 Garton

LITHOPONE—
Holland, 100 cks. F. T. H. Nye

MAGNESITE—
Holland, €210.

MINERAL COLOURS (*otherwise undescribed*)—
France, 4 cks. O. Murray
Italy, 8 brls. W. Harrison
,, 19 pkgs. M. Isaacs
Spain, 24 brls. W. Habakkuk

OCHRE—
France, 31 cks. W. Harrison
,, 18 Taylor & Cox
Spain, 60 brls. C. S. Levell
U.S.A., 20 cks. J. Johnson

PARAFFIN WAX—
U.S.A., 111 t. Anglo-Amer.
,, 25 11 c.
,, 33 Prices Pat. Candle

PHENACETIN—
——— €252.

PHOSPHATE (*otherwise undescribed*)
Belgium, 130 t. C. Page

PLUMBAGO—
Ceylon, 25 brls. Morgan
,, 1 cs. Crucible
,, 30 brls. W. Wallace
Germany, 175 bgs. J. G. Hems
Madagascar, 7,590 Morgan Crucible
,, 25

POTASSIUM BROMIDE—
Germany, 10 pkgs. B. J. Howlett

POTASSIUM CARBONATE—
Germany, 10 pkgs. Bush, Beach & Gent
,, 9

POTASSIUM CHLORATE—
France, 500 pkgs. E. J. Brash
,, 10 Symons
Germany, 60 J. M. Steel

POTASSIUM PERMANGANATE—
Germany, 5 pkgs. Petri

RED LEAD—
Italy, 217 cks.

ROSIN—
France, 350 cks.
,, 200
U.S.A., 100 brls.
,, 200 Lowden Connell
,, 100 Nicholl & Knight
,, 150 Bigland & Jeffries

SALAMMONIAC—
Germany, 5 pkgs. Bush, Beach & Gent

SHELLAC—
Belgium, 5 c. A. F. Suter
Brit. India, 92 t. 1 c. J. W. Cook
,, 7 c. Kingston & Stewart
,, 1 t. 3 c. Litchfield & Saundy
Spain, 2 c. Reitmeyer, Calburn & Kindersley

SILVER NITRATE—*
——— €293.

SOAP—
Belgium, €33. Butlers & Crispe
Denmark €69.
,, €11. Beck & Pollitzer
France, €32. E. E. Mayer
,, €49. Stewart & Esplen
,, €132. T. Cook
,, €12. Mory
,, €138.
,, €4. Shaw Lovell
,, €64. P. Le Brun
,, €30. Weber Smith & Hoare
,, €27. F. Cokinaki
,, €8. Symons
,, €16. W. H. Muller
Germany, €239. S. Kalisky
,, €70.
,, €91. Beck & Pollitzer
Spain, €27.
U.S.A., €343.
,, €907 Knight & Morris
,, €2,941. H. C. Hackney

SODA CRYSTALS—
Belgium, 5 t. P. Winn

SODIUM HYPOSULPHITE—
France, 5 t.

SODIUM NITRITE—
Germany, 5 t.

SODIUM SALTS (*otherwise undes.*)
Belgium, 10 t.
Germany, 1 Van Oppen

STEARINE—
Belgium, 13 bgs. A. C. Garnham
Denmark, 1 cs.
Holland, 57 bgs.
U.S.A., 10 W. H. Bankier

SULPHUR
Italy, €44. J. S. Holt & Moseley
,, €40. G. W. Wheatley

TALLOW
Argentine, 24 t. 12 c. A. C. Garnham
,, 30 H. C. Everett
,, 197 Poynter & Marshall
,, 98 14 T. H. Harris
N.Z., 35 1 Lever
,, 37 9
,, 76 5 Weber, Smith & Hoare
,, 15 12 Goad, Rigg
,, 29 15 H. Hill
,, 112 3 Thornett & Fehr

TANNING MATERIALS—
Gambier
Straits, 152 pkgs. A. Everingham
Myrabolans
Brit. India, 600 pkgs. Fisher, King
,, 2,000
,, 1,000 Wills
Oak
Belgium, 908 pkgs.
Switzerland, 1
Sumac
Italy, 100 pkgs. Gough, Kidston
Unspecified
Belgium, 45 pkgs. J. G. Holt & Moseley
Queensland, 13 t. J. W. Cook

TAR (*otherwise undescribed*)—
France, 55 cks. P. Le Brun
Poland, 16 Thornett & Fehr
U.S.A., 100

TARTARIC ACID—
Holland, 70 pkgs. J. Knill
Italy, 220

TURPENTINE—
Finland, 32 drms. Smith & Moller
Poland, 31 cks. Thornett & Fehr
Sweden, 3 brls.
U.S.A., 500
,, 50 drms. Lowden, Connell

ULTRAMARINE—
France, 4 cks.

WAX (*otherwise undescribed*)—
Japan, 50 bgs.

WHITE LEAD—
France, 13 brls. Dexters
Holland, 40 cks. Chance & Hunt
Italy, 112

ZINC OXIDE—
Belgium, 230 cks. M. Ashby
Germany, 125 Stephens
Holland, 125 M. Ashby

MANCHESTER.

Week ending December 22.

ACETIC ACID—
Amsterdam, 46 cks.
Rotterdam, 5 cks.
St. John (N.B.), 672 brls.

BARIUM CHLORIDE—
Hamburg, 93 cks.

BARYTES—
Bremen, 92 cks., 350 bgs.

CARBON BLACK—
New Orleans, 939 cs.

CAUSTIC POTASH—
Hamburg, 71 drms.

CHEMICALS (*otherwise undescribed*)
Bremen, 2 cs.
Hamburg, 120 drms.

DEXTRINE
Amsterdam, 300 bgs.; Baltimore, 6,583 bgs.; Hamburg, 300 bgs.; Newport News, 7,040 bgs.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Rotterdam, 17 cks.
Unspecified
Hamburg, 104 cks.
Rotterdam, 18 cks.

FORMALDEHYDE—
Bremen, 45 crbys.
Philadelphia, 350 brls.

FORMIC ACID—
Hamburg, 95 cks.

GLUCOSE—
Hamburg, 300 bgs., 73 cks., 50 brls.

GLUE AND GELATINE
Antwerp, 142 bls.; Bremen, 2 cs.; Rotterdam, 60 bgs.

LITHOPONE—
Rotterdam, 200 cks.

MAGNESITE—
Rotterdam, 220 bgs.

MINERAL COLOURS (*otherwise undescribed*)—
Bremen, 39 cks., 100 bgs.
Hamburg, 4 cks., 16 bgs.

MINERAL WAX—
Hamburg, 10 bgs.

OCHRE—
Norfolk, 130 brls.

OXALIC ACID—
Rotterdam, 12 cks.

PARAFFIN WAX—
Baltimore, 219 bgs.
Philadelphia, 175 brls.

PITCH (STEARINE)—
Antwerp, 20 cks.

POTASH (*otherwise undescribed*)
Antwerp, 50 bgs.
Hamburg, 10 crts.

POTASSIUM CARBONATE—
Hamburg, 34 brls.

POTASSIUM PERMANGANATE—
Hamburg, 10 drms.

POTASSIUM PRUSSIATE—
Rotterdam, 8 cks.

SALAMMONIAC—
Hamburg, 8 cks.

SALTPETRE—
Antwerp, 90 bgs.

SCALE WAX—
Philadelphia, 600 brls.

SODIUM ACETATE—
Hamburg, 15 cks.

SODIUM NITRITE—
Rotterdam, 7 cks.

SODIUM PERBORATE—
Hamburg, 48 drms.

SODIUM PHOSPHATE—
Amsterdam, 73 cks.
Hamburg, 20 cks.

STEARINE—
Antwerp, 26 bgs.

TANNIC ACID—
Antwerp, 10 cks.

TANNING MATERIALS—
Unspecified
Hamburg, 27 brls.
Philadelphia, 190 bxs.

ULTRAMARINE—
Bremen, 2 cs.

WAX (*otherwise undescribed*)—
New Orleans, 1,582 brls.
Philadelphia, 697 brls.

WHITE LEAD—
Antwerp, 60 cks.
Hamburg, 19 cks.

ZINC OXIDE—
Antwerp, 40 cks.

ZINC WHITE—
Rotterdam, 100 cks.

NEWCASTLE-ON-TYNE

Week ending December 21.

ACETIC ACID—
Rotterdam, 10 cks.

AMMONIA—
Hamburg, 25 cks.

BARYTES—
Hamburg, 72 brls.

BONE BLACK—
New York, 20 brls.

CALCIUM CARBIDE
Christiania, 340 drms.
Gothenburg, 200 drms.

GLUCOSE—
New York, 120 brls.

* Entered under the Safeguarding of Industries Act.

GLUE—
Antwerp, 99 bls.

KIESELGUHR—
Bergen, 600 bgs.

PARAFFIN SCALE—
New York, 410 brls.

SALT—
Hamburg, 600 bgs.

SALTPETRE
Hamburg, 40 kgs.

SODIUM NITRATE—
Christiania, 51 bgs.

TAR (WOOD)—
Gothenburg, 110 brls.

WHITE LEAD—
Antwerp, 8 drms.

ZINC OXIDE—
Antwerp, 12 brls.

ZINC OXIDE—
Rotterdam, 5 cks.

N. & S. SHIELDS.

Week ending December 22.

NIL.

EXPORTS OF CHEMICAL PRODUCTS

At the Principal Ports of the United Kingdom.

GLASGOW.

Week ending December 22.

BOILER COMPOSITION—
Shanghai, £74.

CHEMICALS (*otherwise undescribed*)
Antwerp, 13 pkgs.; Beira, 185 pkgs.; Bombay, 1 pkg.; Cape Town, 20 pkgs.; Delagoa Bay, 940 pkgs.; Durban, 70 pkgs.; Halifax (N.S.), 400 pkgs.; Kobe, 504 pkgs.; Leghorn, 5 pkgs.; Rouen, 416 pkgs.; Vancouver, 101 pkgs.; Yokohama, 342 pkgs.

COAL TAR PRODUCTS—
Creosote
Monte Video, 9 t.
Tar
Beira, 7 t. 12 c.; Cape Town, 67 t. 13 c.; Durban, 11 t. 11 c.; Hong Kong, 16 c.; Rangoon; 6 bls.
Unspecified
Hong Kong, £17.

DISINFECTANTS (*otherwise undes.*)
Durban, 9 t. 18 c.

GLYCERINE—
Durban, 11 t.

GUANO—
Yokohama, 196 t.

PARAFFIN WAX—
Gijon, 25 t.

POTASSIUM BICHROMATE—
Kobe, 5 t. 1 c.; Rouen, 22 t. 8 c.; Shanghai, 7 t. 6 c.

SHEEP DIP—
Beira, 14 t. 4 c.; Buenos Ayres, 16 t. 14 c.; Cape Town, 1 t. 9 c.

SOAP—
Cape Town, 1 t. 13 c.

SODA CRYSTALS—
Calcutta, 4 c.

SODIUM BICHROMATE—
Rouen, 10 t. 3 c.

WOOD PRESERVATIVE—
Beira, 14 c.

GRANGEMOUTH.

Week ending December 22.

AMMONIUM CARBONATE—
Christiania, 5 kgs

BOILER COMPOSITION—
Christiania, 112 bgs.

CALCIUM ACID PHOSPHATE—
Christiania, 11 kgs.

COAL TAR PRODUCTS—
Creosote Oil
Christiania, 25 brls.
Pitch
Antwerp, 52 t.; Dunkirk, 440 t.

IODINE—
Dunkirk, 3 cks.

MAGNESIUM OXIDE—
Rouen, 25 cs., 7 cks.
Rotterdam, 10 c. and 10 cks.

PARAFFIN WAX—
Bordeaux, 80 bgs.; Dunkirk, 16 bgs.; Rouen, 680 bgs.

PITCH (*otherwise undescribed*)—
Stockholm, 6 brls.

POTASH (*otherwise undescribed*)—
Stockholm, 30 t.

POTASSIUM BICARBONATE—
Dunkirk, 10 cks.
Newfairwater, 13 cks.
Rouen, 10 cks.

POTASSIUM BICHROMATE—
Bordeaux, 46 cks.

SODIUM BICARBONATE—
Newfairwater, 18 cks.
Rouen, 48 cks.

SPERMACETTI WAX—
Stockholm, 10 cs.

WAX (*otherwise undescribed*)—
Stockholm, 16 bgs.

HULL.

Week ending December 18.

CAUSTIC SODA—
Wasa, 74 drms.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 18 drms.; Antwerp, 7 pkgs., 7 drms.; Christiania 10 cs., 310 pkgs.; Copenhagen, 6 cs., 35 drms.; Danzig, 10 kgs., 4 cks.; Gothenburg, 2 pkgs.; Hamburg, 100 cs., 34 drms.; Rotterdam, 4 pkgs.; St. John (N.B.), 5 cks., 160 bgs., 15 brls.; Wasa, 5 bxs.

COAL TAR PRODUCTS—
Creosote
Karachi, 6 drms.
Pt. Said, 6 drms.
Pitch
Antwerp, 200 t.
Tar
Amsterdam, 500 brls.
Copenhagen, 26 drms.
Unspecified
Rouen, 497 drms.

DISINFECTANTS (*otherwise undes.*)
Hamburg, 1,642 cs.
Karachi, 1,500 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Christiania, 23 kgs., 2 pkgs., 1 cs.
Copenhagen, 10 cs.
Christiansand, 1 kg.
Gothenburg, 21 pkgs.
Malmo, 1 drm.

FULLER'S EARTH—
Hamburg, 118 brls.

GLUE—
Antwerp, 1 cs.
St. John (N.B.), 40 cks.

PITCH (STEARINE)—
St. John (N.B.), 10 brl.

SOAP—
Christiania, 11 cs., 2 cks.
Copenhagen, 4 cks.
Gothenburg, 1 cs.

STEARINE—
Gothenburg, 2 kgs.

SULPHURIC ACID—
Christiansand, 8 cs.

TALLOW—
Hamburg, 26 cks.

TURPENTINE—
Karachi, 8 drms.

LEITH.

Week ending December 22.

ALBUMEN—
Copenhagen, 11 drms.

BLEACHING POWDER—
Westmanno, 1 cs.

PARAFFIN WAX—
Ghent, 816 bgs.

PITCH (*otherwise undescribed*)—
Gothenburg, 124 brls.

POTASSIUM BICHROMATE—
Antwerp, 3 cks.
Copenhagen, 6 cks.

SALT—
Westmanno, 1 cs.

SHEEP DIP—
Isafjord, 5 cs.
Reykjavik, 80 cs.

SOAP—
Isafjord, 7 pkgs.; Reykjavik, 10 cs., 3 pkgs.; Thorshavn, 4 pkgs.; Westmanno, 5 cks.

SODA—
Copenhagen, 8 cks.
Isafjord, 2 bgs.

SODIUM BICHROMATE—
Antwerp, 32 cks.
Copenhagen, 92 cks.
Ghent, 4 kgs.

TALLOW OIL—
Copenhagen, 30 tcs.

LIVERPOOL.

Week ending December 20.

ALUM—
Monte Video, 2 t., £40.; Reval, 2 t. 3 c., £47.; Sydney, 4 t. 3 c., £42.

AMMONIA (ANHYDROUS)—
Jersey, 1 c., £19.

AMMONIUM CARBONATE—
Antwerp, 10 c., £13.; Aarhus, 2 t. 10 c., £65.; Antonina, 1 t. 19 c., £85.; Bombay, 2 t. 10 c., £89.; Bahia, 1 t. 14 c., £73.; Bilbao, 10 c., £13.; Barcelona, 1 t., £28.; Constanza, 2 t., £52.; Calcutta, 2 t., £67.; Copenhagen, 3 t. 1 c., £80.; Gothenburg, 1 t., £25.; Galatz, 2 t. 10 c., £70.; Genoa, 4 t. 8 c., £113.; Kobe, 20 t., £480.; Karachi, 2 t., £75.; Moji, 5 t., £133.; Marseilles, 1 t. 14 c., £[illegible]; Madras, 15 c., £28.; New York, 5 t. 7 c., £241.; Osaka, 7 t. 10 c., £196.; Piraeus, 10 c., £16.; Rotterdam, 1 t. 19 c., £50.; Rio de Janeiro, 4 t. 18 c., £210.; Santander, 10 c., £16.; Singapore, 1 t. 10 c., £46.; Yokohama, 30 t. 3 c., £777.

AMMONIUM SULPHATE—
Cheribon, 150 t. 1 c., £2,300.; Hong Kong, 121 t. 1 c., £1,677.; Kobe, 200 t., £2,701.; Samarang, 1,370 t. 14 c., £21,666.; Sourabaya, 465 t. 2 c., £7,124.; Tarragona, 149 t., £1,900.

AMMONIUM CHLORIDE—
Alexandria, 3 t., £131.; Bombay, 1 t., £41.; Bourgas, 10 c., £20.; Bilbao, 5 t. 2 c., £170.; Barcelona, 10 t. 4 c., £316.; Calcutta, 7 t., £284.; Constantinople, 1 t., £41.; Gothenburg, 1 t. 1 c., £37.; Kobe, 139 t. 12 c., £4,105.; Karachi, 10 t., £406.; Lyttleton, 19 c., £37.; Patras, 1 t., £32.; Rouen, 10 t. 4 c., £309.; Sydney, 1 t. 2 c., £34.; Shanghai, 10 t., £406.; Varna, 10 c., £20.; Yokkaichi, 10 t., £298.

ANTIFOULING COMPOSITION—
Bilbao, 2 c., £11.
Havana, 1 t., £125.

ARSENIC—
Valencia, 1 t., £125.

ARSENIOUS ACID—
Melbourne, 2 t., £165.

BLEACHING POWDER—
Alexandria, 9 t. 18 c., £99.; Bombay, 25 t., £300.; Calcutta, 69 t. 2 c., £733.; Copenhagen, 2 t. 4 c., £22.; Hankow, 5 t., £60.; Shanghai, 5 t., £60.; Vancouver, 2 t. 4 c., £27.

BOILER COMPOSITION—
Amsterdam, 11 c., £30.
Christiania, 12 c., £20.

BORAX—
Alexandria, 2 c., £3.; Caibarien, 5 c., £6.; Genoa, 19 t. 14 c., £500.; Havana, 8 c., £10.; Madras, 7 t. 10 c., £199.; Naples, 19 c., £25.; Patras, 1 t., £26.; Sydney, 5 t. 12 c., £140.; St. John's (N.F.), 3 qr., £1. 5s.; Talcahuano, 18 c., £24.

BORIC ACID—
Bombay, 1 c., £4.; Duala, 1 c., £4.; Gothenburg, 1 t., £48.; Lisbon, 10 c., £24.; Pt. Stanley, 1 c. 1 qr., £2. 15s.

CALCIUM CHLORIDE—
Alexandria, 5 t. 2 c., £29.; Buenos Ayres, 30 t. 3 c., £120.; Melbourne, 5 t. 2 c., £29.; Sydney, 9 t. 19 c., £57.; Singapore, 15 t., £86.; Vancouver, 25 t. 4 c., £150.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 4 t. 10 c., £675.; Adelaide, 4 t. 1 c., £100.; Auckland, 1 t., £28.; Brisbane, 2 t. 10 c., £80.; Buenos Ayres, 10 t., £103.; Calcutta, 5 t., £34.; Danzig, 16 t. 1 c., £1,846.; Dunedin, 1 t. 13 c., £46.; Fremantle, 1 t. 5 c., £32.; Gothenburg, 2 t. 10 c., £99.; Geelong, 2 t., £52.; Leghorn, 25 t., £625.; Melbourne, 5 t. 19 c., £527.; Perth, 1 t. 2 c., £31.; Penang, 5 t., £125.; Ronneby, 20 t., £510.; Sydney, 4 t. 5 c., £110.; Sourabaya, 32 t. 10 c., £81.; Wellington, 10 c., £14.

COAL TAR PRODUCTS—
Carbolic Acid
Auckland, 9 c., £21.; Cape Town, 8 c., £10.; Danzig, 5 t. 1 c., £544.; Genoa, 5 t. 2 c., £571.; Kobe, 17 t. 2 c., £2,015.; Perth, 11 c., £32.; Russia, 10 t. 1 c., £1,123.; Sydney, 2 t. 1 c., £88.
Creosote
Antwerp, 1 t. 18 c., £55.; Perth, 2 t. 10 c., £69.; Sydney, 1 t. 3 c., £49.; St. John (N.B.), 9 t. 15 c.; £261.; Wellington, 4 t. 16 c., £111.
Naphthalene
Dunedin, 3 t. 9 c., £66.; Lagos, 8 c., £29.; Pt. Sudan, 6 t., £78.
Orthocreosotinic Acid
Bordeaux, 1 t., £158.
Pitch
Demerara, 1 t. 14 c., £15.
Pyridine
Wellington, 2 c. 2 qr., £40.
Tar
Lagos, 2 t. 7 c., £25.
Tar Oil
Calcutta, 10 t., £287.
Unspecified
Bolivia, 7 c., £29.
Maracaibo, 1 t. 2 c., £104.

COBALT LINOLEATE—
Genoa, 9 c. 2 qr., £94.

COBALT OXIDE—
Hankow, 9 c., £462.

COPPER CARBONATE—
Fremantle, 3 t., £62.

COPPER SULPHATE—
Las Palmas, 10 c., £12.; Madras, 1 t., £26.; Monte Video, 4 t. 18 c., £124.; Singapore, 2 t. 10 c., £70.

CREAM OF TARTAR—
Auckland, 1 t., £88.
Melbourne, 3 t., £261.

DISINFECTANTS (*otherwise undes.*)
Amsterdam, 9 c., £212. Antwerp, 1 t. 18 c., £444.; Adelaide, 10 c., £78.; Alexandria, 1 t. 3 c., £104.; Bombay, 9 c., £15.

DISINFECTANTS (*otherwise undes.*)
Buenos Ayres, 2 c., £37. ; Cape Town, 17 c., £25. ; Corunna, 1 c. 1 qr., £15. ; Demerara, 1 t., £17. ; Dunedin, 7 c., £14. ; East London, 2 t., £24. ; Lyttleton, 4 t., £160. ; New York, 54 t. 15 c., £2,090. ; Puerto Cortes, 10 c., £30. ; Para, 8 c., £26. ; Philadelphia, 8 t. 1 c., £177. ; Pt. Said, 2 t. 10 c., £70. ; Rangoon, 3 t. 4 c., £150. ; Sourabaya, 2 t. 6 c., £106. ; Sarawak, 9 c., £16. ; Singapore, 3 t. 18 c., £96. ; Wellington, 7 c., £405.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Bombay, 31 t. 15 c., £3,143.
Indigo
Malta, 3 c. 2 qr., £28.
Shanghai, 25 t., £3,486.
Unspecified
Barcelona, 1 c. 2 qr., £37. ; Boston, 3 t. 12 c., £1,117. ; Calcutta, 2 qr., £13. ; Dunedin, 2 c., £132. ; Genoa, 13 c., £330. ; Hong Kong, 4 c. 2 qr., £169. ; Lyttleton, 1 c., £42. ; Melbourne, 1 t. 2 c., £451. ; Madeira, 2 c. 1 qr., £17. ; New York, 3 c. 2 qr., £120. ; Sydney, 1 t. 2 c., £618. ; Shanghai, 1 t. 8 c., £557. ; St. John (N.B.), 1 t. 2 c., £582.

ESSENTIAL OILS (SYNTHETIC)—
Rotterdam, 3 t. 17 c., £1,279. ; St. John (N.B.), 2 c., £169. ; Switzerland, 12 c., £207. ; Wellington, 1 t. 5 c., £409.

FERTILISER (*otherwise undes.*)—
Burutu, 4 t. 19 c., £74.

GLYCERINE—
Antwerp, 1 t. 14 c., £142. ; Braila, 1 t., £85. ; Christiania, 19 c., £73. ; Hong Kong, 5 t. 5 c., £428. ; Kobe, 59 t. 18 c., £4,322. ; Karachi, 1 t., £90. ; Shanghai, 13 t. 18 c., £1,163. ; St. John (N.B.), 10 c., £35. ; Yokohama, 4 t. 16 c., £351.

HYDROFLUORIC ACID—
Melbourne, 2 c., £27.

IODOFORM—
Burutu, 10 lb., £17. ; Calabar, 47 lb., £59. ; Sapele, 11 lb., £14. ; Pt. Harcourt, 56 lb., £71. ; Warri, 15 lb., £19.

LACTIC ACID—
Algoa Bay, 2 t. 2 c., £87.

LEAD ACETATE—
Melbourne, 2 t. 1 c., £100.

MAGNESIA—
Santos, 8 c., £54.

MAGNESIA (CALCINED)—
Valparaiso, 3 c., £37.

MAGNESIUM CARBONATE—
Vera Cruz, 1 t. 3 c., £83.

MAGNESIUM SULPHATE—
Abidjan, 1 c. 2 qr., £2. ; Abonema, 1 c., £2. ; Bathurst, 1 c., £3. ; Burutu, 2 qr., £2. ; Cape Coast, 2 c., £2. 10s. ; Demerara, 1 t., £7. ; Duala, 1 c., £1. ; Gibraltar, 1 c., £3. ; Kingston, 1 t. 15 c., £19. ; Lome, 1 c., £3. ; Lagos, 2 c., £2. 10s. ; Montreal, 2 t. 13 c., £22. ; Pt. Harcourt, 4 c., £5. ; Pt. Stanley, 1 c., £4. 10s.

MANGANESE OXIDE—
Sydney, 5 c. 2 qr., £10.

NICKEL SULPHATE—
Shanghai, 19 c., £40.

OXYGEN—
Belgian Congo, £14.

PHOSPHORUS—
Riga, 10 c., £110.

PHOSPHORUS (AMORPHOUS)—
Demerara, 2 c., £23.
La Guaira, 8 c., £94.

PITCH (*otherwise undescribed*)—
Genoa, 51 t. 14 c., £1,060.

POTASSIUM BICHROMATE—
Riga, 3 t. 2 c., £144.

POTASSIUM IODIDE—
Abonema, 2 qr., £60. ; Calabar, 38 lb., £40. ; Degama, 2 qr., £60. ; Opobo, 150 lb., £158. ; Pt. Harcourt, 201 lb., £241. ; Sierra Leone, 19 lb., £21. ; Sapele, 22 lb., £22. ; Warri, 30 lb., £30.

POTASSIUM PRUSSIATE—
Kobe, 5 t., £444.

POTASSIUM SILICATE—
Amsterdam, 15 c., £13.

SALTCAKE—
Buenos Ayres, 5 t. 1 c., £34.

SALTPETRE—
Sierra Leone, 5 c., £10.

SHEEP DIP—
Algoa Bay, 16 t. 5 c., £965. ; Buenos Ayres, 41 t. 3 c., £1,455. ; Barranquilla, 18 c., £71. ; Constanza, 1 t. 8 c., £116. ; Cape Town, 3 t. 8 c., £75. ; Copenhagen, 4 c. 2 qr., £19. ; Dunedin, 5 t. 19 c., £414. ; Monte Video, 4 t. 6 c., £170. ; Oamaru, 2 t. 17 c., £214. ; Puerto Barrios, 1 t. 1 c., £74. ; Puerto Descado, 47 t. 7 c., £3,825. ; Rio Gallegos, 1 t. 7 c., £225. ; San Julian, 2 t. 14 c., £450. ; Santa Cruz, 1 t. 7 c., £225. ; Timaru, 6 t. 7 c., £560. ; Wellington, 9 t. 16 c., £723.

SULPHURIC ACID—
Accra, 12 c., £34.
Lagos, 5 c., £17.

SUPERPHOSPHATE—
Teneriffe, 100 t., £355.

TANNING MATERIALS—
Unspecified
Alexandria, 2 t. 13 c., £42. ; Algoa Bay, 1 t. 3 c., £20. ; Christiania, 11 t. 3 c., £150. ; Cape Town, 13 t. 11 c., £247. ; Gothenburg, 1 t. 14 c., £32. ; Melbourne, 5 t. 16 c., £185. ; Sydney, 3 t. 12 c., £97. ; Stavanger, 1 t. 5 c., £21. ; Syra, 7 t. 10 c., £95.

TAR (VEGETABLE)—
Hong Kong, 1 t., £19.

TAR (*otherwise undescribed*)—
Apapa, 4 t. 5 c., £44.
Bilbao, 14 c., £41.

TARTARIC ACID—
Sydney, 3 t., £364.

TIN CRYSTALS—
Antwerp, 4 c., £30.

TIN OXIDE—
Santander, 2 c., £25.

TITANIUM POTASSIUM OXALATE
Melbourne, 10 c., £84.

VANILLIN—
Amsterdam, 2 c., £230.

WOOD PRESERVATIVE—
Barranquilla, 9 c., £30. ; Barbados, 1 t., £21. ; Kobe, 1 t. 2 c., £60. ; Pt. Swettenham, 1 t. 12 c., £45. ; Puerto Colombia, 9 c., £13.

ZINC CHLORIDE—
Bombay, 7 t. 14 c., £194.
Calcutta, 4 t. 15 c., £108.
Shanghai, 3 t. 2 c., £82.

Week ending December 21.

ALBUMEN—
New York, 6 t.

CAUSTIC SODA—
Adelaide, 18 drms. ; Alexandretta, 132 drms. ; Auckland, 23 drms. ; Bergen, 20 drms. ; Belize, 10 drms. ; Bombay, 25 drms. ; Bourgas, 200 drms. ; Bremen, 71 drms. ; Brisbane, 48 pkgs. ; Buenos Ayres, 684 drms. ; Calabar, 4 drms. ; Cheribon, 8 pkgs. ; Christiania, 235 pkgs. ; Dunedin, 70 drms. ; East London, 9 drms. ; Gothenburg, 20 pkgs., 20 drms. ; Hankow, 150 pkgs. ; Hamburg, 571 drms. ; Jaffa, 52 drms. ; Lisbon, 45 drms. Lyttleton, 109 drms. ; Madras, 172 drms. ; Melbourne, 292 pkgs. ; Mersyne, 34 drms. ; Messina, 7 drms. ; Monte Video, 115 drms. ; Napier, 40 cs. ; Naples, 20 drms. ; N. Plymouth, 65 cs. ; Padang, 40 drms. ; Panarockan, 40 drms. ; Pt. Said, 25 drms. ; Penang, 30 drms. ; Pernambuco, 475 drms. ; Perth, 9 drms. ; Reval, 200 drms. ; Piraeus, 20 drms. ; Pt. Swettenham, 35 drms. ; Riga, 158 drms. ; Punta Arenas, 3 cs. ; Rangoon, 115 drms. ; Rotterdam, 353 drms. ; Rio de Janeiro, 470 drms.

CAUSTIC SODA—
Salonica, 34 drms. ; Samarang, 70 drms. ; Timaru, 10 cs. ; Santos, 450 drms. ; Sourabaya, 30 drms. ; Sydney, 475 pkgs. ; Tampico, 1,012 drms. ; Vera Cruz, 636 drms. ; Volo, 40 drms. ; Wellington, 80 cs.

FERRO MANGANESE—
Antwerp, 193 t. ; Danzig, 250 t. ; Halifax (N.S.), 11 t. ; Hamburg, 50 t. ; Portland (Oreg.), 50 t. ; San Francisco, 110 t. ; St. John (N.B.), 10 t.

GLUE, SIZE, AND GELATINE—
Boston, 465 bgs. ; Cape Town, 10 pkgs. ; Colombo, 10 pkgs. ; Madras, 20 bgs. ; New York, 24 pkgs. ; Rangoon, 41 pkgs. ; Shanghai, 100 bgs. ; Sydney, 10 cks. ; Tientsin, 200 bgs.

LITHARGE—
Curacao, 15 pkgs.
Tripoli (Syria), 1 ck.

PARAFFIN WAX—
Antwerp, 3 crts.

SALT—
Adelaide, 16 t. ; Auckland, 133 t. ; Barbados, 50 t. ; Bergen, 74 t. ; Brisbane, 20 t. ; Buenos Ayres, 166 t. ; Calcutta, 3,570 t. ; Calabar, 88 t. ; Cameroons, 3 t. ; Christiania, 210 t. ; Cape Town, 17 t. ; Copenhagen, 161 t. ; Degama, 8 t. ; Demerara, 9 t. ; Drammen, 20 t. ; Duala, 34 t. ; Dunedin, 180 t. ; Fernando Po, 12 t. ; Ghent, 100 t. ; Grand Bassam, 150 t. ; Iddo, 912 t. ; Lagos, 100 t. ; Livingston, 50 t. ; Lyttleton, 106 t. ; Malmo, 75 t. ; Malta, 30 cs. ; Newcastle, 20 t. ; New Plymouth, 628 t. ; Opobo, 70 t. ; Ouidah, 9 t. ; Pt. Harcourt, 110 t. ; Puerto Barrios, 16 t. ; Rio de Janeiro, 12 t. ; Saltpond, 11 t. ; Sekondi, 32 t. ; Sierra Leone, 56 t. ; Sydney, 50 t. ; Trinidad, 2 t. ; Trondhjem, 16 t. ; Warri, 911 t. ; Wellington, 597 t. ; Winnebah, 14 t.

SOAP—
Accra, 1,235 bxs. ; Alexandria, 1,003 pkgs. ; Amoerang, 250 pkgs. ; Ampenam, 200 pkgs. ; Auckland, 516 pkgs. ; Bandjermassin, 2,200 bxs. ; Bangkok, 840 bxs. ; Banjoewangie, 50 bxs. ; Barcelona, 2 cs. ; Barranquilla, 86 cs. ; Batavia, 450 bxs. ; Batjan, 80 bxs. ; Barbados, 662 cs. ; Beira, 64 bxs. ; Belawan, 200 bxs. ; Benkoelen, 200 bxs. ; Bermuda, 130 bxs. ; Blinjoe, 235 bxs. ; Bilbao, 107 pkgs. ; Bluff, 5 cs. ; Bombay, 3,700 bxs. ; Bourgas, 293 pkgs. ; Bremen, 365 cs. ; Bulgaria, 80 cs. ; Buenos Ayres, 4,200 cs. ; Calcutta, 940 pkgs. ; Calabar, 325 bxs. ; Callao, 25 bxs. ; Calicut, 51 pkgs. ; Cape Coast, 400 bxs. ; Ceuta, 250 bxs. ; Christiania, 295 pkgs. ; Christchurch, 160 bxs. ; Cape Town, 7 bxs. ; Colombo, 230 pkgs. ; Constantinople, 40 pkgs. ; Djambi, 50 pkgs. ; Demerara, 1,284 bxs. ; Duala, 935 bxs. ; Dunedin, 320 bxs. ; Egwanga, 100 pkgs. ; Famagusta, 20 bxs. ; Gibraltar, 112 pkgs. ; Gothenburg, 1,353 pkgs. ; Grenada, 50 pkgs. ; Grand Bassam, 20 pkgs. ; Hamilton, 55 bxs. ; Iddo, 75 bxs. ; Kota Baroe, 75 pkgs. ; Kuala Lumpur, 317 pkgs. ; Karachi, 317 bxs. ; Kingston (Ja.), 1,518 bxs. ; Kobe, 150 bxs. ; Labocan Hadji, 30 pkgs. ; Lagos, 250 bxs. ; Las Palmas, 80 bxs. ; Limon, 30 pkgs. ; Liroeng, 15 pkgs. ; Lome, 26 pkgs. ; Lyttleton, 10 bxs. ; Macassar, 1,650 bxs. ; Madras, 449 cs. ; Malta, 113 pkgs. ; Mazatenango, 2 cs. ; Melilla, 1,336 bxs. ; Menado, 1,525 bxs. ; Morondaro, 100 bxs. ; Muntok, 70 bxs. ; Namlea, 20 bxs. ; New Plymouth, 10 cs. ; Nossi Be, 175 bxs. ; Oena Oena, 20 bxs. ; Oporto, 38 cs. ; Palembang, 250 bxs. ; Panama, 425 cs. ; Panarockan, 100 bxs. ; Pankal Penang, 20 bxs. ; Paramaraibo, 148 bxs. ; Pairga, 20 bxs. ; Pasir, 50 bxs. ; Penang, 1,624 pkgs.

SOAP—
Petta, 50 bxs. ; Pimental, 31 cs. ; Piraeus, 20 cs. ; Pontianak, 10 bxs. ; Pt. Harcourt, 1,200 pkgs. ; Pt. Said, 92 cs. ; Pt. Stanley, 1 cs. ; Posso, 40 bxs. ; Puerto Colombia, 1 cs. ; Punta Arenas, 40 cs. ; Quebec, 6 cs. ; Rangoon, 3,614 pkgs. ; Saltpond, 200 bxs. ; Samarinda, 100 bxs. ; Sandakan, 65 bxs. ; San Fernando, 150 cs. ; Saparoea, 175 bxs. ; Sekondi, 400 bxs. ; Shanghai, 2,221 pkgs. ; Segli, 60 bxs. ; Sherbro, 2 cs., 20 pkgs. ; Siauw, 60 bxs. ; Sierra Leone, 51 pkgs. ; Singapore, 170 pkgs. ; Sourabaya, 688 bxs. ; St. Vincent, 100 cs. ; Suez, 23 pkgs. ; Surinam, 18 pkgs. ; Tagoelandang, 20 bxs. ; Talcahuano, 35 cs. ; Tamatave, 550 bxs. ; Tandjong Balei, 500 bxs. ; Tandjong Padang, 75 bxs. ; Taroena, 90 bxs. ; Teneriffe, 100 bxs. ; Ternate, 200 bxs. ; Tetuan, 250 bxs. ; Timaru, 7 cs. ; Timor Dilly, 50 bxs. ; Tinombo, 15 bxs. ; Trinidad, 750 cs. ; Varna, 250 cs. ; Vatoeroesa, 100 bxs. ; Victoria (W.C.A.), 23 bxs. ; Wellington, 305 cs. ; Winnebah, 100 bxs. ; Yokohama, 3 bxs.

SODA ASH—
Adelaide, 118 pkgs. ; Auckland, 204 pkgs. ; Barranquilla, 30 cks. ; Bombay, 200 bgs. ; Brisbane, 134 bgs. ; Buenos Ayres, 9,143 pkgs. ; Calcutta, 15,000 pkgs. ; Christiania, 1,150 pkgs. ; Colombo, 1,000 bgs. ; Copenhagen, 1,400 pkgs. ; Corfu, 21 pkgs. ; Drammen, 50 pkgs. ; Fremantle, 42 pkgs. ; Helsingborg, 150 pkgs. ; Helsingfors, 100 bgs. ; Hong Kong, 1,344 pkgs. ; Kalmar, 300 pkgs. ; Kobe, 2,536 bgs. ; Lyttleton, 50 pkgs. ; Melbourne, 3,504 pkgs. ; Moji, 2,650 bgs. ; Norrkoping, 550 bgs. ; Penang, 19 pkgs. ; Punta Arenas, 50 pkgs. ; Reval, 400 pkgs. ; Riga, 2,430 bgs. ; Rio de Janeiro, 796 pkgs. ; Rotterdam, 5,100 bgs. ; Santos, 701 pkgs. ; Savanilla, 246 bgs. ; Shanghai, 1,680 bgs. ; Sydney, 688 pkgs. ; Tocopilla, 28 brls. ; Vera Cruz, 390 bgs. ; Volo, 30 bgs.

SODA CRYSTALS—
Buenos Ayres, 508 kgs. ; Cape Town, 87 pkgs. ; Kingston (Ja.), 117 pkgs. ; Penang, 30 pkgs. ; Pt. Stanley, 1 pkg. ; P. Arenas, 80 pkgs. ; Trinidad, 20 kgs.

SODIUM BICARBONATE—
Alexandria, 140 kgs. ; Auckland, 128 pkgs. ; Barbados, 20 kgs. ; Bourgas, 60 kgs. ; Brisbane, 87 kgs. ; Cape Town, 40 pkgs. ; Copenhagen, 43 pkgs. ; Dunedin, 20 pkgs. ; East London, 14 pkgs. ; Kingston (Ja.), 200 pkgs. ; Kotka, 40 kgs. ; La Libertad, 40 pkgs. ; Lyttleton, 81 pkgs. ; Manila, 280 kgs. ; Melbourne, 95 pkgs. ; Moji, 2,154 kgs. ; Monte Video, 100 kgs. ; New Plymouth, 120 bgs. ; Penang, 10 pkgs. ; Rio de Janeiro, 400 pkgs. ; Rockhampton, 120 kgs. ; Samarang, 25 kgs. ; Smyrna, 80 kgs. ; Sourabaya, 25 kgs. ; Sydney, 207 pkgs. ; Trinidad, 20 kgs. ; Varna, 140 kgs. ; Volo, 50 kgs. ; Yokohama, 1,615 kgs.

SODIUM BISULPHITE—
Callao, 20 drms.
Riga, 40 drms.

SODIUM HYDROSULPHITE—
Adelaide, 20 kgs. ; Rouen, 42 kgs. ; Shanghai, 10 cs. ; St. John (N.B.), 20 kgs. ; Sydney, 20 kgs.

SODIUM NITRATE—
Sydney, 4 cks.

SODIUM SILICATE—
Abo, 30 drms. ; Buenos Ayres, 149 pkgs. ; Calcutta, 191 drms. ; Christiania, 53 cks. ; Fremantle, 23 pkgs. ; Hankow, 78 pkgs. ; Kobe, 79 pkgs. ; Lyttleton, 10 pkgs. ; Melbourne, 89 drms. ; Messina, 17 cks. ; Newcastle, 6 cks. ; Oporto, 6 cks. ; Rangoon, 19 pkgs. ; Sydney, 30 cks. ; Tampico, 200 bgs.

SODIUM SULPHIDE—
Alexandria, 4 pkgs.
Algoa Bay, 5 drms.
Auckland, 21 drms.
Coronel, 32 pkgs.
Gothenburg, 57 pkgs.
Pt. Elizabeth, 5 drms.

STEARINE—
Rotterdam, 280 brls.

SUPERPHOSPHATE—
Demerara, 2 t.

TALLOW—
Alexandria, 6 bls.: Calcutta, 22 cks.: Danzig, 66 cks.

LONDON.

OFFICIAL AMENDMENTS.

From return for week ending Sept 12, *Deduct*—

CREAM OF TARTAR—
Port Elizabeth, 1 c., £7.

From return for week ending Sept 26, *Deduct*—

SALTPETRE—
Cape Town, 10 c., £21.

Week ending December 19.

ACETIC ACID—
Barbados, 1 cs., £10.; Cuidad Bolivar, 6 cts., £18.; Irish Free State, 1 ck., £7.; Sapele, 1 cs., £6.; Trinidad, 6 cts., £20.

ACETONE—
Auckland, 6 drms., £65.
Antwerp, 3 drms., £120.
Durban (F.), 2 cs., £9.

ACETYL SALICYLIC ACID—
Bombay, 2 cs. (pt.), £7.; Calcutta, 1 cs. (pt.), £5.; Irish Free State, 1 cs. (pt.), £11.; Lagos (F.), 2 cs., £10.; Montreal, 5 cs. (pt.), £50.

ALUM—
Cuidad Bolivar, 2 brls., £11.
Palma, 3 cks., £9.
Singapore, 8 kgs., £8.

AMMONIA—
Accra, 8 cs., £61.; Bombay, 9 cs., £16.; Canton, 4 cs., £16.; Cape Town, 22 cs., £41.; Channel Islands, 4 cs. (pt.), £10.; Durban, 5 cs., £9.; East London, 4 cs., £7.; Irish Free State, 48 cs., £87.; Lagos, 10 cs., £18.; Kobe, 12 cs., £22.; Shanghai, 5 drms., £14.; Singapore, 5 cs., £16.

AMMONIA (ANHYDROUS)—
Delagoa Bay, 2 cs., £9.; Irish Free State, 2 cylds., £9.; Rangoon, 13 cylds., £108.; Rotterdam, 40 cylds., £529.

AMMONIUM ACETATE—
Calcutta, 1 cs., £8.

AMMONIUM CARBONATE—
Alexandretta, 10 c., £14.; Antwerp, 1 t. 19 c., £49.; Bahia, 1 t. 19 c., £90.; Bolivar, 4 c., £11.; Bombay, 2 c., £9.; Calcutta, 19 c., £75.; Cape Town, 2 c., £5.; Colombo, 8 c., £36.; Dunkirk, 1 t. 19 c., £61.; Durban, 6 c., £13.; Hamburg, 4 t. 18 c., £128.; Hong Kong, 1 t. 3 c., £64.; Mormugao, 5 c., £12.; Palermo, 2 t. 9 c., £64.; Paris, 4 t. 19 c., £150.; Pt. Elizabeth, 8 c., £16.; Singapore, 10 c., £28.; Trieste, 3 t., £71.

AMMONIUM CITRATE—
Calcutta, 1 cs., £11.

AMMONIUM NITRATE—
Harlingen, 50 t. 12 c., £1,130.

AMMONIUM SULPHATE—
Demerara, 30 t., £425.
Kobe, 1,010 t., £13,545.

ANTIMONY OXIDE—
Rio de Janeiro, 4 cks., £30.

ANTIMONY SULPHIDE—
Antwerp, 2 cks., £26.; Charleroi, 2 cks., £44.; Ostend, 3 cks., £56.; Paris, 4 cks., £48.; Santos (F.), 40 kgs., £57.

ARSENIC—
East London, 10 cs., £35.

ARSENIC CHLORIDE—
Calcutta, 1 cs., £6.

ARSENIC SULPHIDE—
New York, 10 kgs., £56.

BARIUM PEROXIDE—
Rotterdam, 33 drms., £435.

BARIUM SULPHATE—
Buenos Ayres, 1 cs., £33.

BARIUM SULPHATE (BLANC FIXE)—
Sydney, 35 bgs., £50.

BISMUTH CARBONATE—
Auckland, 1 cs. (pt.), £9.; Beira, 1 cs., £18.; Christchurch, 1 cs. (pt.), £18.; Lagos, 1 cs., £10.; Melbourne, 1 cs., £72.; Otago, 3 cs., £167.; Wellington, 1 cs. (pt.), £18.

BISMUTH CITRATE—
Auckland, 1 cs., £17.
Melbourne, 1 cs. (pt.), £64.

BISMUTH SALICYLATE—
Lagos, 1 cs., £19.
Melbourne, 1 cs. (pt.), £7.

BISMUTH SALTS (*otherwise undes.*)
Bombay, 2 cs. (pt.), £114.
Calcutta, 3 cs., £126.

BISMUTH SUBNITRATE—
Auckland, 1 cs. (pt.), £11.
Melbourne, 1 cs. (pt.), £15.
Sydney, 1 cs., £30.

BITUMEN—
Calcutta, 170 pkgs. (pt.), £55.
Dunedin, 2 brls., £7.
Madras, 12 pkgs. (pt.), £11.

BONE MEAL—
Channel Islands, 20 t., £160.

BORAX—
Auckland, 5 c., £7.; Cape Town, 3 c., £8.; Delagoa Bay, 2 c., £5.; Durban, 3 c., £6.; Pt. Elizabeth, 2 c., £5.; Pt. Elizabeth (F.), 2 t., £19.; Rotterdam (F.), 1 t. 10 c., £39.; Rotterdam, 3 t., £142.; Shanghai, 5 c., £8.

BORIC ACID—
Bombay, 1 t., £58.; Calcutta, 4 c., £19.; Cape Town, 4 c., £12.; Cape Town (F.), 3 c., £8.; Lagos, 2 c., £14.; Madras, 2 c., £9.

BROMINE—
Penang, 1 cs., £7.

CALCIUM CARBIDE—
Burutu, 5 c., £5.
Sekondi, 6 c., £6.

CALCIUM CHLORIDE—
Sydney, 10 drms., £16.

CARBON TETRACHLORIDE—
Melbourne, 8 cs., £34.

CAUSTIC POTASH—
Danzig, 1 cs., £100.
Dunkirk, 8 drms., £65.

CAUSTIC SODA—
Hong Kong, 2 c., £8.
Shanghai, 15 c., £56.

CHEMICALS (*otherwise undescribed*)
Amsterdam, 100 pkgs., £245.; Auckland (F.), 4 cs. (pt.), £5.; Auckland, 18 pkgs. (pt.), £140.; Beira (F.), 2 pkgs., £8.; Beira, 26 pkgs., £145.; Bombay (F.), 7 cs., £26.; Bombay, 29 pkgs. (pt.), £145.; Brisbane, 22 cs., £101.; Buenos Ayres, 64 cs. (pt.), £549.; Calcutta, 25 pkgs. (pt.), £152.; Cape Town (F.), 1 cs., £8.; Cape Town, 13 pkgs. (pt.), £30.; Christchurch, 2 cs., £10.; Christiania, 5 pkgs. (F.), £27.; Colombo, 7 cs., £31.; Delagoa Bay, 2 cs., £6.; Demerara, 5 pkgs. (pt.), £18.; East London, 5 cs., £8.; Egersund, 30 pkgs., £75.; Fremantle, 40 pkgs., £142.; Gibraltar, 2 cs., £6.; Gothenburg, 3 cs., £130.; Hamburg, 150 pkgs., £375.; Havana, 60 pkgs., £50.; Helsingfors, 25 pkgs., £62.; Hong Kong, 3 cs., £88.; Irish Free State, 10 pkgs. (pt.), £17.; Jesselton, 1 cs., £9.; Jinja, 2 cks., £7.; Libau, 1 cs., £13.; Lyttleton, 20 pkgs., £26.; Madras, 7 cs., £12.; Malta, 2 pkgs., £27.; Marseilles, 4 cs., £52.; Matanzas, 10 pkgs., £25.; Melbourne, 13 pkgs. (pt.), £205.; Montreal, 6 cs., £71.; Mormugao, 3 cs., £5.; Newcastle, 1 cs. £19.

CHEMICALS (*otherwise undescribed*)
Piraeus, 10 pkgs., £25.; Pt. Elizabeth, 24 pkgs., £98.; Reval, 3 cs., £14.; Ronneby, 100 pkgs., £250.; Rotterdam (F.), 10 pkgs., £50.; Rotterdam, 115 pkgs., £284.; Sekondi, 2 pkgs., £7.; Singapore, 7 pkgs., £48.; Stockholm, 6 cs., £150.; Sydney, 148 pkgs. (pt.), £2,567.; Trinidad, 4 pkgs. (pt.), £7.; Wellington, 15 pkgs. (pt.), £87.; Winnebah, 4 pkgs. (pt.), £6.

CITRIC ACID—
Auckland, 3 c., £21.; Cape Town, 2 c., £15.; Constanza (F.), 2 c., £16.; Dunedin, 2 c., £22.; Mormugao, 1 c., £8.; Napier, 1 cs. (pt.), £5.; Rangoon, 1 c., £9.; Stockholm (F.), 2 t., £285.

COAL TAR PRODUCTS—
Anthracene Oil
Rotterdam, 50 drms., £110.
Benzol
Durban, 100 drms., £50.; 30 pkgs., £205.
Carbolic Acid
Bombay, 1 kg., £220.; Calcutta, 11 cs., £54.; Channel Is., 2 cks., £14.; Colombo, 17 cs., £139.
Creosote
Auckland, 1 cs., £7.
Auckland (F.), 1 cs., £8.
Naphthalene
Panama, 9 cs., £18.
Pitch
Alexandria, 210 brls., £263.; Antwerp, 50 brls., £275.; Antwerp (bulk), 320 t., £1,967.; Dunedin, 5 pkgs., £9.; Dunedin (bulk), 1,132 t., £7,325.; France (bulk), 463 t., £2,435.; Genoa, 9 drms., £32.; Pt. Said, 210 pkgs., £239.
Tar
Durban, 705 drms., £100.; East London, 250 drms., £20.; Elizabethville, 100 drms., £23.; Iddo, 100 drms., £79.; Isipingo, 9 drms. £5.; La Libertad, 2 brls., £6.; Nairobi, 80 drms., £19.; Pt. Elizabeth, 95 drms., £21.; Wellington, 1 cs., £8.

COBALT ACETATE—
Brussels, 1 cs., £13.

COBALT OXIDE—
Brussels, 8 cs., £380.
Genoa (F.), 2 pkgs., £396.

COBALT SULPHATE—
Sydney, 5 kgs., £89.

COLOURS (*otherwise undescribed*)—
Bangkok, 3 cs. (pt.), £15.; Calcutta, 2 cs. (pt.), £13.; Kobe, 1 cs., £38.; Madras, 1 cs. (pt.), £10.; Montreal, 1 cs. (pt.), £12.; Rangoon, 1 cs., £20.

COPPER SALTS (*otherwise undes.*)
Melbourne, 2 cs., £43.

CREAM OF TARTAR—
Bolivar (F.), 1 c., £5.; Calcutta, 1 c., £6.; Cape Town (F.), 2 c., £12.; Cologne, 5 c., £22.; Colombo, 2 c., £10.; Delagoa Bay (F.), 1 c., £6.; Delagoa Bay, 4 c., £17.; Durban, 5 c., £21.; Durban (F.), 4 c., £25.; East London (F.), 1 c., £6.; Hong Kong (F.), 1 c., £6.; Pt. Elizabeth (F.), 1 c., £6.

DISINFECTANTS (*otherwise undes.*)
Alexandria, 2 c., £7.; Bangkok, 4 t. 14 c., £154.; Barbados, 9 c., £11.; Bathurst, 1 c., £9.; Beira, 3 c., £8.; Bombay, 2 c., £18.; Burutu, 3 c., £20.; Calcutta, 4 t. 10 c., £162.; Canton, 1 t., £94.; Cape Town, 7 c., £19.; Christchurch, 6 t. 2 c., £1,004.; Colombo, 12 t. 6 c., £773.; Delagoa Bay, 1 t. 5 c., £60.; Demerara, 5 t. 17 c., £168.; Durban, 1 t. 10 c., £90.; Irish Free State, 6 c., £21.; Kilindini, 5 t. 16 c., £340.; Malta, 1 c., £5.; Medan, 3 t. 11 c., £137.; Mollendo, 11 c., £17.; Paris, 4 t. 12 c., £75.; Penang, 15 c., £14.; Pt. Sudan, 2 t. 6 c., £113.; Rangoon, 1 t., £11.; St. Lucia, 8 c., £11.; Trinidad, 1 t. 10 c., £47.; Wellington, 4 c., £88.

DYESTUFFS (ARTIFICIAL)—
Alizarine
Madras, 20 kgs., £172.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Auckland, 1 cs., £19.; Bombay, 1 kg., £220.; Boulogne, 14 kgs., £440.; Cape Town, 1 cs., £13.; Channel Islands (F.), 1 bx., £5.; Madras, 1 cs. pt.), £71.; Melbourne, 1 ck., 3 cs., £148.; Sydney, 1 cs., £48.; Wellington, 1 pkg., £21.

ETHER—
Bombay, 2 cs. (pt.), £12.
Lagos, 4 cs., £18.
Wellington, 4 cs., £16.

ETHER (METHYLATED)—
Calcutta, 7 cs., £36.

FERTILISERS (*otherwise undes.*)—
Amsterdam F.), 3 c., £14.
Channel Islands, 154 t. 8 c., £1,301.

FORMALDEHYDE—
Colombo (F.), 4 cs. (pt.), £10.; Demerara (F.), 3 brls., £38.; Rouen (F.), 28 cks., £320.; Shanghai, 2 drms., £12.

GLYCERINE—
Barbados, 5 c., £21.; Bolivar, 1 c., £6.; Calcutta, 1 cs., £8.; Cuidad Bolivar, 1 c., £6.; Danzig, 1 t., £70.; Ghent (F.) (crude), 1 t., £76.; Irish Free State, 1 cs., £10.; Karachi, 3 cs., £8.; Yokohama, 4 t. 17 c., £368.

GLYCEROPHOSPHATES (*otherwise undescribed*)—
Karachi, 2 cs. (pt.), £13.

HYDROBROMIC ACID—
Calcutta, 1 cs., £6.
Wellington, 1 cs., £6.

HYDROCHLORIC ACID—
Durban, 4 c., £14.
Wellington, 7 c., £12.

HYDROFLUORIC ACID—
Brisbane, 1 cs., £7.
Pt. Elizabeth, 5 cs., £56.
Wellington, 1 cs., £7.

HYDROGEN PEROXIDE—
Lagos, 2 cs., £15.

IODIDES (*otherwise undescribed*)
Bombay, 1 cs., £56.
Calcutta, 1 cs., £114.

IODINE—
Buenos Ayres, 2 cs., £212.
Calcutta, 1 cs., £54.
Paris (F.), 40 kgs., £3,970.

IODINE (RESUBLIMED)—
Bilbao, 5 cs., £531.; Brussels, 3 cs. (pt.), £112.; Durban, 1 cs., £27.; Melbourne, 1 cs. (pt.), £87.; Otago, 1 cs., £54.; Turin, 1 cs., £112.

IRON AMMONIUM CITRATE—
Bombay, 2 cs., £11.
Calcutta, 2 cs. (pt.), £21.

KIESELGUHR—
Rio de Janeiro (F.), 8 c., £7.

LEAD ARSENATE—
Jinja, 2 drms., £11.
Melbourne, 24 drms., £51.

LEAD OXIDE—
Brisbane, 3 kgs., £9.

MAGNESIA—
Auckland, 9 cs., £29.; Bangkok, 3 cs., £8.; Barbados, 3 cs., £97.; Christchurch, 20 cs., £48.; Demerara, 3 cs., £97.; Hong Kong, 2 cs., £5.; Wellington, 21 cs., £53.

MAGNESIA (CALCINED)—
Bolivar, 2 cs., £9.
Cuidad Bolivar, 2 cs., £9.
Cartagena, 1 cs., £10.

MAGNESIUM CARBONATE—
Bombay, 10 cs., £17.
Mormugao, 5 cs., £14.

MAGNESIUM CITRATE—
Calcutta, 2 cs., £17.

MAGNESIUM SULPHATE—
Auckland, 4 t. 14 c., £123.; Barbados, 4 c., £8.; Beira, 4 c., £5.; Bombay, 16 c., £24.; Colombo, 1 t. 1 c., £16.; Delagoa Bay, 6 c., £8.; Dunedin, 1 t. 10 c., £35.; Durban, 4 c., £5.; Mombasa, 10 c., £13.; Mormugao, 11 c., £14.; Pt. Elizabeth, 10 c., £13.; Sierra Leone, 4 c., £5.; Wellington, 5 c., £9.

MERCURIALS (*otherwise undes.*)—
Amsterdam, 4 cs., £208.
Bombay, 1 cs. (pt.), £19.
Calcutta, 3 cs., £48.

MERCURY BICHLORIDE
Bahia, 1 cs. (pt.), £13.

MERCURY CHLORIDE—
Sydney, 1 cs. (pt.), £6.

MERCURY OXIDE—
Karachi, 1 cs., £20.

MERCURY SUBCHLORIDE—
Cocanada, 1 cs., £38.
Madras, 2 cs., £66.

NICKEL OXIDE—
Brussels, 1 cs., £6.

NICKEL SALTS (*otherwise undes.*)—
Melbourne, 12 cs., £36.

NICKEL SULPHATE—
Hamburg, 8 brls., £47.
Shanghai, 2 kgs., £10.

NITRIC ACID—
Benkoellen, 1 cs., £8.; Durban, 5 cs., £22.; Penang, 6 cs., £29.; Wellington, 2 cs., £5.

PHOSPHORIC ACID—
Auckland, 6 cs., £16.
Cape Town, 1 cs., £6.
Otago, 5 cs., £13.

POTASH (*otherwise undescribed*)—
Brisbane, 1 ck., £5.

POTASSIUM BICARBONATE—
Auckland, 2 cs., £6.

POTASSIUM CARBONATE—
Antwerp, 3 cs., £8.
Stockholm, 6 kgs., £12.

POTASSIUM CHLORIDE—
Irish Free State, 6 drms., £23.

POTASSIUM CITRATE—
Bangkok, 4 cs., £26.; Bombay, 5 cs., 1 cs. (pt.), £47.; Calcutta, 3 cs., 2 cks., £56.; Sydney, 2 cks., £20.

POTASSIUM CYANIDE—
Shanghai, 1 cs., £11.

POTASSIUM FERROCYANIDE—
Pt. Sudan, 1 kg., £7.

POTASSIUM IODIDE—
Bangkok, 2 cs., £185.; Bombay, 1 cs., £88.; Calcutta, 1 cs., £88.; Brussels, 3 cs. (pt.), £49.; Jamaica, 1 cs. (pt.), £5.; Melbourne, 6 cs., £553.; Milan, 2 cs., £173.; Penang, 1 cs., £20.; Wellington, 1 cs., 1 cs. (pt.), £111.

POTASSIUM NITRATE—
Dunedin, 2 cs., £8.

POTASSIUM PERMANGANATE—
Auckland (F.), 4 cs., £18.
Buenos Ayres, 2 cs. (pt.), £22.
Melbourne (F.), 5 drms., £20.

POTASSIUM PRUSSIATE—
Rosario, 3 drms., £17.

POTASSIUM SALTS (*otherwise undescribed*)—
Calcutta, 1 cs., £5.
Oporto, 1 cs., £10.

SALAMMONIAC—
Bangkok, 5 pkgs. (pt.), £10.; Buenos Ayres (F.), 1 ck., £8.; Paris, 8 cks., £69.; Shanghai, 6 cks., £14.

SALICYLATES (*otherwise undes.*)—
Montreal, 3 cs. (pt.), £20.
Sydney, 6 cs., £119.

SALICYLIC ACID—
Cuidad Bolivar, 1 kg., £8.
Durban, 1 cs., £5.
Melbourne, 6 cs., £81.

SALTPETRE—
Adelaide, 1 t., £41.; Cape Town, 5 c., £11.; Dunedin, 3 t., £124.; Durban, 9 c., £21.; East London, 5 c., £9.; Irish Free State, 3 t. 3 c., £126.; Pt. Elizabeth, 11 c., £23.; Wellington, 2 t. 10 c., £103.

SHEEP DIP—
Buenos Ayres, 11 t. 5 c., £300.; Delagoa Bay, 4 t. 3 c., £255.; Durban, 6 t. 12 c., £315.; Timaru, 9 t. 13 c., £427.

SILVER NITRATE—
Lyttleton, 1 cs. (pt.), £10.

SODA CRYSTALS—
Perth, 5 c., £19.

SODIUM ACETATE
Auckland, 3 t. 6 c., £74.

SODIUM ARSENITE
Durban, 4 t. 9 c., £308.

SODIUM BICARBONATE
Alexandria, 1 c., £8.; Calcutta, 16 c., £48.; Cape Town, 5 c., £8.; Delagoa Bay, 6 c., £9.; Durban, 10 c., £13.; East London, 14 c., £19.; Montreal, 9 c., £25.; Pt. Elizabeth, 12 c., £19.; St. Helena, 5 c., £6.; Sydney, 11 c., £32.

SODIUM BISULPHITE—
Belawan, 2 t. 9 c., £45.
Buenos Ayres, 5 t., £90.
Rotterdam, 10 t., £185.

SODIUM CARBONATE—
Benkoelen, 8 c., £11.
Hong Kong, 5 c., £16.

SODIUM CITRATE—
Calcutta, 2 c., £16.

SODIUM HYPOSULPHITE—
Colombo, 10 c., £9.
Hong Kong, 1 t., £20.
Wellington, 1 cs., £11.

SODIUM IODIDE—
Brussels, 3 cs. (pt.), £52.; Calcutta, 1 cs. (pt.), £37.; Melbourne, 1 cs. (pt.), £13.; Naples, 1 cs., £125.

SODIUM OXALATE—
Karachi, 3 c., £20.

SODIUM SALICYLATE—
Auckland, 1 c., £8.
Calcutta, 1 c., £14.

SODIUM SALTS (*otherwise undes.*)
Perth, 1 t., £23.

SODIUM SILICATE—
Townsville, 9 c., £17.

SODIUM SULPHATE—
Accra, 10 cs., £12.; Cartagena, 10 c., £6.; East London, 20 kgs., £7.; Jamaica, 20 cks., £8.; Sydney, 17 kgs., £50.

SODIUM SULPHIDE—
Dunedin, 5 t., £63.
Lyttleton, 34 t. 13 c., £440.

SODIUM SULPHITE—
Hong Kong, 4 c., £15.
Stockholm, 1 t. 10 c., £30.

SODIUM TARTRATE—
Canton, 2 pkgs., £14.

SPENT OXIDE—
Rotterdam, 371 t. 19 c., £1,075.

SULPHUR—
Beira (F.), 10 c., £7.
Sydney, 9 c., £33.
Trinidad (F.), 5 brls., £8.

SULPHUR (FLOWERS)—
Pt. Sudan (F.), 11 c., £8.

SULPHURIC ACID—
Accra, 11 c., £17.
Penang, 6 c., £25.
Sekondi, 1 t. 18 c., £38.
Wellington, 8 c., £15.

SUPERPHOSPHATE—
Channel Islands, 10 t., £28.

TARTARIC ACID—
Callao, 1 c., £9.; Cape Town, 1 c., £8.; Cape Town (F.), 1 c., £7.; Constanza (F.), 1 c., £6.; Delagoa Bay (F.), 2 c., £14.; Durban, 1 c., £7.; Durban (F.), 7 c., £59.; Irish Free State, 2 c., £12.; Mormugao, 1 c., £6.

TIN OXIDE—
Sydney, 4 cks., £113.

TITANIUM, POTASSIUM OXALATE—
Sydney (F.), 14 kgs., £120.

TURPENTINE—
Cape Town, 2 cs., £7.

URANIUM NITRATE—
Stockholm, 1 cs., £12.

ZINC AND AMMONIUM COMPOUNDS (*otherwise undes.*)—
Antwerp (F.), 15 pkgs., £75.

ZINC OXIDE—
Alexandria, 10 cks., £59.; Bombay, 1 cs., £9.; Calcutta, 1 cs., £8.; Copenhagen, 30 cks., £95.; Leghorn, 10 cks., £14.; Wellington, 2 cs., £8.

ZINC SULPHATE—
Antwerp, 1 drms., £11.

Week ending December 19.

ANTIMONY REGULUS
Lyttleton, 2 t.

CERESINE WAX
Salonica, 5 t.

FULLER'S EARTH
St. John (N.B.), 50 t.

GLUE AND GELATINE—
Delagoa Bay, 1 t.; Durban, 1 t. 10 c.; Kobe, 7 t.; Madras, 3 c.; Montreal, 2 t.; Newcastle, 2 t.; Perth, 10 c.; Piraeus, 5 c.; Rangoon, 1 c.; Salaverry, 1 t.; Sourabaya, 12 c.; Townsville, 2 c.; Tunis, 1 t.

MINERAL WAX—
Yokohama, 5 t.

PARAFFIN WAX—
Antwerp, 2 t. 15 c.

PLUMBAGO—
Bilbao, 3 t. 19 c.
Cape Town, 1 t.
Copenhagen, 4 c.
Hong Kong, 1 t. 15 c.

QUININE—
Calcutta, 6,050 oz.; Melbourne, 200 oz.; Montreal, 1,500 oz.; Sydney, 2,224 oz.

SALT—
Cape Town, 1 t. 1 c.; Calcutta, 4 c.; East London, 1 t. 5 c.; Hong Kong, 10 c.; Madras, 3 c.; Mombasa, 1 c.; Paramaribo, 13 c.; Pt. Sudan, 19 c.; Punta Arenas, 6 c.; Rangoon, 1 c.; Rockhampton, 16 c.; San Francisco, 1 c.; Townsville, 1 t. 7 c.; Valparaiso, 1 c.

SOAP—
Abonema, 1 t. 2 c.; Ascension, 1 c.; Auckland, 1 t. 8 c.; Bombay, 4 c.; Calabar, 1 t. 10 c.; Channel Islands, 4 c.; Christchurch, 1 c.; Dunedin, 11 c.; Durban, 1 c.; Forcados, 10 c.; Gibraltar, 1 c.; Gothenburg, 1 c.; Irish Free State, 3 t. 5 c.; Italy, 9 c.; Kilindini, 2 t. 7 c.; Lagos, 2 t. 5 c.; Loango, 5 c.; Malta, 2 c.; Melbourne, 1 c.; Mombasa, 8 c.; Pt. Harcourt, 5 t. 14 c.; Punta Arenas, 1 c.; Rangoon, 1 c.; Sapele, 1 t. 3 c.; Sekondi, 22 t.; Seville, 3 c.; Shanghai, 7 c.; Stockholm, 2 c.; Tanga, 2 c.; Toronto, 2 c.; Trinidad, 4 c.; Victoria (B.C.), 3 c.; Warri, 9 t. 12 c.; Wellington, 1 t. 18 c.; Winnebah, 1 t. 5 c.

TALLOW—
Harlingen, 4 t. 8 c.; Nantes, 6 t. 3 c.; Paris, 10 t. 1 c.

WHITE LEAD—
Buenos Ayres, £1,185.; Cape Town, £41.; Dunedin, £119.; East London, £60.; Fremantle, £238.; Irish Free State, £31.; Lyttleton, £213.; Oamaru, £44.; Sydney, £342.

MANCHESTER.

Week ending December 20.

ALBUMEN—
Providence (R.I.), 6 cks.

AMMONIUM CARBONATE—
Denmark, 20 cks.
Egypt, 5 cks.

AMMONIUM SALTS (*otherwise undescribed*)—
Italy, 1 cs.

AMMONIUM SULPHATE—
France, 2,176 bgs.

CARBON BLACK—
Bombay, 80 cks.

CHEMICALS (*otherwise undescribed*)
Bombay, 12 drms., 4 cs.
Boston, 15 cks.
France, 2 cks.

CHROME ALUM—
Belgium, 20 kgs.
France, 10 cks.

COAL TAR PRODUCTS—
Pitch
Dunkirk, 952 t.
Unspecified
Austria, 2 cks.
Belgium, 98 drms.

DYESTUFFS (ARTIFICIAL)—
Unspecified
Basle, 10 cks., 13 drms.; Bombay, 104 cks., 16 pkgs., 1,100 kgs.; Gothenburg, 20 pkgs.; India, 1 kg., 1 bx.; Malta, 1 cs.; Rouen, 2 cs., 25 cks., 3 pkgs., 1 kg.; Switzerland, 5 cks.

FERRO MANGANESE—
Philadelphia, 50 t.

GELATINE—
Belgium, 17 bgs.

GLUE—
Belgium, 1 ck.; Canada, 20 bgs.

IRON OXIDE—
Philadelphia, 10 cks.

KIESELGUHR—
Odense, 2 bgs.

PITCH (*otherwise undescribed*)—
New York, 610 brls.

SALT—
Ghent, 3,000 sks.; Gothenburg, 2,545 bgs., 35 brls.; St. John (N.B.), 1,436 sks., 115 brls.

SALTCAKE—
Gothenburg, 1,085 t. 18 c.

SIZE—
Belgium, 1 ck.

SOAP—
Belgium, 10 cs.; Bombay, 22 cs.; Cairo, 44 cs.; Holland, 85 cs.; The Hague, 17 cs.

SODA ASH—
Bombay, 25 bgs.

SODIUM SALTS (*otherwise undes.*)
Austria, 1 ck.

TALLOW—
Bombay, 42 brls.

NEWCASTLE-ON-TYNE

Week ending December 21.

ANTIMONY—
Antwerp, 2 cks.
Portland (Me.), 48
Rotterdam, 3

BARYTES—
Antwerp, 250 bgs.

BLEACHING POWDER—
Rotterdam, 204 cks.

CAUSTIC SODA—
Antwerp, 104 drms.; Bergen, 86 drms.; Christiania, 40 drms.; Copenhagen, 82 drms.

COAL TAR PRODUCTS—
Pitch
Rotterdam, 1 cs.

GLUE (MARINE)—
Antwerp, 67 pkgs.

LITHARGE—
Hamburg, 39 cks.
Rotterdam, 7 cs.

MAGNESIA—
Antwerp, 100 bgs.
Copenhagen, 42 cs.
Portland (Me.), 20 cks.

RED LEAD—
Bergen, 4 cks.; Christiania, 4 cks.; Copenhagen, 17 cks.; Hamburg, 75 cks.; Rotterdam, 2 cks.

SODIUM SULPHITE—
Copenhagen, 16 kgs.
Rotterdam, 69 cks.

WHITE LEAD—
Antwerp, 300 kgs., 100 ktls., 9 cks.; Hamburg, 18 cks.; Rotterdam, 250 cks.

ZINC ASHES—
Antwerp, 271 bgs.

ZINC OXIDE—
Antwerp, 12 cks.

N. & S. SHIELDS.

Week ending December 21.

CALCIUM CARBIDE—
Valparaiso, 1 t. 16 c.

LITHARGE—
Callao, 3 c. 2 qrs.

SODIUM HYPOSULPHITE—
Antofagasta, 1 t. 2 qrs.
Iquique, 48 t. 15 c.

PRICES CURRENT.

WEDNESDAY, DEC. 26, 1923.

PREPARED BY MESSRS. HIGGINBOTTOM & Co., 21, SPRING GARDENS, MANCHESTER.

The values stated are F.O.R. at makers' works, but it must be understood that the prices in different localities may vary

		£	s.	d.
ACIDS.				
Acetic, 40% and 80%	*cwt.	23- / & 46/-		
Acetic, (Glacial, B.P.) in carboys	*ton	70	0	0
Arsenic, S.G. 2.000	ton	80	0	0
Boric (crystals)	†ton	48	0	0
Citric	lb.	0	1	4½
Formic, 80/85%	*ton	49	0	0
Hydrofluoric, 59/60%	*lb.	0	0	7½
Lactic, 50%	ton	43	0	0
Muriatic (Tower Salts), 28° Tw.	*carboy	0	3	6
Nitric, 80° Tw.	*ton	21	10	0
Oxalic	lb.	0	0	5¾
Phosphoric, 1,500° tech.	*ton	33	0	0
Sulphuric (168°)	*ton	7	10	0
Sulphuric (140°)	*ton	3	15	0
Sulphuric (free from Arsenic, 144°)	*ton	4	10	0
Tannic (commercial)	lb.	0	1	6
Tarteric (crystals)	lb.	0	1	1
COAL TAR PRODUCTS.				
Aniline Oil	*lb.	0	0	8½
Aniline Salt	*lb.	0	0	8½
Anthracene, 40/45% "A"	unit	0	0	4
Benzol, 90%	*gallon	0	1	3
Carbolic Acid (crude 60%)	gallon	0	3	4
Carbolic Acid (crystals 40°)	lb.	0	1	0
Creosote	*gallon	0	0	9¼
Cresylic Acid, 97/99%	*gallon	0	2	0
Naphtha, crude, 30%	*gallon	0	0	8½
Naphtha, solvent (90/160)	*gallon	0	1	3
Naphthalene, refined	ton	17	10	0
Pitch (f.a.s. Liverpool)	ton	5	7	6
Pyridin	gallon	1	2	6
Tar, crude	ton	4	10	0
Tar, refined	barrel	1	17	6
Toluol	*gallon	0	1	9
Xylol, (pure)	*gallon	0	2	3
GENERAL CHEMICALS.				
Acetone	*ton	124	0	0
Alum, loose lump (delivered)	*ton	10	10	0
Aluminium Sulphate, 17/18%	ton	10	10	0
Aluminium Sulphocyanide	lb.	0	0	7
Aluminoferric (in slabs) 20° Tw.	ton	7	0	0
Ammonia, anhydrous	*lb.	0	1	4
Ammonia, .880	*ton	22	10	0
Ammonia, .920	*ton	14	10	0
Ammonium Carbonate (lump)	lb.	0	0	4
Ammonium Muriate (grey)	†ton	30	0	0
Ammonium Nitrate	ton	35	0	0
Ammonium Phosphate	ton	60	0	0
Ammonium Sulphate, 25¾% delivered	†ton	14	16	0
Ammonium Sulphocyanide, 95%	lb.	0	1	3
Antimony (Golden Sulphide)	lb.	0	0	9
Arsenic (Cornish White)	ton	68	0	0
Barium Carbonate (native), 92/94%	ton	5	15	0
Barium Chlorate	lb.	0	0	7
Barium Chloride (in casks)	ton	14	10	0
Barium Sulphate	ton	£5	to	£7
Barium Sulphocyanide, 95%	lb.	0	0	9½
Bleaching Powder, 35%	*†ton	10	0	0
Bleaching Liquor, 7%	*ton	4	10	0
Calcium Chloride	†ton	5	10	0
Carbon Bisulphide	*ton	26	0	0
Casein (commercial)	ton	81	0	0
China Clay (at Runcorn), in bulk	ton	50/-	to	90/-
Chromium Acetate (crystals)	lb.	0	0	8
Copper Sulphate	ton	25	0	0
Formaldehyde, 40%	ton	63	0	0
Glycerine (chemically pure, S.G. 1,260)	*ton	85	0	0
Glycerine (crude), 80%	*ton	60	0	0
Iodine	*oz.	0	1	0
Iron Nitrate, 80° Tw.	*ton	6	5	0
Iron Sulphate (copperas), delivered in bulk	*ton	2	2	6
Iron Sulphide (lumps)	ton	6	0	0
Lead Acetate (white)	ton	46	0	0
Lead Acetate (brown)	ton	45	0	0
Lead Carbonate (White Lead)	ton	47	0	0
Lead Nitrate	ton	43	0	0
Lime Acetate (brown)	*ton	14	10	0
Lime Acetate (grey), 80%	*ton	22	0	0
Lime Bisulphite (S.G. 1,070)	*ton	8	0	0
Lime Superphosphate, 30%	ton	3	5	0
Litharge (British)	ton	43	0	0
Magnesite, Calcined (delivered)	ton	11	0	0
Magnesite, Raw	ton	3	0	0
Magnesium Carbonate (light)	cwt.	1	16	0
Magnesium Chloride (solid)	ton	3	0	0
Magnesium Sulphate (Epsom Salts, coml.)	ton	4	10	0
Magnesium Sulphate, B.P.	ton	6	10	0
Manganese Borate, 85%	ton	105	0	0
Manganese Sulphate, 90%	ton	45	0	0
Methylated Alcohol, 64° (industrial)	gallon	0	3	1
Naphtha (Wood), Solvent	*gallon	0	5	6
Naphtha (Wood), Miscible, 60° p.	gallon	0	5	6
Potassium Bichromate	lb.	0	0	5¾
Potassium Carbonate, 90%	ton	27	0	0
Potassium Chlorate	lb.	0	0	3
Potassium Hydrate (Caustic Potash), 88/90%	ton	33	0	0
Potassium Hydrate (liquid), 50° Bé.	ton	18	10	0
Potassium Chloride 80%	ton	8	10	0
Potassium Nitrate (refined)	ton	25	0	0
Potassium Permanganate (commercial)	lb.	0	0	8¾
Potassium Prussiate (yellow)	lb.	0	0	9¼
Potassium Prussiate (red)	lb.	0	2	3
Potassium Sulphate, 90% (ex ship)	ton	11	0	0
Potassium Sulphocyanide	lb.	0	1	6
Salammoniac, lump (sublimed) 1st & 2nd	cwt.	55/-	&	52/3
Sodium Acetate	ton	24	0	0
Sodium Arsenate, 45%	ton	44	0	0
Sodium Borate (Borax), Crystals	†ton	25	0	0
Sodium Bicarbonate (2 cwt. bags)	†ton	10	10	0
Sodium Bichromate	lb.	0	0	4½
Sodium Carb. (Alkali), 58% bags	†ton	7	10	0
Sodium Carb. (Soda Crystals), bags, car. pd.	†ton	5	5	0
Sodium Chlorate	lb.	0	0	3
Sodium Cyanide (100% basis) for export	lb.	8d.	to	8½d
Sodium Hydrate (76% C. Soda), f.o.r.	†ton	19	7	6
Sodium Hydrate (70% C. Soda)	†ton	17	17	6
Sodium Hydrate (60% C. Soda)	†ton	16	17	6
Sodium Hydrate (Liquid, 90° Tw.)	†ton	8	5	0
Sodium Hydrate, 77/78% powdered (99%)	†ton	22	0	0
Sodium Hyposulphite (commercial)	†ton	9	10	0
Sodium Hyposulphite (photographic)	ton	15	10	0
Sodium Manganate (basis 25%)	ton	45	0	0
Sodium Nitrate, 96% ref'd, f.o.r. L'pool	ton	13	5	0
Sodium Nitrite, 100% basis	ton	28	10	0
Sodium Perborate	lb.	0	0	11¼
Sodium Phosphate	ton	14	0	0
Sodium Prussiate	lb.	0	0	5¼
Sodium Silicate (glass), Alkaline	†ton	11	5	0
Sodium Silicate (liquid, 140° Tw.)	†ton	9	0	0
Sodium Sulphate (Saltcake)	†ton	4	10	0
Sodium Sulphate (Glauber's Salt)	ton	3	10	0
Sodium Sulphide (conc.), 60/65%	ton	14	10	0
Sodium Sulphide Crystals (casks)	†ton	9	0	0
Sodium Sulphocyanide (liquid)	lb.	0	0	6
Sulphur (Flowers) ex ship, Sicilian	ton	8	0	0
Sulphur (Roll Brimstone)	ton	8	0	0
Sulphur (Texas Gulf)	ton	5	5	0
Tartar Emetic, 43/44%	lb.	0	1	0
Tin Crystals	lb.	0	1	3½
Tin Perchloride fused	lb.	0	1	10
Titanous Chloride	lb.	0	1	0
Zinc Chloride (solution, 102° Tw.)	*ton	20	0	0
Zinc Sulphate, Crystals	ton	13	10	0
METALS.				
Aluminium (Ingot Metal 98/99%)	ton	115	0	0
Antimony	ton	44	10	0
Copper	ton	61	11	3
Lead (Chemical Sheet), delivered	cwt.	1	17	6
Lead (Foreign Pig)	ton	30	12	6
Nickel	ton	130	0	0
Silver	oz.	0	2	9 11/16
Tin, English Ingots	ton	235	0	0
Zinc (Spelter)	ton	32	12	6
Zinc Dust, 90/92%	ton	45	0	0
OILS.				
Cottonseed	*ton	46	0	0
Linseed, Raw	*ton	45	10	0
Stearine, 115-120° M.P.	ton	48	0	0
Tallow	ton	42	0	0
Turpentine	cwt	3	12	6

* *Packages extra or returnable*; otherwise prices usually include packages

1 Makers' prices for home consumption only.

INDEX.

VOL. LXXIII.

Note.—Entries marked (P.N.) refer to "Parliamentary News."

Pages.	No.	Date.
1 to 30	1885	July 6 1923
31 „ 60	1886	„ 13 „
61 „ 90	1887	„ 20 „
91 „ 122	1888	„ 27 „
123 „ 152	1889	Aug. 3 „
153 „ 182	1890	„ 10 „
183 „ 210	1891	„ 17 „
211 „ 242	1892	„ 24 „
243 „ 270	1893	„ 31 „
271 „ 298	1894	Sept. 7 „
299 „ 328	1895	„ 14 „
329 „ 358	1896	„ 21 „
359 „ 388	1897	„ 28 „
389 „ 418	1898	Oct. 5 „
419 „ 448	1899	„ 12 „
449 „ 480	1900	„ 19 „
481 „ 510	1901	„ 26 „
511 „ 540	1902	Nov. 2 „
541 „ 570	1903	„ 9 „
571 „ 602	1904	„ 16 „
603 „ 636	1905	„ 23 „
637 „ 666	1906	„ 30 „
667 „ 696	1907	Dec. 7 „
697 „ 728	1908	„ 14 „
729 „ 758	1909	„ 21 „
759 „ 790	1910	„ 28 „

A

Page.

Abrasives, The Technology of 33
Absorption Tower, A Study of the 577, 610
Accelerators, Analysis of Organic 701
Accelerators, Organic Vulcanisation 673
Accelerators, Xanthates as Vulcanisation 674
Acetic Acid in British Malaya 312
Acetylene and Ethylene as Anæsthetics 103
Acetylene, The Action of, on Phenols 400
Acid Pumping and Elevating Plant 737
Acid Transport in Carboys and Drums 766
Acids, Corrosive, The Shipment of 646
Activated Charcoal 161
Activation of Hydrogen in Organic Compounds 336
Adhesives Industry, The Modern: A Summary of Technical Progress 301
Agitation in Chemical Engineering Practice 249
Agar-agar, Japanese Production of 432
Alcohol Denaturant, New American 78
Alcohol, Estimation of, in Benzol 255
Alcohol, Industrial, Production (P.N.) 110
Alcohol, Isopropyl 395
Alcohol, Methyl, in Ethyl Alcohol 223
Aldehydes, The Schiff's Reaction for 371
Algeria, Calcium Carbide in .. 195
Alkali Inspectors' Reports 3, 34, 36
Alkali Prices, American 429
Alumina, Italian Leucite a Source of 608
Alumina, The Manufacture of 361
Aluminium Chloride in Petroleum Refining 371
Aluminium Industry, The Norwegian 549
Aluminium Paint and Heat Radiation 283
Aluminium-sulphate Solutions, Purification of 679
Amalgamations, Holding Companies and 612
America and the German Patents 191
America, Arsenic Situation in 189
America, Carbon-black Production in 313
America, Coke By-products in 463
America, Sulphuric Acid in .. 462
America, Zinc and Lead Compounds in 102
American Alkali Prices 429
American Benzol Production 430
American Chemical Exposition 312
American Chemical Warfare Service 770
American Diabetes Remedies 194
American Dyestuffs Industry in 1922 104
American Non-ferrous Metallurgy 583
American Sulphur Exports .. 45
America's Heavy Chemical Industry 275
Amines, The Identification of 742A
Amino-naphthols, The 35
Ammonia, Sulphate of (P.N.) 168
Ammonia, Sulphate of, Federation: Annual Meeting 612
Ammonia, Synthesis of, by Novel Belgian Process 364
Ammoniacal Liquor for Water-softening 340
Ammoniacal Liquors, The Distillation of 36
Anæsthetics, Ethylene and Acetylene as 103
Analysis, Electrometric Methods in 552
Analysis, "Permutit" in .. 742A
Analysis, Volumetric, Potassium Permanganate in 309
Analyst, Public, The Position of the 11
Analytical Chemist, The Future of the 519
Anglo-Persian Oil Co. (P.N.) 619
Aniline in Fuel Oil Analysis 187
Anise Oil Market at Hong Kong 649
Anthraquinone, Decomposition of, by Heat 400
Antiseptic, A New Zinc Chloride 400
Argentina Exhibition of Educational Materials 738
Arsenic in Food Preservative 432
Arsenic Ores in Turkey 649
Arsenic Poisoning, Ferric Hydroxide in 371
Arsenic Production, Canadian 742A
Arsenic Situation in America 189
Arsenical Insecticides, The Toxicity of 313
Arseniuretted Hydrogen Fatality 399
Artists' Materials, Committee on 738
Asbestos Factory in Quebec ... 710
Asbestos Output, Quebec .. 138
Asphaltenes, Separation of, from Mineral Oils 648
Association of British Chemical Manufacturers (see SOCIETIES, ETC.).
Australia, White-lead Purchasing Restriction in 738
Australian Chemical Imports 370
Australian Copper Mine Fails 555
Australian Mining Company Ceases Operations 138
Australian Motor Spirit 771
Austria, The Chemical Industry of 487

B

Page.

Bactericides, New 576
Baku Oil Industry 463
Bank Rate Increased 43
Barium Test for Sulphates, The 372
Barytes, Bleaching 166
Barytes Deposits in Corea .. 771
Barytes Production in the U.S. 219
Bauxite in Russia 338
Bauxite Mining Industry, German 711
Belfast Soapmakers, Compensation for 138
Belgian Nitrogen-fixation Process, A Novel 364
Belgian Radium Production .. 710
Belgian Reparation Dyestuffs, Disposal of 312
Bentonites, Canadian 96
Benzine, Deodourisation of .. 462
Benzol, Deodourisation of .. 462
Benzol, Estimation of Alcohol in 255
Benzol-plant Fatality 340
Benzol Production, American 431
Benzol Works Fatality 522
"Bergius" Hydrogenation Process 248
Birmingham Societies' Dinner 740
Blast-furnace Linings, The Deterioration of 9
Bleaching Liquors from Liquid Chlorine 424
Bleaching Powder, The Available Chlorine in 216
Bleaching with Concentrated Hydrogen Peroxide 676
Bleaching with Hydrogen Peroxide 515
Bleaching with Percarbonates 433
Boilers, Wrought Iron, The Life of 492
BOOKSHELF:—
Alcoholic Fermentation. *Arthur Harden* 12
Alcohol, Industrial. *J. G. McIntosh* 650
American Petroleum Refining. *H. S. Bell* 102
Bacteriology, Practical, for Chemical Students. *David Ellis* 12
Betriebseinrichtigungen der Textilveredelung. *Dr. P. Heermann and Ing. G. Durst* 196

Page.

BOOKSHELF (*continued*):—
Blasting with High Explosives. *W. Gerard Boulton* 583
Bulletin of the Imperial Institute, Vol. XXI. 461
Catalysis in Organic Chemistry. *Paul Sabatier* 167
Chemical Engineering Catalog (1923) 398
Chemistry, A Treatise on (Vol. II.). *Roscoe and Schorlemmer* 167
Chemistry, Inorganic and Organic. *Charles L. Bloxam* 38
Chemistry, Practical, for High Schools. *H. B. Dunnicliff* 398
Clouds and Smokes. *Dr. W. E. Gibbs* 650
Colloid Chemistry, Theoretical and Applied. *Ostwald and Fischer* .. 38
Dairy Farming. *R. H. Leitch* 369
Elektrische Behandlung von Gasen. *Henri Silbermann* 196
Entwicklung der Chemischen Technik bis zu dem Anfangen der Grossindustrie. *Dr. Gustav Fesler* 196
Gesammelte Abhandlungen. *Dr. F. Kehrmann* 72
Journal of Scientific Instruments 461
Kelly's Directory of the Chemical Industries (1923). *Kelly's Directories, Ltd.* .. 583
Laboratory Exercises in Second-year College Chemistry. *W. H. Chaplin* 72
Machine Construction and Drawing, A First Course in. *T. M. Naylor and W. Tattersall* 398
Métaux Précieux, Les. *Jean Voisin* 196
Nitric Acid and Nitrates. *A. Cottrell* 519
Nitrous Gases, The Absorption of. *W. H. Webb* .. 369
Oil Analysis, A Short Handbook of. *A. H. Gill* 583
Organic Chemistry (Molinari), Part II., Vol. II. *Thomas H. Pope* 620
Organic Chemistry, Systematic. *Cumming, Hopper and Wheeler* .. 620
Perfumes and Cosmetics. *W. A. Poucher* 72
Radio Activity. *Kasimir Fajans* 398
Second-year College Chemistry. *W. H. Chaplin* 72
Stoking, Mechanical. *David Brownlie* 715
Van Nostrand's Chemical Annual (1922). *J. C. Olsen* 583
Varnishes and Their Components. *Dr. R. S. Morrell* 583
Boric Acid, The Titration of 453
Brass, Red Stains on 771
Brazil, Caustic-soda Plant for 137
British Association (see SOCIETIES, ETC.)
British Association of Chemists (see SOCIETIES, ETC.)
British Chemical and Dyestuffs Traders' Association (see SOCIETIES, ETC.)
British Chemical Plant Manufacturers' Association (see SOCIETIES, ETC.)
British Dyestuffs Corporation (P.N.) 136
British Dyestuffs Corporation Reconstruction 770

Page.

British Dyestuffs Corporation: Resignation of Prof. Green .. 244
British Dyestuffs Corporation, The Directorate of the 430, 459, 490
British Empire Exhibition 429, 457, 521, 739, 771
British Engineering Standards Association .. 72
British Industries Fair .. 137, 548
British Overseas Chemical Trade .. 73, 195, 338, 464, 585, 739
Bromine in the U.S. .. 370
Brunner, Mond and Co., Jubilee of .. 644
Brunner, Mond and Co.: Jubilee Celebration Dinner 11
Burma, Lead and Silver Discovery in .. 341

Business Notices :—
Anchor Chemical Co., Ltd.... 584
Barclay Chemical Corporation .. 463
Benzol and By-Products, Ltd. .. 432
Boor (George) and Co.... .. 463
British and Foreign Metal and Chemical Co., Ltd. .. 399
Broadbent (Thomas) and Sons, Ltd. .. 13
Broughton Analytical Laboratories .. 254
Brown (J.) and Co., Ltd. .. 522
Brown, James M. .. 340
Burt, Boulton and Haywood, Ltd. .. 340
Greenhalgh (D. W.) and Son 463
Guttmann (Oscar) and Sons 13
Keeling's Oxides (1921), Ltd. 340
Lever Bros., Ltd. .. 616
Limmer and Trinidad Lake Asphalt Co., Ltd. .. 432
Main (A. and J.) and Co., Ltd. .. 370
Mantz and Reid, Ltd. .. 103
Midland Tar Distillers, Ltd. 282
Salus Co., Ltd.... .. 340
Sharples Super-Centrifuge... 616
United Brassfounders and Engineers, Ltd. .. 226
Western Chemical Co. (Paisley), Ltd. .. 434

Page.

Caracristi Process for Low-Temperature Carbonisation 9
Carbide Manufacture in Sao Paulo .. 255
Carbide Production in South Africa .. 105
Carbide Production, Tasmanian 711
Carbon, Activated: General Properties, Structure, and Manufacture .. 99
Carbon Black in Canada .. 462
Carbon-black Production in America .. 313
Carbon-dioxide Manufacture, Nitric-acid Formation in .. 282
Carbon, The Oxidation of .. 253
Carboys and Drums, Acid Transport in .. 766
Casein in the Paints Industry 220, 252, 310
Casein Manufacture in Finland 554
Casein Production in the U.S. 225
Cast-iron Research, British .. 196
Castor-oil Industry .. 483
Caustic-soda Plant for Brazil 137
Causticising, Quicklime for .. 362
Celadonite from India .. 494
Celanese in France .. 712
Cellulose Acetates; Recent Progress in Chemistry and Technology .. 155
Cellulose Ethers and Esters .. 451
Cement Companies' Merger .. 226
Cement Manufacture in India 770
Cement, Portland, Sulphur in 95
Cement Position in the U.S. .. 283
Cement Production in China .. 226
Cement Trade Development .. 399
Ceylon Imports of Calcium Carbide .. 284
Ceylon, Plumbago Trade of .. 75

Change of Address :—
Agricultural Information Bureau for the French Potash Mines .. 340
Barr (James C.), Ltd. .. 255
British Carbide Factories, Ltd. .. 399
Chance and Hunt, Ltd. .. 584
Continuous Reaction Co., Ltd. .. 255
Evans (Joseph) and Sons (Wolverhampton), Ltd. .. 616
Lautaro Nitrate Co., Ltd. .. 399
Magnesium Co., Ltd. .. 13
P. and B. Evaporators, Ltd. 166
Rosario Nitrate Co., Ltd. .. 312
Shetliff (Wm. A.) and Co. .. 462
U.S. Department of Commerce: London Office .. 71
Vivian and Sons, Ltd. .. 710
Whiffen and Sons, Ltd. .. 399

Charcoal, Activated .. 161
Chemical Industry Club (see Societies, etc.)
Cheshire Salt Deposits .. 137
Chile, British Trade with .. 738
Chile, Chemical Trade of .. 675
Chilean Copper Industry .. 396
Chilean Iodine Combine .. 13
Chilean Package Regulations 554
China, Manufacture of Soda in 711
China, Salt Manufacture in .. 103
China-wood Oil, The Importance of Correct Sampling of 709
Chinese Camphor Trade .. 163
Chinese Dyestuffs Market .. 676
Chinese Groundnut Crop .. 255
Chlorination, Electro-chemical 669
Chlorination of Toluene, The .. 709
Chlorine, Liquid, Bleaching Liquors from .. 424
Chromium, Electro-plating with 543
Chromium, The Volumetric Estimation of .. 703
Cinchona Products in Japan .. 195
Citrate of Lime Sales, Italian 738
Citrate of Lime Industry, Italian .. 397
Citric Acid Industry in Sicily 579
Citric Acid Industry, Italian 553
Coal Discovery in New Zealand 432
Coal Output, British .. 255
Coal Production, The World's 616
Coal, The Determination of Nitrogen in .. 576
Coal, The Liquefaction of .. 248
Coalfields in the North of Ireland .. 770
Cobalt Production, Canadian 193
Cobalt, The Estimation of, by Dinitroso Resorcinol .. 462
Cochineal Insects Check Prickly Pear .. 312

Page.

Coconut Oil: A Survey of the Present Position of the Industry .. 273
Coconut Oil and Copra Exports from British Malaya 770
Cohesion and Molecular Forces 335
Coke By-products in America 463
Coke, Exports of (P.N.) .. 14
Coking Plant, The New Consett 394
Colombia, The Platinum Industry of .. 70
Colour Users' Brochure .. 493

Companies, New :—
Abbey Works, Ltd. .. 528
African Pioneer Agency, Ltd. .. 621
Alsace-Lorraine and General Products Co., Ltd. .. 653
Aluminium Products, Ltd.... 528
Anglo-American Cattle Products Co., Ltd. .. 438
Anglo-Spanish Oilfields, Ltd. 684
Armourite (Laboratories), Ltd. .. 556
Artificial and Real Silk Co., Ltd. .. 715
Artificial Silk and Textile Co., Ltd. .. 108
Ashby Soaps, Ltd.... .. 375
Ashwood Dale Quarries, Ltd. 402
Associated Paint Manufacturers, Ltd. .. 78
Banff and Moray Agricultural Co., Ltd. .. 261
Barons, Ltd. .. 140
Bellamy and Wakefield, Ltd. 653
Beswick's Lime Works, Ltd. 261
Bideford Storage, Ltd.... .. 50
Birmingham Rubber and Chemical Co., Ltd. .. 140
Boby (William) and Co., Ltd. .. 402
Brass (Geo. H.) and Co., Ltd. .. 438
Briquette Binders, Ltd. .. 375
British Ferro-Silicate Tar Macadam and Concrete Co., Ltd.... .. 438
British International Industries, Ltd. .. 78
British Mineral Oil Products, Ltd. .. 684
British Synthetics, Ltd. .. 715
Burbanks (Pilbarra) Copper Mines, Ltd. .. 17
Burlington Syndicate, Ltd... 228
Byerley and Gut, Ltd. .. 556
Calumite Lead Products, Ltd. .. 653
Carlton Bleaching and Dyeing Co. (1923), Ltd. .. 556
Carlton Laboratories, Ltd.... 50
Carr and Day and Martin, Ltd. .. 228
Celite Products Corporation 496
Cement and Steel, Ltd. .. 715
Cement Supply Co., Ltd. .. 17
Charles Morrison Compositions Co., Ltd. .. 196
Charnock Bros. and Co., Ltd. .. 140
Ciela Photographic Supplies, Ltd. .. 778
Clark (Robt. Ingham) and Co. (Scotland), Ltd. .. 375
Cleeneeze, Ltd. .. 684
Cleveland Scientific and Technical Institution .. 78
Cockson's, Ltd.... .. 715
Coley (H. Edwin), Ltd. .. 311
Collins, A. G., and Brother, Ltd. .. 50
Commercial Petroleum Co., Ltd. .. 261
Coty (England), Ltd. .. 743
Coxeter and Son, Ltd. .. 171
Craig Mitchell (W.) and Co., Ltd. .. 496
Crampshaw, Ltd. .. 17
Cross (Alexander) and Sons (London), Ltd. .. 592
Crums Prints, Ltd. .. 343
C.V. Aluminium Syndicate, Ltd. .. 653
Cyanamid Products, Ltd. .. 311
Danish Soap Industry, Ltd. 684
Decolourising Materials, Ltd. .. 496
De Vains Process, Ltd. .. 108
Deptford Glass Works, Ltd. 592
Doughty-Richardson Fertilisers, Ltd. .. 50
Dundalk Chemicals, Ltd. .. 715
Dy-O-La Dye Co. .. 402

Page.

Companies, New (*continued*):—
Eclipse Oil Co., Ltd. .. 556
Ellis and Sons (1923), Ltd.... 171
Enzymetan, Ltd. .. 778
Fairclough (Alfred), Ltd. .. 402
Featherstone Hammond Partners, Ltd. .. 621
Fine Chemicals, Ltd. .. 556
"Flare" Firelighters, Ltd. 743
Gas Generators and Industrial Furnaces, Ltd. .. 621
Griffen Chemical Co., Ltd.... 108
Greenhalgh (John) (Vigo Products), Ltd. .. 375
Hambling (Jane), Ltd. .. 438
Hardy, Brown and Co., Ltd. 50
Harpic Manufacturing Co., Ltd. .. 621
Hibbs and Wishart, Ltd. .. 196
Hightensite and Ebonite Manufacturing Co., Ltd.... 261
Hope (H. Edward) and Co., Ltd. .. 311
Houston and Wallace, Ltd.. 171
Huber (J. M.), Ltd. .. 715
Hutchins (Geo. Osmond) Oils, Ltd. .. 261
Hydra Lime Products, Ltd. 196
Hydro Carbon Distillation Syndicate, Ltd. .. 743
Ideal Requisites (1923), Ltd. 402
Ilfar Aluminium Co., Ltd.... 343
Industrial Products, Ltd.... 311
Industrial Residues, Ltd. .. 17
International Commodities, Ltd. .. 140
Irish B.P. Co., Ltd. .. 528
Jamaica Sugar Syndicate, Ltd. .. 311
Japan All Producers, Ltd.... 438
John J. Clark Co., Ltd. .. 653
Jones (Ellis) and Co. (Stockport), Ltd. .. 743
Jopson, Bardsley and Jopson, Ltd. .. 196
Key Products, Ltd. .. 621
Kirkland Iron Ore Co., Ltd. 171
Klenso, Ltd. .. 17
Kynaston, Ltd. .. 778
Lactobacilline, Ltd. .. 261
Lafarge Aluminous Cement Co., Ltd.... .. 78
Lamplough (F.) and Co., Ltd. .. 78
Lines Lead Products, Ltd. 778
Latex Developments, Ltd.... 653
Lavoclean, Ltd. .. 140
Lee and Pollard, Ltd. .. 743
Leicester Paper Staining Co., Ltd.... .. 468
Lennox Chemicals, Ltd. .. 592
Linium Products Syndicate, Ltd. .. 468
Lintox, Ltd. .. 171
Liquid Oxygen Explosives, Ltd. .. 108
London Casein Works, Ltd. 140
London Lead Oxide Co., Ltd. 50
Lustrafil, Ltd. .. 438
M.F.W. Syndicate, Ltd. .. 778
Maltby's Morpour Co., Ltd. 140
Mann and Bishop, Ltd. .. 50
Marsdens (Clayton), Ltd. .. 468
Martin (Edmund), Ltd. .. 438
Metal Treatment Co., Ltd. 778
Miller (E.) and Co. (Peckham), Ltd. .. 228
Milton Proprietary, Ltd. .. 438
Mineral Deposits, Ltd.... .. 653
Musgrave (John), Ltd.... .. 196
National Carbonised Fuel and By-Products Syndicate, Ltd. .. 196
New Brights, Ltd.... .. 743
New Motor Spirit Co., Ltd. 50
Newsome (T. H.) and Co., Ltd. .. 438
Normanby Park Tar Supply Co., Ltd.... .. 715
Northern Sabulite Explosives Co., Ltd. .. 402
Northern Smokeless Fuels, Ltd. .. 528
Nugget Polish Co. of Ireland, Ltd. .. 592
O'Malley (George), Ltd. .. 17
Orient Co., Ltd. .. 108
Osmos Salts, Ltd. .. 228
Oxford Growers' Supply Co., Ltd. .. 496
Paisley Oil and Chemical Co., Ltd.... .. 50
Pattison's Combustion Product Plant, Ltd. .. 171
Permanent Bronzing and Restoring Syndicate, Ltd. 261

C

Cacao Production, Science and 137
Cadmium in Soldering Alloys 422
Caffeine, Distinguishing Theobromine from .. 13
Calcium Arsenate, Electrolytic Production of .. 138
Calcium Carbide, Ceylon Imports of .. 284
Calcium Carbide in Algeria .. 195
Calico Printing in Czecho-Slovakia .. 771
Camphor Refining in Hong Kong .. 770
Camphor Trade, Japanese .. 282
Camphor Trade, The Chinese 163
Canada and the Industrial Property Convention .. 492
Canada, Carbon Black in .. 462
Canada, Eastern, Silica Deposits of .. 226
Canada, Mineral Salts in .. 225
Canada, Oil Production in .. 769
Canada, Sodium Sulphate in .. 515
Canada, The Mineral Production of .. 283, 423
Canadian Arsenic Production 742a
Canadian Bentonites .. 96
Canadian Chemical Developments .. 167
Canadian Cobalt Production .. 193
Canadian Exports of Chemicals 225
Canadian Imports of Chemicals 370
Canadian Output of Salt and Gypsum .. 312
Canadian Production of Heavy Chemicals .. 371
Canadian Trade Marks Registration .. 399
Cancer, Industrial .. 648
Cancer, Pitch (P.N.) .. 14

Page.

COMPANIES, NEW (*continued*):—
Pharmaceutical Supply Co., Ltd. ... 311
Phœnix Glass Co., Ltd. ... 228
Phosaline (1923), Ltd. ... 684
Pierre Rouston (Grasse), Ltd. ... 78
Pike, Leggett and Cash, Ltd. 17
Pinchin (William) and Co., Ltd. ... 261
Pynol, Ltd. ... 402
Pyorrhosal, Ltd. ... 556
Quilliam (John) and Co. (1923), Ltd. ... 592
Radiosan, Ltd. ... 343
Razip Manufacturing Co., Ltd. ... 684
Reids Ovalbo, Ltd. ... 285
Rigby (Robert), Ltd. ... 468
Robinson, Nelson and Co., Ltd. ... 196
Saville Whittle (T.) (Export), Ltd. ... 621
Senaphos, Ltd. ... 653
Senior, Crozier and Co., Ltd. 653
Silloth Products, Ltd. ... 140
Silver Drug Supply Co., Ltd. 684
Smethurst (C.), Ltd. ... 621
Smith (J. M.) and Co. (London), Ltd. ... 228
Smith (W. R.) and Sons, Ltd. ... 228
Sopex Co., Ltd. ... 261
Sotyr Institute, Ltd. ... 438
Spectrum, Ltd. ... 438
Stainless and Non-Corrosive Metals, Ltd. ... 196
Standard Match Co., Ltd. ... 261
Standard Varnish Works (of Great Britain), Ltd. ... 715
Standfast Dyes and Printers, Ltd. ... 743
"Statu" Manufacturing Co., Ltd. ... 556
Steele (T. F.) and Co., Ltd. 375
Stewart (Ralph W.) and Co., Ltd. ... 402
Stovoids, Ltd. ... 743
Stream-Line Filter Co., Ltd. 743
Stuart (Roy) and Co., Ltd. 528
Sublima, Ltd. ... 261
Super-Centrifugal Engineers, Ltd. ... 592
Sutton (Thos. S.) and Sons, Ltd. ... 50
Swaledale Limestone Fertiliser Co., Ltd. ... 402
Tar Surfacing, Ltd. ... 715
Tarrant and Co., Ltd. ... 778
Tarslag (1923), Ltd. ... 78
Thames Bank Chemical Works, Ltd. ... 621
Thames Lubricants, Ltd. ... 196
Thomas (Bertram) and Co., Ltd. ... 556
Thornley Binders, Ltd. ... 108
Tomlinsons (Manchester), Ltd. ... 261
Towles, Ltd. ... 402
Treamble Minerals, Ltd. ... 17
Unit Pasteuriser and Chiller, Ltd. ... 684
United Coke and Chemicals Co., Ltd. ... 743
United Fertiliser Co., Ltd. ... 285
Vidrox, Ltd. ... 621
Voldek Soap Co., Ltd. ... 743
Waen Silica Co. (North Wales), Ltd. ... 402
Waipund Kauri Gum Co., Ltd. ... 171
Ward (Samuel) and Co., Ltd. 468
Warren Row Whiting Works, Ltd. ... 468
Warrington Products Co., Ltd. ... 528
Waterhouse and Gray, Ltd. 17
White Island (N.Z.) Sulphur and Fertiliser Co., Ltd. ... 556
Whitewall Manufacturing Co., Ltd. ... 140
Wilson Chemical Co. (Leeds), Ltd. ... 228
Windsor Richards Protective Paint Co., Ltd. ... 17
World List of Scientific Periodicals ... 743
Wyld, Crowther and Barron, Ltd. ... 468

COMPANY REPORTS:—
Aberthaw and Bristol Channel Portland Cement Co., Ltd. ... 314
Aguas Blancas Nitrate Co., Ltd. ... **526**

Page.

COMPANY REPORTS (*continued*):—
Alianza Nitrate Co., Ltd. 434, 464
Aluminium Corporation, Ltd. 588
Amalgamated Photographic Manufacturers, Ltd. ... 47
Amalgamated Zinc (De Bavays) Co., Ltd. ... 47, 556, 588
Amelia Nitrate Co., Ltd. ... 588
American Cyanamid Co., 286, 372
American Smelting and Refining Co. ... 526
Angela Nitrate Co., Ltd. ... 496
Anglo-Chilean Nitrate and Railway Co., Ltd. ... 496
Anglo-Continental Guano Works, Ltd. ... 108, 140
Anglo-Greek Magnesite Co., Ltd. ... 464
Anglo-Persian Oil Co., Ltd., 650, 742
Arizona Copper Co., Ltd. ... 140
Asbestos Corporation of Canada ... 346, 742
Ayrton, Saunders and Co., Ltd. ... 526
Bell's United Asbestos Co., Ltd. ... 402
Benzol and By-Products, Ltd. ... 47, 286, 346, 556
Bird (Alfred) and Sons, Ltd. 526
Birmingham Aluminium Co., Ltd. ... 621
Boots Pure Drug Co., Ltd., 47, 78, 402, 715
Borax Consolidated, Ltd., 464, 496
Bradford Dyers' Association 200
British Aluminium Corporation, Ltd. ... 346
British Broken Hill Proprietary Co., Ltd. ... 258
British Burmah Petroleum Co., Ltd. ... 715
British Cellulose and Chemical Manufacturing Co., Ltd. ... 346, 402
British Cotton and Wool Dyers' Association, Ltd. ... 621
British Cotton-seed Products, Ltd. ... 372, 402
British Cyanides Co., Ltd., 47, 108, 742, 775
British Dyestuffs Corporation, Ltd. ... 17, 39
British Glues and Chemicals, Ltd. ... 372
British Motor Spirit Co., Ltd. ... 715
British Oil and Cake Mills, Ltd. ... 200
British Oxygen Co., Ltd. 17, 683
British Portland Cement Manufacturers, Ltd. ... 464
British Platinum and Gold Corporation, Ltd. ... 775
Briton Ferry Chemical and Manure Co. ... 17
Broken Hill Proprietary Co., Ltd. ... 171, 258
Broken Hill Proprietary Block 14 Co., Ltd. ... 286
Broken Hill (South) Mining Co., Ltd. ... 173
Broughton Copper Co., Ltd. 47, 775
Brunner, Mond and Co., Ltd. 526
Bryant and May, Ltd. ... 434
Burmah Oil Co., Ltd. ... 464
Burt, Boulton and Haywood, Ltd. ... 286, 314
Bush (W. J.) and Co., Ltd., 17, 47
Calico Printers' Association, Ltd. ... 228, 314
Callender's Cable and Construction Co., Ltd. ... 464
Canada Cement Co., Ltd., 47, 434
Canadian Explosives Co., Ltd. ... 47, 434
Cape Asbestos Co., Ltd. ... 78
Cassel Cyanide Co., Ltd., 621, 683, 742
Castner-Kellner Alkali Co., Ltd. ... 556, 650
Cellulose Holdings and Investment Co., Ltd. ... 588
Centrifugal Separators, Ltd. 200
Chemical and Metallurgical Corporation, Ltd. ... 742
Chloride and Electrical Storage Co., Ltd. ... 621
Compangnie Nationale des Matières Colorantes ... 340

Page.

COMPANY REPORTS (*continued*):—
Consett Spanish Ore Co., Ltd. ... 140
Corocoro United Copper Mines, Ltd. ... 775
Courtaulds, Ltd. ... 78
Cunningham (J. and J.), Ltd. ... 171
Diamond Match Co. ... 171
Dolcoath Mine, Ltd. ... 434
Dominion Glass Co. ... 346, 621
Dominion Tar and Chemical Co., Ltd. ... 17, 258, 286
Dublin and Wicklow Manure Co., Ltd. ... 171
Eastern Chemical Co., Ltd. 496
Eastman Kodak Co. of New Jersey ... 200, 621
Ebbw Vale Steel, Iron and Coal Co., Ltd. ... 47, 742
Egyptian Salt and Soda Co., Ltd. ... 715
Electrolytic Zinc Co. of Australasia, Ltd. ... 78, 496
Elliott's Metal Co., Ltd. ... 314
English Beet Sugar Corporation, Ltd. ... 496
English China Clays, Ltd. ... 372
English Margarine Works, Ltd. ... 372
English Oilfields, Ltd. ... 402
English Velvet and Cord Dyers' Association, Ltd. ... 140
Esperanza Nitrate Co., Ltd. 621
Explosives and Chemical Products Co., Ltd. ... 742
Forster's Glass Co., Ltd. ... 434
Forth Glass Works, Ltd. ... 78
Fullers Earth Union, Ltd. ... 556
Gas Light and Coke Co. ... 78
Glenboig Union Fire Clay Co., Ltd. ... 434
Goodlass, Wall and Co., Ltd. ... 200, 258
Goulding (W. and H. M.), Ltd. ... 140
Hampden Cloncurry Copper Mines, Ltd. ... 286
Henley's (W. T.) Telegraph Works Co., Ltd. ... 171
Home Grown Sugar, Ltd. ... 286
Huelva Copper and Sulphur Mines, Ltd. ... 683
Ilford, Ltd. ... 621
India Rubber, Gutta Percha and Telegraph Works Co., Ltd. ... 621
International Nickel Co. ... 78
International Paint and Compositions Co., Ltd. ... 228
Kaye's Rubber Latex Process, Ltd. ... 775
Killifreth Mine, Ltd. ... 775
Kinta Tin Co., Ltd. ... 47
Knight (John), Ltd. ... 78
Lagunas Nitrate Syndicate, Ltd. ... 588, 621
Langdale's Chemical Manure Co., Ltd. ... 556, 650
Laporte (B.), Ltd. ... 228
Lawes' Chemical Manure Co., Ltd. ... 588
Leeds Fireclay Co., Ltd. ... 775
Lighting Trades, Ltd. ... 526
Liverpool Nitrate Co., Ltd., 588, 650
London Nitrate Co., Ltd., 588, 650
Low-temperature Carbonisation, Ltd ... 775
Major and Co., Ltd. ... 78, 108
Malayan Tin Dredging, Ltd. 650
Mandleberg (J.) and Co., Ltd. ... 228
Mather and Platt, Ltd. ... 78
Miami Copper Co. ... 464
Minerals, Separation, Ltd., 228, 258
Mond Nickel Co., Ltd., 17, 47, 108
Mount Lyell Mining and Railway Co., Ltd. ... 588
Natal Ammonium Co., Ltd. 621
Nathan (Joseph) and Co., Ltd. ... 556, 775
National Lead Co. ... 200
New Transvaal Chemical Co., Ltd. ... 17
Nigerian Tin Corporation, Ltd. ... 496
Nitrate Producers' Steamship Co., Ltd. ... 526
Nitrate Railways Co., Ltd. ... 496
Nobel Industries, Ltd., 314, 372
North Broken Hill Co., Ltd., 314, 496, 556, 683

Page.

COMPANY REPORTS (*continued*):—
Olympic Portland Cement Co., Ltd. ... 496
Pan de Azucar Nitrate Co., Ltd. ... 621, 650
Parke's Drug Stores, Ltd. ... 650
Peachey Leather Products, Ltd. ... 286
Peachey Process Co., Ltd. ... 742
Pears (A. and F.), Ltd. ... 496
Pease and Partners, Ltd. ... 496
Pena Copper Mines Co., Ltd. ... 621
Pilbara Copper Fields, Ltd. 372
Pinchin, Johnson and Co., Ltd. ... 286, 715
Reckitt and Sons, Ltd., 346, 742
Rio Tinto Co., Ltd. ... 434
Ropp Tin, Ltd. ... 556
Rosario Nitrate Co., Ltd. ... 464
Sadler and Co., Ltd. ... 464, 526
Salar del Carmen Nitrate Co., Ltd. ... 196
"Sanitas" Co., Ltd. ... 588
Santa Catalina Nitrate Co., Ltd. ... 556, 588
Santiago Nitrate Co., Ltd., 556, 588
Scottish Oils Co., Ltd. ... 683
Ship Canal Portland Cement Manufacturers, Ltd. ... 526
Siamese Tin Syndicate, Ltd. 496
South American Copper Syndicate, Ltd. ... 715
South Metropolitan Gas Co. 78
Standard Chemical Co. ... 258
Staveley Coal and Iron Co., Ltd. ... 258, 346
Steiner (F.) and Co., Ltd. ... 286
Sulphide Corporation, Ltd. 715, 775
Tarslag (1923), Ltd. ... 742
Tate and Lyle, Ltd. ... 715
Taylor's Drug Co., Ltd. ... 402
United Alkali Co., Ltd. ... 108
United Indigo and Chemical Co., Ltd. ... 228, 742
United Turkey Red Co., Ltd. 171
Van den Berghs, Ltd. ... 346
Var Oil and Coal Co., Ltd. 775
Virginia Carolina Chemical Co. ... 228
Wall Paper Manufacturers, Ltd. ... 526, 588
Weardale Lead Co., Ltd. ... 588
Welsbach Light Co., Ltd., 17, 47, 78
Zinc Corporation, Ltd., 17, 314, 650

Compensation, Workmen's, The Law of: Changes in the New Act ... 734
Concrete in Chemical Engineering ... 97
Concrete, The Strength of ... 679
Contract Law, Chemists and ... 66
Copper, Electrolytic ... 44
Copper Industry, The Chilean 396
Copper Sulphate, British, in France ... 522
Copper Sulphate Production ... 517
Copra and Coconut Oil Exports from British Malaya 770
Corea, Barytes Deposits in 771

CORRESPONDENCE:—
Barytes Production, British. *L. A. Mitchell* ... 224
Bleaching with Hydrogen Peroxide. *Guthrie and Co.* ... 614
Castner-Kellner Alkali Co., Ltd. ... 712
British Chemical Plant Manufacturers' Association. *L. M. G. Fraser* ... 224
British Dyestuffs Corporation. *Professor A. G. Green* ... 459
British Empire Exhibition. *W. J. U. Woolcock* ... 613
Carbide Production in South Africa. *South African Carbide and By-Products Co., Ltd.* ... 168
Carbonisation Patents, The "Sensible Heat." *F. Mollwo Perkin* ... 647
Cement from Spent Oil Shale. *H. O. Weller* ... 46
Chemical Workers' Strike. *Arthur Barrett* ... 281
Chemists and the Election. *The British Association of Chemists* ... 680

Page.

CORRESPONDENCE (*continued*):—
Colouring of Poisons,
James Sexton, M.P. 70
George D. Yates 110
Corrosion of Iron and Steel.
W. Stanley Smith 772
"Darco" Decolourising Carbon.
S. W. Hoving 193
Dyestuffs Industry, The Control of Our.
Walter M. Gardner 345
Empire Market for British Dyestuffs.
N. Grattan Doyle 518
"Free Trade" and the British Margarine Industry.
Maypole Dairy Co., Ltd. 613
Glycerine Prices.
Haller and Phillips, Ltd. 614
Fl. Bourgeois 712
Government Research, The Remuneration of the Scientist in.
Lord Salisbury 518
Hydrochloric-acid Treatment, Chemical Engineering and.
Guthrie and Co. 647
J. W. Hinchley 680
Hydrogen Peroxide, Concentrated.
B. Laporte, Ltd. 712
Institute of Chemistry, The.
C. Watson Gray 680
Italian Citric-acid Production.
"*L'Appula*" (*Società per L'Industria Chimica Italiana*) 614
"Izal," The Disinfectant.
Newton, Chambers and Co., Ltd. 614
S. N. Brown 647
Nitrogen Fixation Process, A Novel.
I. J. van der Bossche .. 256
Power Conference, The World.
George A. Touch 460
Power, Off-Peak Electrical.
I. J. Moltkehansen 551
Soil Acidity and the Use of Superphosphates.
Fertiliser Manufacturers' Association, Ltd. 138
Tar for Roads, The Use of Hydrated Lime in.
C. A. Longley 614
Tariff Reforms and Industry.
Leopold Farmer & Sons .. 613
Trade Marks in the Irish Free State.
W. H. Beeston 647
Unemployment Among Chemists
Dr. R. B. Forster 281

Corrosion, Metal, The Prevention of 578
Corrosion, Metallic, Mechanism of 367
Corrosion of Condenser Tubes 135
Corrosion of Iron and Steel, Colloid Theory of 734
Corrosion, The Study of 736
Cotton Textiles, Sizing Materials for 768
Cream of Tartar, A Commercial Standard for 738
Cream of Tartar, Estimation of Lead in 703
Cyanogen Chloride for Fumigating 462
Cyanogen Compounds from Coal Gas 642
Czecho-Slovakia, Calico Printing Industry in 771
Czecho-Slovakian Glass Company, A New 44
Czecho-Slovakian Trade in July 341

D

Dakin Solution, The Colour of 340
Dangerous Drugs in Ships .. 340
De-aerating of Boiler Feed-water 394
Dehydrating Agent, Magnesium Chloride as a 399
Detecting Subterranean Water and Minerals 313
Diabetes Remedies, American 194
Diabetes Remedy, A New .. 340
Diabetes Treatment, New American 166
Diazotisation of Para-nitraniline 255
Diethyl Sulphate in Commercial Ethylations 369
Disinfectant, A New 770
Disinfectants and Preservatives 545
Disinfectants, The Hong Kong Market for 369
Disinfectants, The Standardisation of 12
Divi Divi, The World's Trade in 160
Drums and Carboys, Acid Transport in 766
Dutch East Indies, The Trade and Industry of the 675
Dye Combine, The French .. 486
Dye, Fast, Industry, The Development of the 190
Dyeing, Cotton, Recent Advances in 395
Dyers' Dispute Settled 648
Dyestuffs Act and the Irish Free State 137
Dyestuffs, American, Standardisation of 399
Dyestuffs, Belgian Reparation, Disposal of 312
Dyestuffs Development Committee 432
Dyestuffs, Electrolytic Preparation of 672
Dyestuffs, German Production of 163, 312, 771
Dyestuffs Imports in British Malaya 195
Dyestuffs Industry, American, in 1922 104
Dyestuffs Industry, The Government and the 167
Dyestuffs Industry, The British (P.N.) 101, 136
Dyestuffs Licences 166, 432
Dyestuffs Market, The Chinese 676
Dyestuffs, New 576
Dyestuffs Production, French 334
Dyestuffs, Reparation (P.N.) .. 46
Dyestuffs, Vat, Industry, The Development of the 190

E

Eczema from Potassium Persulphate 371

EDITORIAL:—
A.B.C.M., The Work of the 61
A Costly Victory 698
A Question of Policy 329
Alkali Inspectors' Reports... 1
Ammonium Sulphate, The Export Trade in 603
Arbitration in the Chemical Trade 512
Arsenic Market, The 571
Atomic Structure and Atomic Energy 299
Bankruptcy Law Reform .. 730
Bleaching Liquors from Liquid Chlorine 390
British Association...271, 299, 330
British Association of Chemists, The Progress of the 512
British Cellulose Report .. 330
British Industries Fair .. 542
British Trade with Germany 154
Carneristi Low-Temperature Process 62
Carbonisation, Low-Temperature 760
Carbonisation, Low-Temperature, in Vertical Retorts... 212
Caustic Soda from Sodium Sulphate 62
Chemical Plant Manufacturers' Grievances 154
Chemical Share Market, The 272
Chemist as Administrator, The 390
Chemists' Dinner 542
Colloid Chemistry, The Fifth Report on 698

Page.

EDITORIAL (*continued*):—
Colour Users and the Dye Agents 92
Contract, Standard, for Chemicals 2
Contracts, Service, in Restraint of Trade 124
Co-operation Between Chemical Societies 668
Copper Price Prospects .. 124
Cuban Alcohol Industry .. 760
Dump, Chemical-waste, Dangers 123
Dye Troubles in America .. 272
Dyestuffs Corporation Finance 538, 760
Dyestuffs Industry, The Control of Our 244
Dyestuffs Prices, Pre-war and Post-war 31
Economic Conference at Work 541
Efficiency in Details 604
Empire Exhibition, Pure Chemistry at the.. 419
Engineering Industry, A Lead from the 482
Engineering Institution, A New 450
Ethics, A Code of, for Chemists 572
Fertiliser, A New Compound 360
Fertiliser Situation, The .. 759
Fertilisers, An International Questionnaire on.. 272
Formaldehyde and the Customs Authorities: An Excess of Zeal 300
Formaldehyde Decision, The 184, 211
German Mineral Oil Combine, The New 32
German Reparations Default 604
Glass in Factory Construction 124
Government Laboratory, The Work of the 359
Government Remuneration of Scientific Talent 512
Harker, The late Dr. 420
Imperial Conference, Thoughts on the 389
Japanese Alkali Market .. 184
Leucite and the Fixation of Nitrogen 667
Madagascan Mystery, A .. 420
Muspratt, The late Dr. E. K. 272
National Certificates in Chemistry 184
Nitrogen Fixation, British Progress in 62
Nitrogen Fixation in Great Britain 697
Nitrogen-fixation Process, A Novel 183
Nobel Industries Meeting, The 360
Oxygen, Industrial, in America 212
Oxygen Plants, Private .. 360
Patent, German, The Valueless 123
Patent Office Procedure .. 2
Peat Production and Utilisation 32
Pharmaceutical-Chemical Prices 542
Platinum in the Transvaal.. 729
Potash, A New Source of .. 604
Powdered Fuel in Chemical Works 760
Protection by Patents 638
Pyrites Agreement, The .. 244
Radium Supplies, The World's 243
Research, The Imperial Aspect of 449
River Pollution 698
Rubber Manufacture, Fine Chemicals and 668
Rubber Technology, The Future of 481
Safeguarding Act, The Interpretation of the 511
Safeguarding of Industries Act 154
Silicate of Soda in Road Construction 668
Sir William Pope and the B.D.C. 420
Smoke Abatement Bill... .. 91
Sulphate, Lower Prices for 2

Page.

EDITORIAL (*continued*):—
Sulphuric-acid Manufacture, High Pressures in 637
Sulphuric Acid Production 300
Superphosphate Industry, The Declining 212
"Tolerances" on Chemical Specifications 153
Trade Returns
92, 184, 450, 572, 730
Tradition, A Break with .. 450
Transport of Dangerous Goods by Road 730
Vacuum Flask, The, as a Commercial Container .. 482

Effluents from Ammonia Plants 36
Egyptian Industry and Trade 253
Egyptian Soda Exports 103
Electrical Power for Chemical Plants 421
Electrical Pyrometry, Modern 213
Electrolytic Methods in Organic Chemistry 669
Electrolytic Oxygen and Hydrogen 704
Electrometric Methods in Analysis 553
Engineering Exhibition at Olympia 280
Engineering, Research Professorship in 134
Enzymes, British Association Discussion on 336
Essential Oil Industry of Sicily 579
Etching Reagents for Alloy Steels 104
Ether, The Manufacture of .. 363
Ethyl-alcohol Industry 125
Ethyl Alcohol, Methyl Alcohol in 223
Ethyl Chloride, Thermal Properties of 774
Ethylations, Commercial, Diethyl Sulphate in 309
Ethylene and Acetylene as Anæsthetics 103
Eugenol, Estimation of, in Essential Oils 651
Evaporation of Oil from Tanks 555
Exhibition, The British Empire 429, 457, 521, 739, 771
Explosion at Preston Gasworks 738
Explosion in a Sulphuric-acid Tank 552
Explosives in Coal Mines .. 463
Explosives in Fertiliser Plants 157
Explosives, Lead Azide in .. 283
Explosives, Nitro-starch in .. 104
Explosives, Permitted, in Mines 103
Exports of Chemicals and Allied Products, 77, 106, 199, 231, 342, 375, 495, 524, 623, 653, 745, 777
Extraction of Oil from Seeds, Nuts, and Kernels 735

F

Factory Inspector's Report for 1922 129
Fatality at a Chemical Works 521
Fats and Oils Markets in 1922 68
Fats and Oils Industry 193
Fermentation, The History of 732
Ferric Hydroxide in Arsenic Poisoning 371
Fertiliser, Leucite as a 608

FERTILISER NEWS:—
American Fertiliser Exports in 1923 315
Australian Superphosphate Industry 229
British Agriculture, The Position of 229
China's Requirements of Fertilisers 229
Compound Fertilisers, The Use of 315
Czecho-Slovakia's Fertiliser Trade 651
Dutch Superphosphate Industry 467
Egyptian Phosphate Industry 109
German Potash Industry .. 343

Page.

Fertiliser News (*continued*):—
Japanese Fertiliser, A New 229
New Zealand, Synthetic Nitrates in ... 587
Radioactivity of Chilean Nitrate ... 497
Russian Phosphate Deposits 285
Superphosphate Production in U.S. in 1923 ... 651
Swedish Fertiliser Industry 139

Fertiliser Plants, Explosives in 157
Fertilisers and Feeding Stuffs Act (P.N.) ... 14
Filling, Tower, Multiple Helix 371
Filter Press, The Theory of the 708
Finland, Casein Manufacture in ... 554
Finland, Tar Market in ... 679
Fire-proofing and Fire-extinguishing Agents ... 573
Formaldehyde Decision, The ... 254
Formaldehyde, Safeguarding Act Inquiry on ... 6, 217
France, Celanese in ... 712
France, Power Alcohol in ... 37
France, Stainless Steel in ... 463
French Artificial Silk Industry 311
French Dye Combine, The 432, 486
French Dyestuffs Production 334
Fuel Economy Congress in Paris ... 134
Fuel Economy in Chemical Works ... 761
Fuel, Powdered, in Chemical Works ... 761
Fuller's Earth Deposit in Cornwall ... 194
Fuller's Earth Industry ... 93
Fumigating, Cyanogen Chloride for ... 462
Fumigation, Hydrocyanic Acid for ... 489
Fungicide, Sulphur as a ... 521
Fur-dyeing Process, Electrolytic ... 313

G

Gas-consumption Statistics, British ... 432
Gas Engineers, Institution of 13
Gas Exhibition, The National 338, 366
Gas Undertakers as Chemical Manufacturers ... 426, 461
Gasworks Residuals, The Market in ... 615
German Bauxite Mining Industry ... 711
German Chemical Industry Developments ... 44
German Chemical Trade ... 490
German Dyestuffs Manufacturers' Profits ... 44
German Dyestuffs Production 163, 312, 771
German Foreign Chemical Trade Regulations, New ... 711
German Lime Trade ... 167
German Patent Regulations ... 366
German Reparation Duty ... 620
German Reparation Duty (P.N.) ... 14
German Reparation (Recovery) Act (P.N.) ... 136
Germany, Publication of Scientific Works Suspended in ... 370
Glasgow Corporation Chemical Works ... 226
Glasgow, Ramsay Chemical Dinner at ... 772
Glass Company, New Czecho-Slovakian ... 44
Glass, Laboratory, Industry, The Italian ... 459
Glass-making Machine, A New 393
Glass, The Estimation of Selenium in ... 520
Glue, A New Water-resistant 492
Glue, New Waterproof ... 282
Glycerine, Direct Determination of ... 702
Glycerine, The Estimation of 127, 463
Glycerol, Micro-organisms Growing in ... 645

Page.

Government Laboratory Report for 1922-23 ... 367
Greece, The Chemical Trade and Industry of ... 489
Greek Soap Trade ... 399
Grinding and Mixing, Combined ... 520
Groundnut Crop, Chinese ... 255
Groundnut Crop, Indian ... 584
Gypsum and Gypsum Products 245
Gypsum Deposit, Ontario ... 371

H

Hamburg Paraffin and Wax Market ... 617, 648
Heat Radiation, Aluminium Paint and ... 283
Heat Transmission Through Steel Pipes ... 555
Helium Storage Plant for U.S. Navy ... 522
Holding Companies and Amalgamations ... 612
Hong Kong, Anise Oil Market at ... 649
Hong Kong, Camphor Refining in ... 770
Hong Kong Market for Disinfectants ... 369
Hong Kong, The Vermilion Industry in ... 615
Hydrocyanic Acid for Fumigation ... 489
Hydrocyanic Acid, The Detection of ... 341
Hydrofluosilicic Acid: New Uses and Properties ... 366
Hydrogen, Activation of, in Organic Compounds ... 336
Hydrogen and Oxygen, Electrolytic ... 704
Hydrogen-ion Concentration ... 645
Hydrogen Peroxide, Bleaching with ... 515
Hydrogen Peroxide, Concentrated ... 676
Hydrogen Sulphide, The Toxicity of ... 104
Hydrogenated Phenols and Cresols ... 305, 363
Hydrosulphite of Soda, The Estimation of ... 486
Hypochlorite of Soda, The Manufacture of ... 218

I

Imperial College Research Fellowships ... 103
Imperial Institute, The Future of the ... 649
Imports of Chemicals and Allied Products, 16, 76, 105, 198, 230, 374, 403, 466, 494, 586, 622, 744, 774
India, Cement Manufacture in 770
India, Imports of Chemicals into: New Tariff Valuation 44
India, Match Manufacture in 616
Indian Groundnut & Sesamum Crops ... 584
Indian Indigo Crop, The ... 551
Indian Market for British Chemicals ... 133
Indian Oilseeds Crop ... 10
Indian Sesamum Crop ... 369
Indian Tariff on Sulphur ... 739
India's Heavy-chemical Industry ... 187
Indicator, A New, for Acidimetry ... 194
Indigo Shortage in Japan ... 575
Insecticide, A New Organic ... 612
Insecticides, Arsenical, The Toxicity of ... 313
Indigo Crop, The Indian ... 551
Institute of Chemistry (See Societies, etc.)
Institute of Metals (See Societies, etc.)

Page.

Institution of Chemical Engineers (See Societies, etc.)
Institution of the Rubber Industry (See Societies, etc.)
Insulin Manufacture in Sweden 194
Insulin Prices Reduced ... 738, 771
Insulin Research, Progress in 554
Intermediates for Dyestuffs, New ... 576
Iodine Combine, Chilean ... 13
Iodine in the Tanning Industry ... 371
Ireland, Northern, Coalfields in 770
Ireland, The Chemical Institute for ... 164
Irish Free State, Chemistry in the ... 8
Irish Free State, Foreign Trade of the (P.N.) ... 168
Irish Free State, Patents in the (P.N.) ... 46
Irish Free State, The Dyestuffs Act and the ... 137
Iron, Gravimetric Estimation of ... 64
Iron-ore Deposits in Lapland 711
Iron Ore in Ontario ... 313
Iron Oxide, Red, The Spanish Trade in ... 647
Isopropyl Alcohol ... 395
Isotopes, The Separation of ... 13
Italian Chemical Industry, Notes on the 10, 164, 310, 396, 554, 677
Italian Citrate of Lime Industry ... 397
Italian Citrate of Lime Sales 738
Italian Customs Duties ... 226
Italian Laboratory Glass Industry ... 459
Italian Leucite ... 608
Italian Market for Paraffin Wax ... 554

J

Japan, Chemical Stocks in 546, 710
Japan, Cinchona Products in 195
Japan, Indigo Shortage in ... 575
Japan, Patent Office in ... 584
Japan, Patent Rights in ... 773
Japan Suspends Import Duties 370
Japanese Camphor Trade ... 282
Japanese Match Industry ... 191
Japanese Production of Agar-agar ... 432
Japan's Chemical Industry, Earthquake Damage to ... 736
Jewels, Synthetic ... 312
Jubilee of Brunner, Mond and Co. ... 644

K

Kieselguhr, The Uses of ... 765
Knowles Patent Plant for Electrolytic Production of Oxygen and Hydrogen ... 704

L

Lapland, Iron-ore Deposits in 711
Latex, Rubber, the Shipment of ... 398
Lead and Zinc Compounds in America ... 102
Lead Azide in Explosives ... 283
Lead Compounds, The "Solubility Test" for ... 456

Page.

Lead, Estimation of, in Cream of Tartar ... 703
Lead Find in Derbyshire, A New ... 492
Lead, Microchemical Test for 616
Lead Mining in Britain ... 340
Lead Poisoning Fatality ... 770
Lead Poisoning in Industry (P.N.) ... 168
Lead, White, in Painting (P.N.) ... 74
Leather, Artificial ... 104

Legal Intelligence:—
Alsace Lorraine Development and Trading Co., Ltd. ... 646
Ammonium Perchlorate During the War ... 372
Anderson (A. J. R.), Ltd., *v.* G. Daniel ... 525
Aniline Dye and Chemical Co., Ltd. ... 434
Arbitration in the Chemical Trade ... 493, 525
Belvedere Fish Guano Co., Ltd., *v.* Rainham Chemical Works ... 589
Bowring (C. T.) and Co., Ltd., *v.* C. W. and C. Kendall ... 72
Brandt (A. H.) and Co. and F. W. Vogel and Co. *v.* L. B. and R. P. Shipping Co., Ltd. ... 624
British Casein Co. (1911), Ltd. ... 281, 741
Bromage (Gerald) and Co., Ltd. ... 224
Brotherton and Co., Ltd., *v.* Glasgow Corporation ... 74
Burlington Industrial Laboratories, Ltd. ... 741
Coe, William W. ... 71
Cowen, Godfrey ... 715
Crown *v.* Rio Tinto Co., Ltd. ... 102
Damant (J.) and Co., Ltd. ... 738
Daniel, G., *v.* A. J. R. Anderson, Ltd. ... 525
Dispute Over Alleged Guarantee ... 103
Fish Oil Process, Sale of a ... 646
Forbes W. D. *v.* Milton Manufacturing Co., Ltd. ... 646
Glasgow Corporation *v.* Brotherton and Co., Ltd. 74
Hewitt, William ... 715
Heyl, George Edward ... 42
Insulators, Ltd. ... 12
Jenkins, Frederick W. ... 372
Kendall, C. W. and C., *v.* C. T. Bowring and Co., Ltd. ... 72
L. B. and R. P. Shipping Co., Ltd., *v.* A. H. Brandt and Co. and F. W. Vogel and Co. ... 624
Levin, Bertram ... 646
Manning (H. T.) and Co. *v.* J. Strother and Co. ... 12
Mayer, Hugo Edward ... 525
Milton Manufacturing Co. *v.* W. D. Forbes ... 646
"Milton," The Manufacture of, in America ... 646
Monks (W. N.) and Co., Ltd. ... 340
Myer, Robert Henry ... 493
Oil Refiners, Injunction Against ... 72
Oliver, E. G., *v.* J. W. Wolstenholme ... 646
Oxide, Ltd. ... 493
Parker Ward and Co., Ltd. 166
Paulding (T.), Ltd., *v.* The Talbot Clearing House ... 741
Preston, Hull and Co., Ltd., 12, 551
Pyrites, Supply of, During the War ... 102
Rainham Chemical Works *v.* Belvedere Fish Guano Co., Ltd. ... 589
Rio Tinto Co., Ltd., *v.* The Crown ... 102
"Salvage" Fertiliser, Imported ... 525
Sapon Soaps, Ltd. ... 194
Scrimaglio *v.* Thornett and Fehr ... 493, 525
Sharp (J. B. and W. R.), Ltd. ... 551
Shilvock, Thomas J. ... 370
Soap Contract, Breach of a 12
Soap, Unsuccessful Deal in 715

Page.

LEGAL INTELLIGENCE (*continued*):
South Metropolitan Gas Co. *v.* British Sulphate of Ammonia Federation, Ltd. 525, 589
Stansfield, John L. 555
Strother (J.) and Co. *v.* H. T. Manning and Co. .. 12
Sulphate of Ammonia Federation, Ltd., *v.* South Metropolitan Gas. Co. 525, 589
Talbot Clearing House *v.* T. Paulding, Ltd. 741
Tar and Ammoniacal Liquor Contract Dispute... 74
Thornett and Fehr *v.* Scrimaglio 493, 525
Transport by Road of Carbon Bisulphide 741
Turner Drug and Galenical Co., Ltd.... 12
Veglene Oil Refinery and Chemical Works, Ltd. ... 372
Vogel (F. W.) and Co. and A. H. Brandt and Co. *v.* L. B. and R. P. Shipping Co., Ltd. 624
Wolstenholme, J., *v.* E. G. Oliver 646
Wrigglesworth, E. H. 772
Zinc Ashes, The Transport of 624

Leucite, Italian 608
Lime in North Wales 738
Lime Trade, German 167
Linseed-oil Industry 639
Low-Temperature Carbonisation, Caracristi Process for 9
Low-Temperature Carbonisation, The "Marshall-Easton" Process of 135

M

Magnesium Perchlorate as a Dehydrating Agent 399
Malaya, British, Acetic Acid in 312
Malaya, British, Exports of Copra and Coconut Oil from 770
Malaya, British, Imports of Dyestuffs into 195
Manchester's New Metallurgical Laboratories 283
"Marshall-Easton" Process of Low-Temperature Carbonisation 135
Match Industry, Japanese .. 191
Match Manufacture in India .. 616
Match Manufacturers' Combine, Swedish 493
Menhaden Oil Production .. 228
Merchandise Marks Bill (P.N.) 168
Mercury Boilers and Turbines 394
Mercury Output in Spain 253, 433
Metals, Rare, Production of .. 618
Metals, The Coating of 95
Metals, The Rare Alkali 513
Methane, Industrial 617
Methyl Alcohol in Ethyl Alcohol 223
Metric System in America .. 370
Mexico, Chemical Manufacture in 710
Mixing and Grinding, Combined 520
Morphine Industry, The Progress of the 731
Motor Fuel from Potatoes .. 43
Motor-spirit Fumes, Death from 166
Mustard Gas, The Manufacture of 702, 735
Mysore, Wood Distillation in 44

N

Naphthalene, The Sulphonation and Nitration of 337
Naphthol AS and Its Congeners 395
Naphthol, Amino-, Polysulphonic Acids 362
Naphthols, Alpha and Beta .. 221
Netherlands, Chemical Trade of the 159, 255, 524, 683
New Companies in 1923 71
New Zealand Coal Discovery 432
Nickel, Detection of, in Solution 255
Nickel Industry, The 767
Nickelling Cast Iron 137
Nitraniline (*p*), The Diazotisation of 255
Nitrate of Soda 38
Nitric-acid Formation in Carbon-dioxide Manufacture 282
Nitric Acid, Gravimetric Estimation of 400
Nitro-compounds, Electrolytic Reduction of 671
Nitrogen-fixation Process, A Novel Belgian 364
Nitrogen, The Determination of, in Coal 576
Nitro-starch in Explosives .. 104
Nobel Prize Awards 522, 584
Nomenclature, Chemical 165
Norwegian Aluminium Industry 549
Norwegian Cellulose Products Exports 492

O

OBITUARY:—
Ayrton, Mrs. Hertha 254
Bishop, Lieut.-Col. Alfred Conway 463
Chambers, E. V. 137
Clowes, Prof. Frank 739
Friedlander, Dr. Paul 340
Gerhardt, C. F. 770
Harker, Dr. John A. 432
Harries, Prof. Carl 555
Lyle, Sir Robert Park 70
McLeod, Prof. Herbert ... 399
Muspratt, Dr. E. K. 279
Muspratt, Sydney Knowles... 678
Pain, James 463
Rice, A. E.... 312
Smith, Alfred 710
Smith, William 103
Statham, Richard T. 225
Stead, Dr. J. E. 522
Stutzer, Dr. A. 370
Thomson, William 431
Wardle, Frederick 710
Wilkie, John M. 678, 703

Oil-boring, Government (P.N.) 136
Oil-contaminated Water, Purification of 589
Oil, Extraction of, from Seeds, Nuts, and Kernels 735
Oil from Russia (P.N.) 168
Oil, Fuel, Analysis, Aniline in 187
Oil Industry of Baku 462
Oil-mill Workers, Overalls for (P.N.) 110
Oil in Spain 43
Oil Refineries in U.S. Decreasing 432
Oil Refining by Silica-gel .. 71, 136
Oil Situation in Canada 769
Oils and Fats Industry 192
Oils and Fats Markets in 1922 68
Oilseeds Crop, Indian 10
Ontario, Iron Ore in 313
Opium Industry, The Progress of the 731
Organic Accelerators, Analysis of 701
Organic Chemistry, Electrolytic Methods in 669
Oxidation of Carbon, The .. 253
Oxygen and Hydrogen, Electrolytic 704
Oxygen for Blow-pipe Purposes 617
Oxygen, Liquid, as an Explosive 649
Ozokerite Output in Poland .. 103

P

Paint Industry, A "Solubility Test" for the 456
Paints Industry, Casein in the 220, 252, 310
Paper, Colouring, with Insoluble Azo-colours 525
Paper from Coconut Husks .. 522
Paraffin Wax, The Italian Market for 554
Parliament, The New 706

PATENT ABSTRACTS:—
Accelerators, Rubber Vulcanisation. Naugatuck Chemical Co. 122, 255
Acetic-acid Distillation. British Cellulose and Chemical Manufacturing Company, Ltd.; and Bader 625
Acetic Anhydride, Treatment of Animal Fibres with. Ransford 111
Acetylene Polymerisation Products. Elektrizitätswerk Lonza 289
Acetylene, Regenerating Rubber with. Koller .. 111
Acid Chlorides, Organic. Farbwerke vorm. Meister, Lucius and Brüning 517
Acid Sulphates, Refining Hydrocarbons with. Plauson's (Parent Company), Ltd. 469
Acid Treatment of Coal Tar. Richards, and Siluminite Insulator Company, Ltd. .. 685
Acids, Pumps for. Gaillard 500
Adhesives, Soya-bean. Johnson 591
Alcohol and Ammonium-sulphate Manufacture. Compagnie de Béthune 49
Alcohol and Yeast, Production of. Klein 747
Alcoholic Liquids, Distilling. Harris 685
Aldehyde Motor-spirit Mixtures. Terrisse 438
Alkali and Alumina from Leucite. Jourdan 19
Alkali Bichromates, Electrolytic Production of. Jouve, Helbronner, and Soc. Hydro-Electrique and Metallurgique du Palais 592
Alkali Cyanide Retorts. Fairweather 260
Alkali Cyanides. Marks .. 347
Alkali Thiosulphates. Mellersh-Jackson 347
Alkali Thiosulphates and Barium Salts. Rhenania Verein Chemischer Fabriken Akt.-Ges., and Rusberg 80
Alloys, Lead Alkaline-earth Metal. Mathesius 377
Alumina. Hurter 655
Alumina and Alkali from Leucite. Jourdan 19
Alumina and Aluminium Chloride. Mond 747
Alumina Salts, Iron-free. Chemische Fabrik Griesheim Elektron 592
Aluminates. Forit-choner; and Hansgirg 235
Aluminium Chloride, Hydrocarbon Polymerisation with. Soc. Ricard, Allenet et Cie 469
Aluminium Chloride and Alumina. Mond 747
Aluminium Coating. Aluminium Company of America 19, 49
Aluminium—Silicate Detergents. Guernsey and Electric Smelting and Aluminium Co. 288
Amines, Aromatic. Farbwerke vorm. Meister, Lucius, and Brüning 685
Amino-anthraquinone Derivatives. Bloxam 746
Ammonia Oxidation. Partington 779
Ammonium Sulphate. Pease and Partners, Ltd., and Stevenson 80
Thwaite, and Pease and Partners, Ltd. 529
Ammonium-sulphate and Alcohol Manufacture. Compagnie de Béthune 49
Ammonia Synthesis. Casale 112
Urfer 202
Norsk Hydro-elektrisk Kvaelstofaktieselskab .. 717
PATENT ABSTRACTS (*continued*):—
Anthraquinone Acid Dyestuffs. British Dyestuffs Corporation, Ltd.; Baddiley; and Tatum 407
Anthraquinone, Amino-, Derivatives, Bloxam 746
Anthraquinone Sulphonic Acids. Thomas; and Scottish Dyes, Ltd. 347
Anthraquinone Vat Dyestuffs. Ransford 112
Antimony Sulphides, Colloidal. Wolvekamp 18
Aryl Phosphates. Bloxam .. 591
Asbestos in Pottery Manufacture. Tams 173
Bacteria for Indigo Dyeing. Meister, Lucius & Brüning 779
Barium and Strontium Salts. Rhenania Verein Chemischer Fabriken Akt.-Ges. 656
Benzaldehyde and Benzoic Acid. Carbide and Carbon Chemicals Corporation .. 49
Benzanthrone Dyestuffs. Johnson 591
Farbwerke vorm. Meister, Lucius, and Brüning 747
Benzoic Acid and Benzaldehyde. Carbide and Carbon Chemicals Corporation .. 49
Benzoquinone Mordant Dyestuffs. Durand and Huguenin Akt.-Ges. 115
Bituminous Compositions, Rubber Containing. De Caudemberg 111
Bituminous Emulsions. Mackay 437
Borneol and Isoborneol. Schindelmeiser 655
Boron Carbides. Hartstoff-Metall Akt.-Ges. 626
Briquettes, Fuel. Soc. dite l' Avébène 144
Brine, Pure Salt from Electrolysis of. Angel .. 718
Camphor. Schindelmeiser .. 577
Carbazol Condensation Products. Galbraith, Lewcock, and Tallantyre 406
Carbon, Active. Count Le W. Hamon; and Byrom .. 111
Carbonates and Sulphites, Electrolytic Production of. Plauson's (Parent Co.), Ltd. 779
Casein Distempers. Weller 717
Catalytic Apparatus. Cederberg and Bäckström 79
Catalytic Materials. Casale 19
Urfer 202, 233, 457
Cellulose Acetate Dyeing. Johnson 625
Clavel 625
Cellulose Acetates. Zdanowich 316
Cellulose Acetate Silk, Dyestuffs for. Green and Saunders, and British Dyestuffs Corporation, Ltd. .. 79
Cellulose Carboxylates. Soc. de Stearinerie et Saxonnerie de Lyon 377
Cellulose Ester-containing Paints. Titanine. Ltd.; Ward, and Fletcher 747
Cellulose Ethers, Dyeing. Dreyfus 19
Cellulose Products. Dreyfus 716
Ceramic Material. Green .. 174
Charcoal, Active. Farbwerke vorm. Meister, Lucius, and Brüning (2) 457
Charcoal, Vegetable. Bonnard 261
Chemicals, Fire-extinguishing. Eckelmann 376
Chloranthraquinone. Dodd, Sprent, and United Alkali Co., Ltd. 655
Chlorinating Liquids. Van Meter 376
Chlorination of Rubber Latex. Naugatuck Chemical Co. 407
Chlorine, Application of. Van Meter 201
Chlorine-containing Perylene Vat Dyes. Pereira 780
Chlorine Dioxide in Glue Manufacture. Köln-Rottweil Akt.-Ges. 747

Page.

PATENT ABSTRACTS (*continued*):—
Chromium Compounds. Mond ... 684
Chromium, Pure. Brewer ... 80
Chromium Residues, Utilisation of. Jucker and Co. ... 407
Chromium Sulphate. Nydegger ... 175
Clay, Purifying. Feldenheimer; and Plowman ... 261
Coal, Recovering, from Sludge. Steen ... 202
Coal Tar, Acid Treatment of. Richards, and Siluminite Insulator Co., Ltd. ... 685
Coatings, Protective, on Metals. Mai ... 577
Colloidal Antimony Sulphides. Wolvekamp ... 18
Colloidal Dispersions, Producing. Hinchley, and Plauson's (Parent Co.), Ltd. ... 717
Colloidal Solutions. Oderberger Chemische Werke Akt.-Ges. ... 115
Colloids in Electro-deposition. Classen ... 80
Condensation Products, Carbazol. Galbraith, Lewcock, and Tallantyre ... 406
Condensation Products, Formaldehyde-urea. Pollak ... 407
Crystallising. Passburg; and Griffiths ... 655
Cyanamide as Vulcanisation Accelerator. Chatelan ... 577
Decolourising Liquids. Cumming, and Klarit, Ltd. ... 49
Decomposition, Catalytic, of Water Vapour. Laurent ... 112
Deodourising Fumes. Donkervoort; van der Voorden, and Donkervoort ... 780
Desulphurising Oils. Zesfield ... 49
Detergents, Aluminiumsilicate. Guernsey, and Electric Smelting and Aluminium Co. ... 288
Diaminoanthraquinone. Imray ... 717
Diaphragms, Electrolytic. Pechkranz ... 316
Digesting and Evaporating Apparatus. Appareils et Evaporateurs Kestner ... 656
Distillation, Dry. Moscicki 469
Distillation Plant. Plauson's (Parent Co.), Ltd. ... 172
Distilling. Cabrier ... 718
Drugs, Synthetic. Imray ... 747
Drying-agents. Moyer ... 717
Dye, Insoluble Black Azo, Produced on Fibre. Bloxam 529
Dyeing Cellulose Acetate. Johnson ... 625
Clavel ... 625
Dyeing Cellulose Ethers. Dreyfus ... 19
Dyeing, Indigo, Bacteria for. Meister, Lucius & Brüning 779
Dyeing, Vat, Lactic Acid in. Morton; and Wood ... 655
Dyestuff Derivatives, Vat. Durand and Huguenin Akt.-Ges. ... 470
Dyestuffs, Anthraquinone Acid. British Dyestuffs Corp., Ltd.; Baddiley; and Tatum ... 407
Dyestuffs, Anthraquinone Vat. Ransford ... 112
Dyestuffs, Azo. Farbwerke vorm. Meister, Lucius, and Brüning ... 19
Carpmael ... 173
Dyestuffs, Basic, Silicates of. Eberlein ... 407
Dyestuffs, Benzanthrone. Johnson ... 591
Meister, Lucius & Brüning 747
Dyestuffs, Benzoquinone Mordant. Durand and Huguenin Akt.-Ges. ... 115
Dyestuffs, Disazo. Carpmael ... 144
Dyestuffs for Cellulose-acetate Silk. Green and Saunders, and British Dyestuffs Corporation ... 79
Dyestuffs, New Vat. Johnson ... 626
Dyestuffs, Perylene. Sokal 407

Page.

PATENT ABSTRACTS (*continued*):—
Dyestuffs, Perylene Vat. Pereira ... 289
Dyestuffs, Perylene Vat, Chlorine containing. Pereira ... 780
Dyestuffs, Sulphur. Soc. of Chemical Industry in Basle 718
Dyestuffs, Sulphuretted. Ransford ... 625
Dyestuffs, Sulphuretted Vat. Pereira ... 112
Dyestuffs, Sulphurised. Atack ... 18
Dyestuffs, Thioindigoid. Carpmael ... 142
Dyestuffs, Thioindigoid Vat. Sokal ... 531
Electro-deposition, Colloids in. Classen ... 80
Electrolysis of Brine, Pure Salt from. Angel ... 718
Electrolysis of Fused Salts. Asheroft ... 112
Electrolytic Cells. Casale ... 288
Scott ... 499
Electrolytic Diaphragms. Pechkranz ... 316
Electrolytic Oxygen and Hydrogen. Scott ... 779
Electrolytic Production of Alkali Bichromates. Jouve, Helbronner, and Soc. Hydro-Electrique and Metallurgique du Palais ... 595
Electrolytic Production of Carbonates and Sulphites. Plauson's (Parent Co.), Ltd. ... 779
Electrolytic Production of Glyoxylic Acid. Marks ... 175
Electrolytic Production of Per-compounds. Chemische Fabrik -Weissenstein Ges., and Baum ... 145
Electrolytic Zinc Production. Electrolytic Zinc Company of Australasia, Ltd. ... 592
Emulsions, Bituminous. Mackay ... 457
Enamels. Chemische Werke vorm. Auerges ... 112
Evaporating Liquids. Bollmann ... 145
Evaporators, Spray and Film. Plauson's (Parent Company), Ltd. ... 347
Explosives. Hawkins ... 252
Fats, Purifying. Bedford ... 173
Fats, Vulcanising. Van der Meulen ... 748
Fertilisers. Soc. d'Etudes Chimiques pour l'Industrie ... 112
Brewer ... 145
Fibres, Animal, Treatment of, with Acetic Anhydride. Ransford ... 111
Film and Spray Evaporators. Plauson's (Parent Company), Ltd. ... 347
Filter-bed Resistance, Recording. Kent ... 80
Filter-presses. Jackson, S. R.; Jackson, A. E.; and Jackson, T. D. ... 18
Filtering Media. Torley ... 347
Bechold ... 457
Filters, Funnel. Giacobbe ... 145
Filters, Pressure. Hurrell ... 529
Filters, Rotary and Others. Jung ... 80
Fire-extinguishing Agents. Fohlen ... 717
Fire-extinguishing Chemicals. Eckelmann ... 576
Fireproof and Washable Paper. Hydroloid, Ltd. ... 499
Fireproofing Compositions. Eichengrün ... 500
Fluxes. Yamanouchi ... 558
Formaldehyde. Hirchberg ... 260
Soc. des Etablissements. Barbet ... 779
Formaldehyde-urea Condensation Products. Pollak ... 407
Formamide. Johnson ... 591
Formic Acid. Nielsen; and Laing ... 145
Fractionating Liquids. Bloomfield; and Boake, Roberts and Co., Ltd. ... 591

Page.

PATENT ABSTRACTS (*continued*):—
Fuel, Agglomerating. Du Boistesselin and Dubois; Tabb; Varnier; and Hertenbein ... 115
Fumes, Deodourising. Donkervoort, van der Voorden & Donkervoort ... 780
Fumigants. Evans-Jackson 18
Fungicides and Germicides. Koholyt Akt.-Ges. ... 747
Funnel Filters. Giacobbe ... 145
Furfural. Quaker Oats Company ... 592
Gas Analysis, Apparatus for. Macdonald ... 376
Gases and Vapours, Separating. Plauson's (Parent Co.), Ltd.; Plauson, H. ... 48
Gases, Compressed and Liquefied, Storing. Soc. Anon. d'Applications des Gaz Liquéfiés ... 655
Gases, Metallurgical, Sulphur Dioxide from. White ... 591
Gases, Poisonous. Van Meter ... 144
Gases, Purifying. Taplay; and Galbraith ... 457
Gases, Treating Liquids with. Shaw; and Peachey Process Co. ... 49
Germicides and Fungicides. Koholyt Akt.-Ges. ... 747
Glass Manufacture, Iron Oxide in. Chance Bros. and Co., Ltd.; and Forster 48
Glass, Thermo-resistant. Van Nieuwenburg ... 261
Glue Manufacture, Chlorine Dioxide in. Köln-Pottweil Akt.-Ges. ... 747
Glyoxylic Acid, Electrolytic Production of. Marks ... 173
Halogen-substituted Hydrocarbons. Farbwerke vorm. Meister, Lucius, and Brüning ... 19
Hydrazine, Production of. Joyner; and Nobel's Explosives Co., Ltd. ... 260
Hydrocarbon Polymerisation with Aluminium Chloride. Soc. Ricard, Allenet et Cie 469
Hydrocarbons, Halogen-substituted. Farbwerke vorm. Meister, Lucius, and Brüning ... 19
Hydrocarbons, Purifying. Dunstan ... 626
Hydrocarbons, Refining, with Acid Sulphates. Plauson's (Parent Company), Ltd. ... 469
Hydrogen and Oxygen, Electrolytic. Scott ... 779
Indigo Dyeing, Bacteria for. Meister, Lucius & Brüning 779
Ink, Removing, from Printed Papers. Bourcet and Regnault ... 175
Inks. Mellersh-Jackson ... 261
Insulin, Production of. Feeny ... 591
Iron-free Alumina Salts. Chemische Fabric Griesheim Elektron ... 592
Iron Oxide in Glass Manufacture. Chance Bros. and Co., Ltd.; and Forster ... 48
Iron Oxides, Reducing. Constant and Bruzac ... 590
Ketones, Aryl-oxy-naphthyl. Imray ... 747
Lactic Acid in Vat Dyeing. Morton; and Wood ... 655
Latex, Preserving. Bostock 780
Lead Arsenate. McDougall and Howles ... 655
Lead Hydroxide. Topp ... 347
Lead Metallurgy, Sulphur Chloride in. Ashcroft 516
Lead, Powdered. Shimadzu 18
Leucite, Alkali and Alumina from. Jourdan ... 19
Lignone Sulphonic Acids. Cross and Engelstad ... 457
Liquids, Chlorinating. Van Meter ... 576
Liquids, Decolourising Cumming, and Klarit, Ltd. ... 49
Liquids Evaporating. Bollmann ... 145
Liquids, Treating, with Gases. Shaw and Peachey Process Co. ... 49
Mercury Fulminate. Barnes 142

Page.

PATENT ABSTRACTS (*continued*):—
Metaldehyde. Johnson ... 142
Metals, Precipitating. Marks 377
Metals, Protective Coatings on. Mai ... 577
Metals, Welding or Cutting. Rose; and Harris ... 747
Mineral Oils, Purifying. Ridge and Hodgkinson ... 559
Mixing Machines. Westerman ... 685
Monazo Dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning ... 747
Motor-spirit Mixtures, Aldehyde. Terrisse ... 458
Naphthoquinone Derivatives. Soc. Anon. des Matières Colorantes et Produits Chimiques de St. Denis; Wahl, and Lantz ... 779
Nickel Catalysts, Reactivating. Technical Research Works, Ltd.; and Lush ... 529
Nitrogen Fixation. Gerber ... 255
Nitrogen Peroxides. Stacey 655
Nitroso Compounds. Siderfin, Tallantyre, and Shannon; and Galbraith ... 529
Oils, Desulphurising. Nesfield ... 49
Oils, Sulphonated. Guilleminot ... 718
Organic Compounds, Catalytic Oxidation of. Johnson ... 261
Organic Compounds, Reducing, Murdoch, and Galbraith ... 559
Organic Compounds, Water-insoluble, Reduction of. Adams, Siderfin, Murdoch, and Galbraith ... 288
Organic-mercury Compounds. Wolvekamp ... 48
Oxidation, Catalytic, of Organic Compounds. Johnson ... 261
Oxygen and Hydrogen, Electrolytic. Scott ... 779
Paint, Composition for Removing. Hamaguchi ... 255
Paints, Cellulose Ester, Containing. Titanine, Ltd.; Ward, and Fletcher ... 747
Paper, Washable and Fireproof. Hydroloid, Ltd ... 499
Paper Waste, Utilising. Burlin ... 207
Paper, Waterproofing. Masterman ... 469
Papers, Printed, Removing Ink from. Bourcet and Regnault ... 175
Para-nitrophenetol. Lewcock, and Gas Light and Coke Co. ... 655
Para-phenetol-carbamide. Sonn ... 778
Peptisation, Purification by. Bloxam ... 377
Per-compounds, Electrolytic Production of. Chemische Fabrik Weissenstein Ges., and Baum ... 145
Persalts, Stable, Preparation of. Noll ... 499
Perylene Dyestuffs. Sokal ... 407
Perylene Vat Dyestuffs. Pereira ... 289
Perylene Vat Dyestuffs, Chlorine-containing. Pereira ... 780
Phenols, Halogenated. British Dyestuffs Corporation, Ltd.; and Hodgson ... 516
Phosphorescent Zinc Sulphide. Allchemin Allgemeine Chemische Industrie Ges., and Jahoda ... 407
Phosphorus Pentoxide. Threlfall ... 79
Pigment, Black. Mellersh-Jackson ... 655
Pitch, Handling. Coke and Gas Ovens, Ltd. ... 517
Pottery Manufacture, Asbestos in. Tams ... 175
Pressure Filters. Hurrell ... 529
Pumps for Acids. Gaillard 500
Pyrazolone-Barbituric Acid Compounds. Chemische Fabrik auf Actien ... 144
Pyrazolone Derivative. Imray ... 201

Page.

PATENT ABSTRACTS (*continued*):—
Quinoline Derivatives. Synthesis of. Gardner & Williams 145
Reactions, Chemical, Facilitating. Spensley, and Chemical Engineering Company (Manchester), Ltd. 457
Reduction of Water-insoluble Organic Compounds. Adams, Siderfin, Murdoch, and Galbraith 288
Refining Tin. Goldschmidt Akt.-Ges., Schertel, and Lüty 19
Refractory Substances. Garnett, Reid, Greenwood, and Cowlishaw 235
Refrigerators, Sulphur Dioxide. Golby 235
Resinous Compositions. Consortium für Elektrachemische Industrie Ges 506
Resins, Synthetic. Holzverkohlungs Industrie Akt.-Ges. 19
Petroff 717
Retorts. Fairweather 469
Retorts, Alkali Cyanide. Fairweather 260
Rotary-filter Frames. Coating, with Pulp. Vallez .. 406
Rubber containing Bituminous Compositions. De Caudemberg 111
Rubber, Regenerating, with Acetylene. Koller 111
Rubber, Tanned. Marter .. 175
Rubber Latex, Chlorination of. Naugatuck Chemical Co. 407
Rubber Vulcanisation Accelerators. Naugatuck Chemical Co. 112, 235
Rubber, Vulcanising. Naugatuck Chemical Co. 347, 438
Dunlop Rubber Co., Ltd.; Twiss; and Thomas 685
Salt, Pure, from Electrolysis of Brine. Angel 718
Salt, Purifying. Westerman 235
Salts, Fused, Electrolysis of 112
Silica Gel. Farbenfabriken vorm. F. Bayer and Co. .. 685
Silicates of Basic Dyestuffs. Eberlein 407
Slag, Granulating. S.A. Chaux et Ciments de Lafarge et du Teil 780
Sludge, Recovering Coal from. Steen 202
Soaps. Hohenloher Seifenfabriken Akt.-Ges. 174
Legradi 457
Soaps, Rapid Manufacture of. Welter 499
Sodium Carbonate, Mineral. Blattner 559
Sodium Chromate. Baumgartner 18
Sodium Hydroxide. Court-aulds, Ltd., and Jones .. 18
Sodium Silicate. Clayton; and Richards 591
Soya-bean Adhesives. Johnson 591
Spray and Film Evaporators. Plauson's (Parent Company), Ltd. 547
Standard Solutions, Making. Horst 202
Stannic Chloride. Buss Akt.-Ges. 407
Strontium and Barium Salts. Rhenania Verein Chemischer Fabriken Akt.-Ges. 656
Sulphites and Carbonates, Electrolytic Production of. Plauson's (Parent Co.), Ltd. 779
Sulphonic Acids. Anthraquinone. Thomas, and Scottish Dyes, Ltd. 547
Sulphonic Acids, Aromatic. Rheinische Kampfer-Fabrik Ges. 499
Sulphonic Acids, Lignone. Cross, and Engelstad 457
Sulphur Burners. Prentice 80
Sulphur Burning. Texas Gulf Sulphur Company Inc. 438

Page.

PATENT ABSTRACTS (*continued*).—
Sulphur Chloride in Lead Metallurgy. Ashcroft .. 316
Sulphur, Colloidal. Vogel .. 470
Sulphur Dioxide. Houseman; and British Oxygen Co., Ltd. 717
Sulphur Dioxide from Metallurgical Gases. White .. 591
Sulphur Dioxide Refrigerators. Golby 235
Sulphur Dyestuffs. Soc. of Chemical Industry in Basle 718
Sulphur, Refining. Robinson 717
Sulphuretted Dyes. Ransford 625
Sulphuretted Vat Dyestuffs. Pereira 112
Sulphuric Acid. Lamoreaux 144
Sulphuric Acid, Concentrating. Hechenbleikner; and Oliver 145
Sulphuric-acid Manufacture, Control of. Aktieselskab Dansk Svovlsyre and Super Phosphat-Fabrik, and Dansk Aktieselskab Siemens Schuckert 174
Sulphurised Dyestuffs. Atack 18
Tanning Agents. Melamid 235
Tanning Materials. Moeller 316
Tar, Dehydrating and Distilling. Coke and Gas Ovens, Ltd. 517
Tar Wells. Allen 517
Thermo-resistant Glass. Van Nieuwenburg 261
Thioindigoid Dyestuffs. Carpmael 142
Thioindigoid Vat Dyestuffs. Sokal 591
Thymol. Howards and Sons, Ltd., and Blagden 79
Thymols, Synthetic. Howards and Sons, Ltd., and Blagden 288
Tin Refining. Goldschmidt Akt.-Ges., Schertel and Lüty 19
Titanium-nitrogen Compounds, Decomposition of. Titan Co., Aktieselskabet 748
Titanium Oxide and Sulphate. Weizmann and Blumenfeld 558
Titanium Sulphates. Llewellyn, Spence, and P. Spence and Sons, Ltd. .. 547
Ultramarine. Kur; and Wilkinson 111
Urea-formaldehyde Condensation Products. Pollak 407
Vapours and Gases, Separating. Plauson's (Parent Co.), Ltd.; Plauson, H. .. 48
Vulcanisation Accelerator, Cyanamide as. Chatelan .. 377
Vulcanisation Accelerators. Pirelli and Co. 656
Skellon; Roberts; and Clarke 685
Vulcanising Fats. Van der Meulen 748
Vulcanising Rubber. Naugatuck Chemical Co. 247, 438
Dunlop Rubber Co., Ltd.; Twiss; and Thomas .. 685
Washing Compositions. Bloxam 626
Water Softening. Hilditch; Wheaton; and J. Crosfield and Sons, Ltd. 558
Water Vapour, Catalytic Decomposition of. Laurent 112
Waterproofing Paper. Masterman 469
Welding and Cutting Metals. Rose; and Harris 747
White Lead. Lloyd; Clapp; and Campbell 559
Rascher and Plaueln 559
Wood Preservation. Carpmael 175
Yeast and Alcohol, Production of. Klein 747
Zinc Production, Electrolytic. Electrolytic Zinc Company of Australasia, Ltd. 592
Zinc Sulphide, Phosphorescent. Allchemin Allgemeine Chemische Industrie Ges., and Jahoda .. 407

Page.

Patent-fuel Industry of South Wales 615
Patent Office in Japan 584
Patent Practice, A Neglected Point in 740
Patent Regulations, German 366
Patent Rights in Japan 773
Peppermint Oil, British 254
Perfumed Spirits, Importation of (P.N.) 168
Perkin Medallist for 1923 .. 554
"Permutit" in Analysis .. 742A

PERSONAL:—
Allan, John 522
Askenasy, Dr. Percy 194
Aston, Dr. Francis W. 43
Baekeland, Dr. L. H. 166
Balfour, Dr. Andrew .. 313, 522
Banting, Dr. F. G. 43
Barlow, J. E. 522
Browne, Dr. Charles A. .. 137
Campbell, Arthur 737
Clark, L. M. 71
Clarkson, Thomas 71
Curie, Madame 648
Eastham, Alfred 462
Ellis-Richards, P. A. 522
Faragher, Dr. W. F. 738
Fraser, Alex. 678
Gardner, C. E. 584
Gorin, Frank B. 370
Green, Prof. A. G. .. 244, 400
Hanley, Dr. J. A. 770
Houghton, T. E. 554
Lea, Prof. F. Charles 462
Liveing, Dr. G. D. 770
Longmuir, Dr. Percy 194
Perkin, Prof. W. H. 432
Pilcher, R. B. 584
Rée, Dr. Alfred 313
Remsen, Dr. Ira 400
Ripper, Prof. 462
Smith, Wm. 71
Smithells, Prof. Arthur .. 71
Turner, Professor A. J. .. 770

Petrol Prices Reduced .. 71, 370
Petrol-water Mixtures 283
Petroleum Refining, Aluminium Chloride in 371
Petroleum-spirit Storage Regulations 648
Petroleum, The Origin of .. 460
Phenols and Cresols, Hydrogenated 305, 363
Phenols in Coal-tar Oils 308
Phenols, The Action of Acetylene on 400
Phosphorus, The Glowing of 138
Pickling Process in Tinplate Manufacture 34
Pig-iron Specification for International Trade 463
Pigment Grinding, Fire Risks in 552
Pitch Cancer (P.N.) 14
Pitches, Industrial 221
Plating, Electro-, with Chromium 543
Platinum Discovery, Transvaal 225
Platinum in Modern Industry: The Care of Laboratory Apparatus 581
Platinum in Russia 166
Platinum in the U.S. 186
Platinum Industry of Colombia 70
Plumbago Trade of Ceylon .. 73
Poisoning Fatality at Liverpool 710
Poland, Ozokerite Output in 103
Potash Feldspar in Ontario .. 72
Potash, Italian Leucite a Source of 608
Potash Recovery at Swedish Cement Works 679
Potassium and Sodium, Distinguishing Test Between .. 104
Potassium Permanganate in Volumetric Analysis 309
Potassium Persulphate, Eczema from 391
Powdered Fuel in Chemical Works 761
Power Alcohol in France 37, 400
Power Conference, The Forthcoming World 428
Precipitates, The Formation of 335
Preservatives and Disinfectants 545
Preservatives in Food .. 43, 166
Preservatives, Wood 392
Preservatives in Food (P.N.) 619
Preserved Foods, The Sterilisation of 771

Page.

Prussian Blue, Fire Risks in Grinding 552
Prussian Blue from Coal Gas 642
Public Analyst, The Position of the 11
Pumping and Elevating Plant, Acid-resisting 737
Pumps for Industrial Purposes 365
Pyrites Agreement Signed .. 103
Pyrites Deposits, Swedish .. 104
Pyrites Trade Prospects 70
Pyrometry, Modern Electrical 213

Q

Quantum Theory in Chemistry 335
Quebec Asbestos Output 136
Quicklime for Causticising .. 362

R

Radium Deposit Discovered, A New 370
Radium Production, Belgian .. 710
Railway Charges, Revised .. 526
Railway Rates, New, Objections to 493
Railway Rates, Reduced 138
Ramsay Chemical Dinner at Glasgow 773
Ramsay Memorial Fellowships 72
Rare Alkali Metals 513
Refractory Material, Sillimanite, A New 548
Refrigerator Plant, The Economical Working of 278
Reparation Duty, German .. 620
Reparation Duty, German (P.N.) 14
Reparation Dyestuffs (P.N.) .. 46
Reparation Dyestuffs, Belgian, Disposal of 312
Reparation (Recovery) Act, German (P.N.) 136
Research, Scientific and Industrial, Department of 426
Residuals, The Market in Gasworks 615
Resins from Eastern Asia .. 773
River Pollution, Riparian Owners and 549
Rochelle Salt, Safeguarding Act Inquiry on 131, 218
Rosin Industry and Trade .. 763
Rot, Damp, in Wooden Roofs 331
Royal Society 678
Royal Society Awards 555
Rubber, Hevea, The Resin Content of 335
Rubber Latex Exports 341
Rubber, The Chemistry of .. 674
Russia, Bauxite in 338
Russia, Oil from (P.N.) 168
Russia, Chemical Manufacture in 672

S

Safeguarding of Industries Act: Complaints under .. 554
Safeguarding of Industries Act: Inquiries under the:—
Formaldehyde 6, 217
Rochelle Salt 131, 218
Safeguarding of Industries Act: Method of Payment of Duty under Part I. 165
Salt Deposits, Cheshire 137
Salt Manufacture in China .. 103
Salt Production in the U.S. .. 44
Salt Production, The World's 341
Salters' Institute Awards .. 194

Page.

Samples, Chemical, Importation of ... 461
San Paulo, Carbide Manufacture in ... 255
Schiff's Reaction for Aldehydes 371
Seaweed, Scottish Factory for Treatment of ... 137
Selenium, The Estimation of, in Glass ... 520
Sesamum Crop, Indian ... 369, 584
Sewage Purification (P.N.) ... 74
Sewage Works Problems ... 643
Share and Stock List, Monthly 284, 401, 550, 680
Shellac ... 453
Shipment of Corrosive Acids ... 646
Sicilian Sumac Crop ... 648
Silesian Zinc Industry, The ... 547
Sicily as a Chemical Producer 579
Silica Deposits of Eastern Canada ... 226
Silica Gel, Oil Refining by 71, 136
Sillimanite, A High-grade Refractory Material ... 548
Silk, Artificial, Industry of France ... 311
Silk, Artificial, The Present Position of ... 492
Silk, Artificial, The World's Trade in ... 188
Silk, Raw, World Production of ... 462
Sizing Materials for Cotton Textiles ... 768
Smoke Abatement Bill (P.N.) 110, 136
Soap Trade of Greece ... 399
Soaps, Soft, The Manufacture of ... 547
Societies' Conjoint Dinner ... 550

Societies, Etc. :—

Association of British Chemical Manufacturers: Annual Meeting ... 63
British Association ... 332, 335
Date of 1924 Meeting ... 738
British Association of Chemists ... 133, 458, 517
British Chemical and Dyestuffs Traders' Association, 11, 165, 166, 254, 461
British Chemical Plant Manufacturers' Association 162
Chemical Industry Club 614, 644
Institute of Chemistry, 8, 13, 137, 707
Birmingham Section ... 740
Huddersfield Section ... 459
Leeds Section ... 740
Manchester Section ... 549
Institute of Metals ... 304, 307
Institute of Patentees; New Scottish Section ... 770
Institution of Chemical Engineers ... 577, 610, 708
Institution of the Rubber Industry ... 13, 673
Manchester Literary and Philosophical Society ... 434
Society of Chemical Industry :—
Birmingham Section 576, 674, 740
Chemical Engineering Group ... 608, 735
Liverpool Section ... 611, 735
London Section ... 677
Manchester Section ... 552, 701
Newcastle Section ... 771
Nottingham Section, 488, 645, 732
Yorkshire Section ... 740
Society of Dyers and Colourists ... 395, 396, 515
Society of Glass Technology 127, 487
Society of Public Analysts 576, 703

Societies' Winter Activities ... 491
Soda Exports, Egyptian ... 103
Soda, Manufacture of, in China 711
Sodium and Potassium, Distinguishing Test Between ... 104
Sodium Borates, Examination of the ... 104
Sodium Hydrosulphite, The Estimation of ... 486
Sodium Hypochlorite, The Manufacture of ... 218
Sodium Perborate: Its Manufacture, Properties, and Industrial Applications ... 65

Page.

Sodium Silicate, Italian Leucite a Source of ... 608
Sodium Sulphate in Canada ... 515
Sodium Thiosulphate Solutions, The Stability of ... 523
Soldering Alloys, Cadmium in 422
Soldering Materials, The Technology of ... 185
Solvents for Oil Extraction ... 785
South Africa, Carbide Production in ... 105
South Africa, Freights to ... 71
South Africa, Mineral Production of ... 195
South Australian Minerals ... 433
South Wales Patent Fuel Industry ... 615
Spain, Oil in ... 43
Spain, The Mercury Output in 253, 433
Spanish Chemical Trade ... 616
Spanish Trade in Red Iron Oxide ... 647
Specifications, A Dictionary of 739
Spent Oxide, The Treatment ment of ... 773
Stainless Alloy, A New ... 92
Stainless Steel in France ... 463
Standards, Physico-chemical ... 216
Steam Generation at 3000lb. Pressure ... 8
Steam, High-pressure, for Power Generation ... 431
Steam System in a Chemical Works: Details of Boiler Control, Pipe Fittings, etc. ... 605
Steel Pipes, Transmission of Heat Through ... 555
Steel Samples, British Standardised ... 225
Sterilisation of Preserved Foods ... 771
Stirring Devices, The Choice of Suitable ... 249
Stock and Share List, Monthly 284, 401, 550, 680
Stoker, Mechanical, A New Multiple-retort ... 278
Stone, Building, The Decay of 677
Stoneware, Chemical: Its Manufacture, Types, and General Uses ... 158
Streatfeild Memorial Lecture 519
Sugar Beet in Great Britain 137, 166
Sugar, Home-grown ... 770
Sulphate of Ammonia (P.N.) ... 168
Sulphate of Ammonia Federation: Annual Meeting ... 612
Sulphates, The Barium Test for ... 372
Sulphur as a Fungicide ... 521
Sulphur Exports, American ... 45
Sulphur in Organic and Inorganic Compounds ... 773
Sulphur in Portland Cement ... 95
Sulphur, Indian Tariff on ... 739
Sulphur, The Estimation of 303 773
Sulphuric Acid in America ... 462
Sulphuric-acid Tank Explosion 552
Sumac Crop, Sicilian ... 648
Sumac Production and Trade 251
Surface Action (The Physical Chemistry of Interfaces) ... 332
Surplus Government Property (P.N.) ... 74
Sweden, Insulin Manufacture in ... 194
Swedish Cement Works, Potash Recovery at ... 679
Swedish Match Combine ... 493
Swedish Pyrites Deposits ... 104

T

Tanning Industry, Iodine in the ... 371
Tannins, The Gold-beater's Skin Test for ... 576
Tar (Coal) Oils, Phenols in ... 308

Page.

Tariff Notes :—
Australia ... 194, 554, 584, 738
Brazil ... 770
British Guiana ... 492
British North Borneo ... 370
Bulgaria ... 738
Colombia ... 522
Czecho-Slovakia ... 340
Dominica ... 137, 616
Esthonia ... 313
Fiji ... 399
Finland ... 72
France ... 137, 340, 554
Germany ... 433, 770
Gilbert and Ellice Islands Colony ... 554
Greece ... 225, 462
India ... 44, 738
Italy ... 226, 522, 710
Latvia ... 166
Madagascar ... 254, 399
Malay States ... 616
Mexico ... 370, 462
New Caledonia ... 283
New Zealand ... 72, 616
Nigeria ... 554, 710
Paraguay ... 522
Poland ... 399, 554, 738
Roumania ... 13
San Salvador ... 13, 283
Sierra Leone ... 399, 648
South Africa ... 103, 313, 433, 584
Southern Rhodesia ... 288, 492
Spain ... 522, 584
Sweden ... 13
Tunis ... 462, 492
Zanzibar ... 137

Tar Market in Finland ... 679
Tartar, Cream of, A Commercial Standard for ... 738
Tartar, Cream of, Estimation of Lead in ... 703
Tartaric Acid Industry in Sicily ... 579
Tasmanian Carbide Production ... 711
Teachers, Amended Qualifications for ... 492
Tellurium Compounds as Bactericides ... 576
Textile Chemicals, The Outlook for ... 396
Theobromine, Distinguishing Caffeine from ... 13
Tin, New Organic Compounds of ... 645
Tinplate Amalgamation in South Wales ... 225, 254
Tinplate Manufacture, The Pickling Process in ... 34
Tinplate Scrap, Utilisation of 103
Titania as a Glass Constituent 487
Toluene, Electrolytic Oxidation of, and Its Derivatives 670
Toluene, The Chlorination of 709
Tower, Absorption, A Study of the ... 577, 610
Tower Filling, Multiple Helix 371
Trade, British Overseas Chemical ... 73, 195, 338, 464, 585, 739
Trade of Principal Countries ... 195
Transport of Acid in Carboys and Drums ... 766
Transvaal Platinum Discovery 225
Trespassing, Injuries Received while ... 523
Trinidad Pitch Lake Concession (P.N.) ... 619

U

U.S., Barytes Production in the ... 219
U.S., Bromine in the ... 370
U.S., Casein Production in ... 225
U.S. Cement Position ... 283
U.S. Chemical Industries Exhibition ... 648
U.S., German Manufacturers in the ... 13
U.S., Oil Refineries Decreasing in the ... 432

Page.

U.S., Platinum in the ... 186
U.S., Salt Production in the ... 44
U.S. Wood Products Output ... 679
University News ... 554, 678
Uranium, Cupferron for Determination of ... 226
Uranium, Metallic, The Production of ... 65

V

Vat Dyestuffs Industry, The Development of the ... 190
Vermilion Industry of Hong Kong ... 615
Vinegar, The Manufacture of 699, 733
Vinegar, The Testing of ... 733
Volumetric Analysis, Potassium Permanganate in ... 309
Vulcanisation Accelerators, Organic ... 673

W

Wages, Dyers' Rise in ... 492
Wages in the Dyeing Trade ... 166
Water Clarification by Means of Alum ... 104
Water Purification, Modern Methods of ... 306
Water-Right Cases, Some Aspects of ... 549
Water Softening, Ammoniacal Liquor for ... 340
Water Supplies, The Problem of City ... 611
White Lead Purchasing Restrictions in Australia ... 738
Wood Distillation in Mysore ... 44
Wood Preservatives ... 391
Wooden Roofs, Damp Rot in ... 331
Wrought-iron Boilers, The Life of ... 492

X

Xanthates as Vulcanisation Accelerators ... 674
Xylenes, Separation of the ... 104

Z

Zinc and Lead Compounds in America ... 102
Zinc Chloride Antiseptic, A New ... 400
Zinc Combination, Empire ... 738
Zinc Concentrates, The Disposal of ... 739
Zinc Industry, The Silesian ... 547

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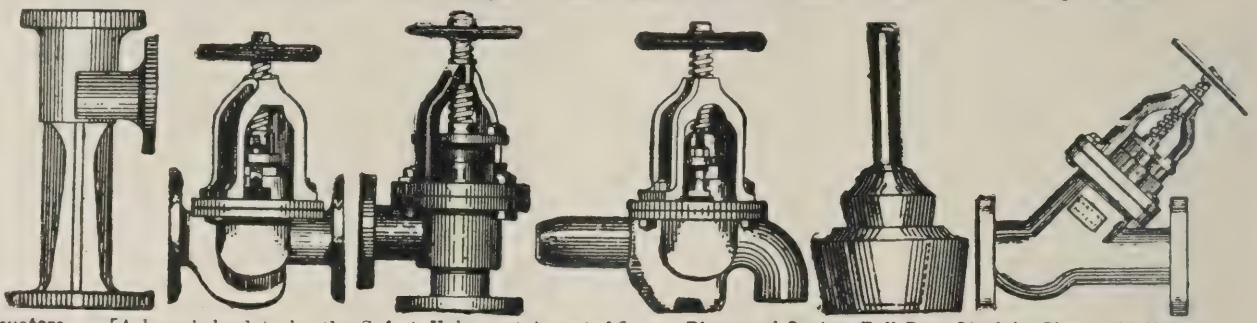

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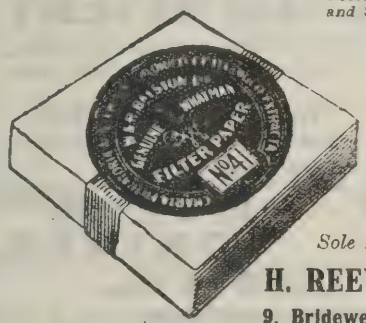

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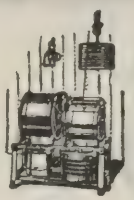

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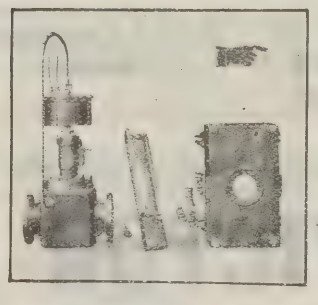

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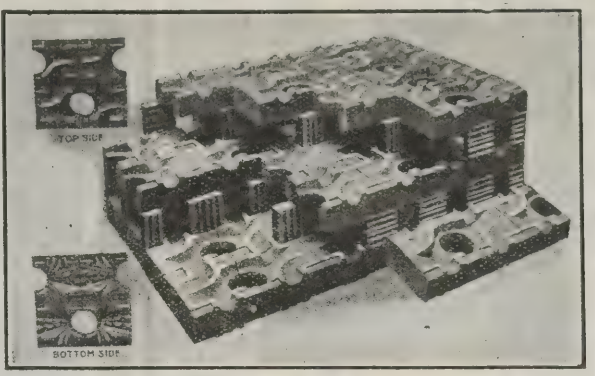

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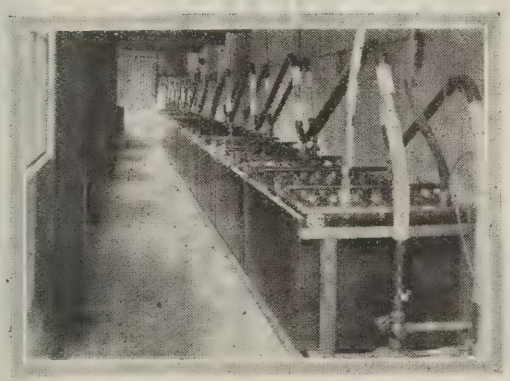

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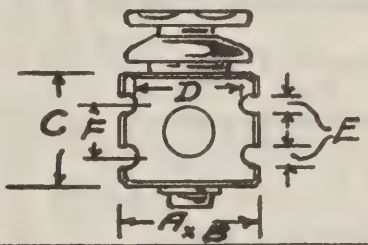

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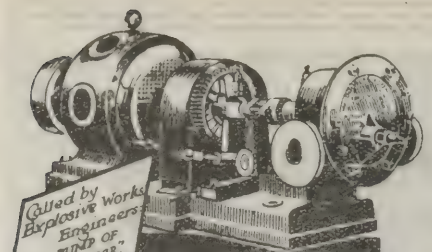

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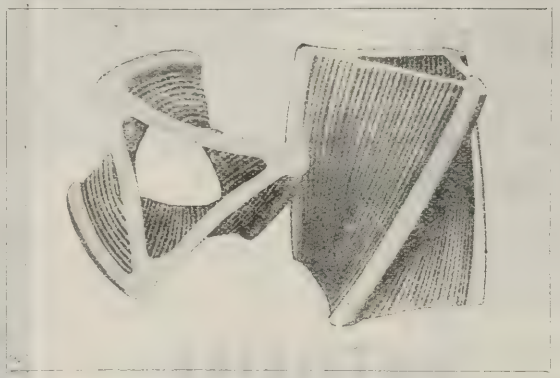

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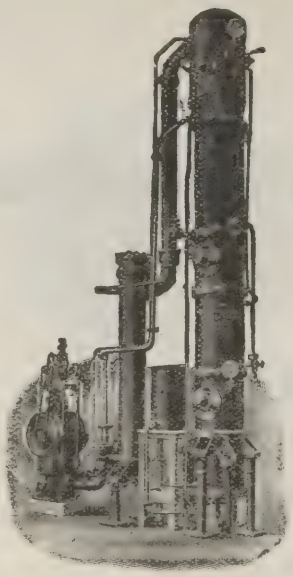

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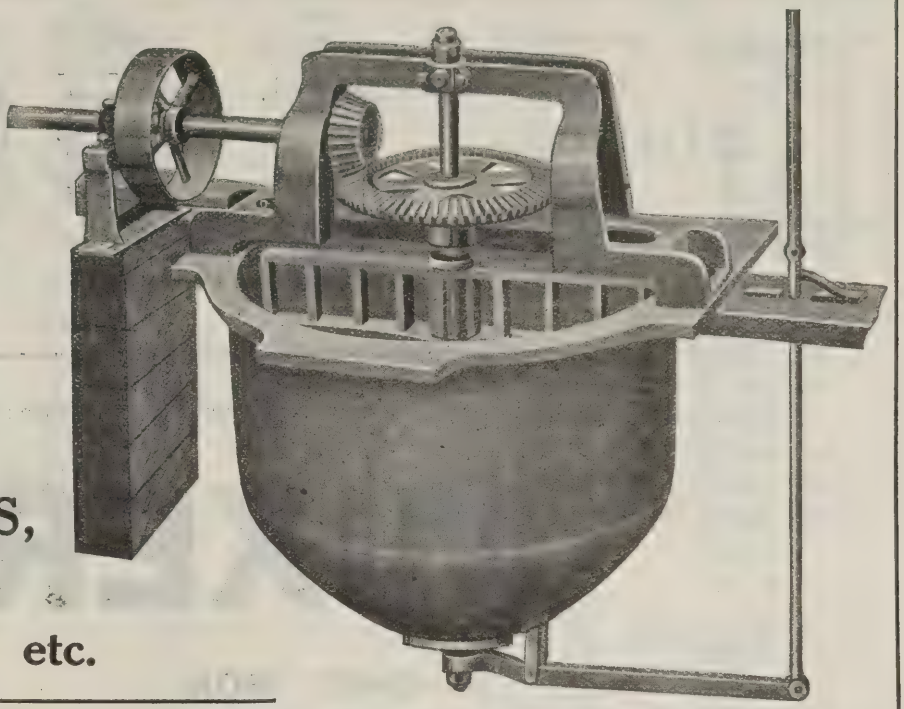

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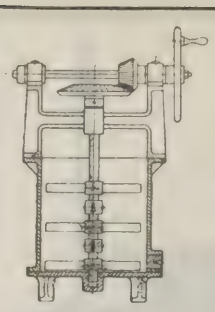
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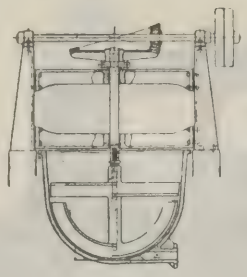
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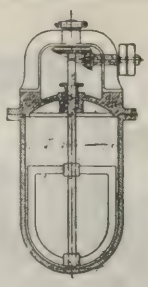
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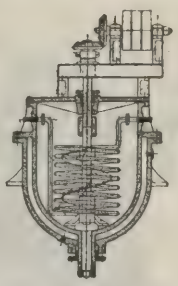
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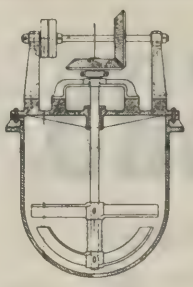
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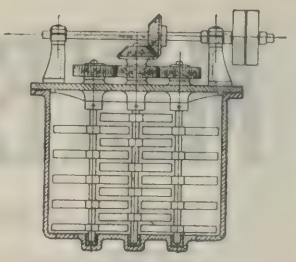
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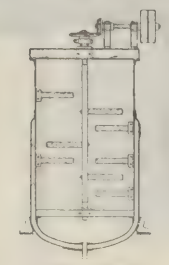
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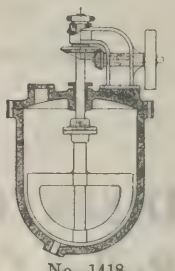
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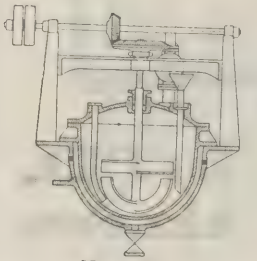
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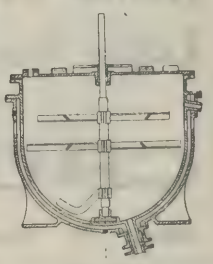
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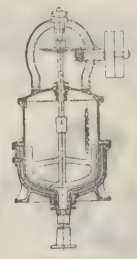
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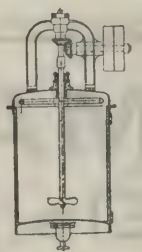
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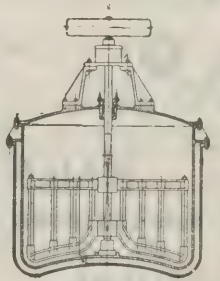
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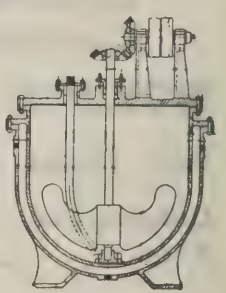
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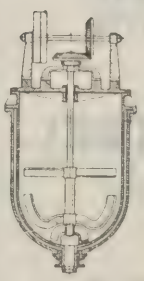
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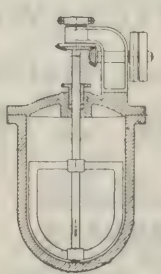
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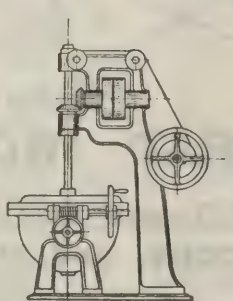
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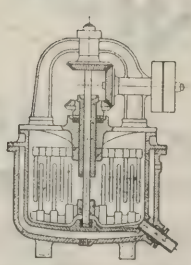
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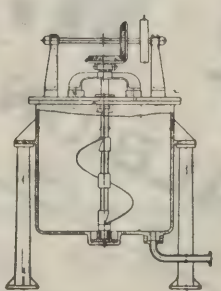
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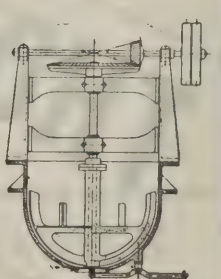
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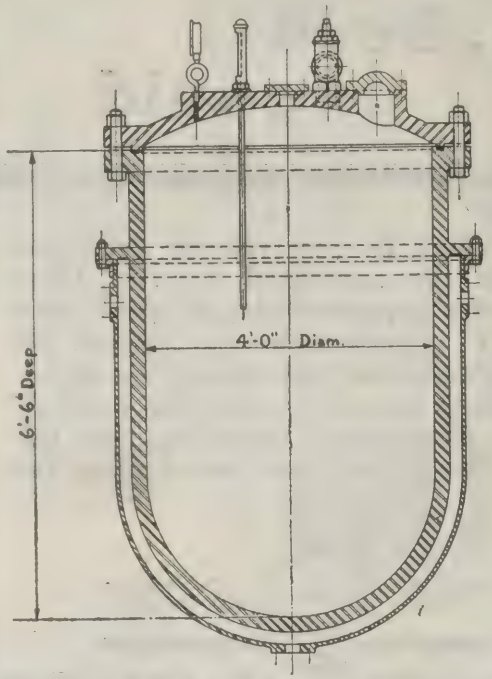

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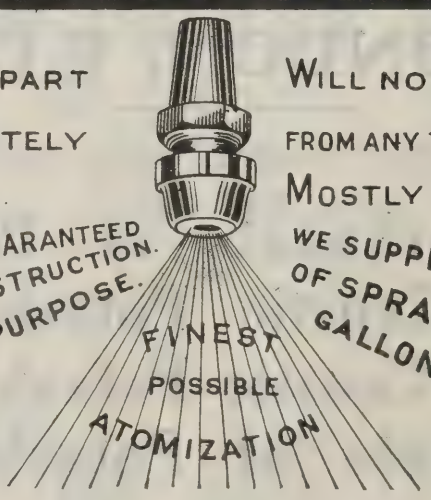

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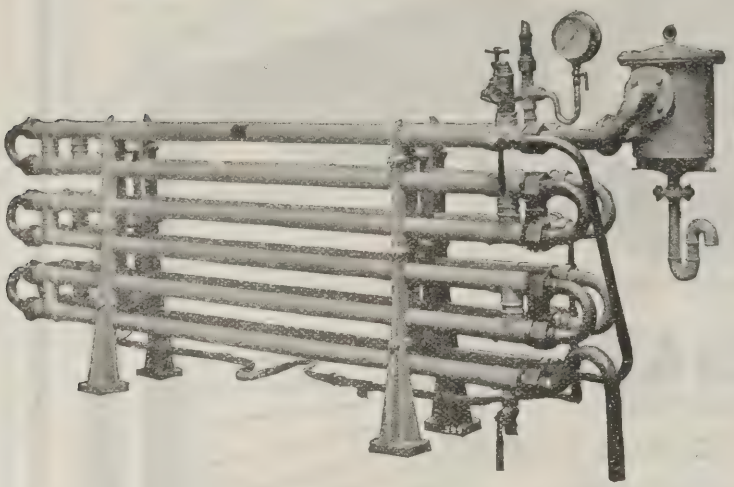

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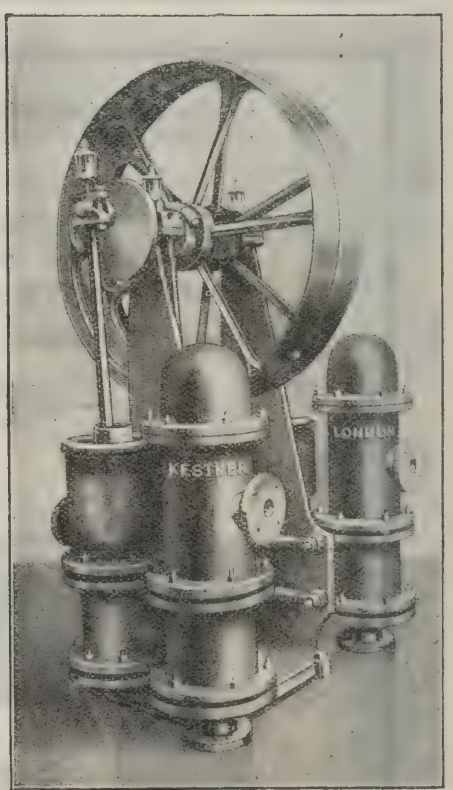

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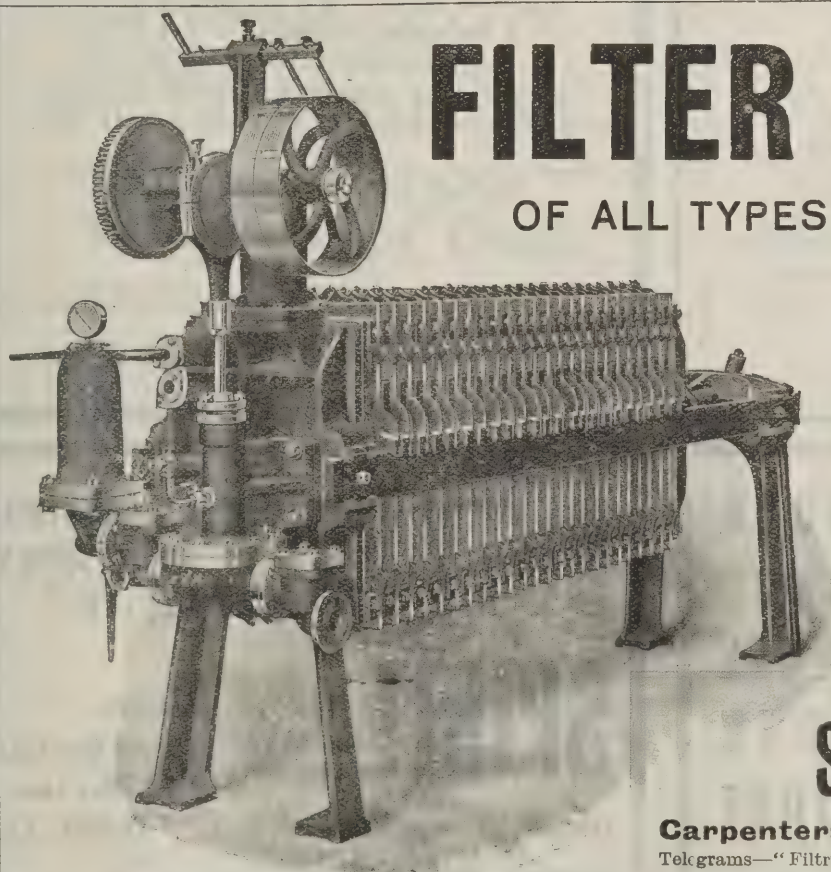

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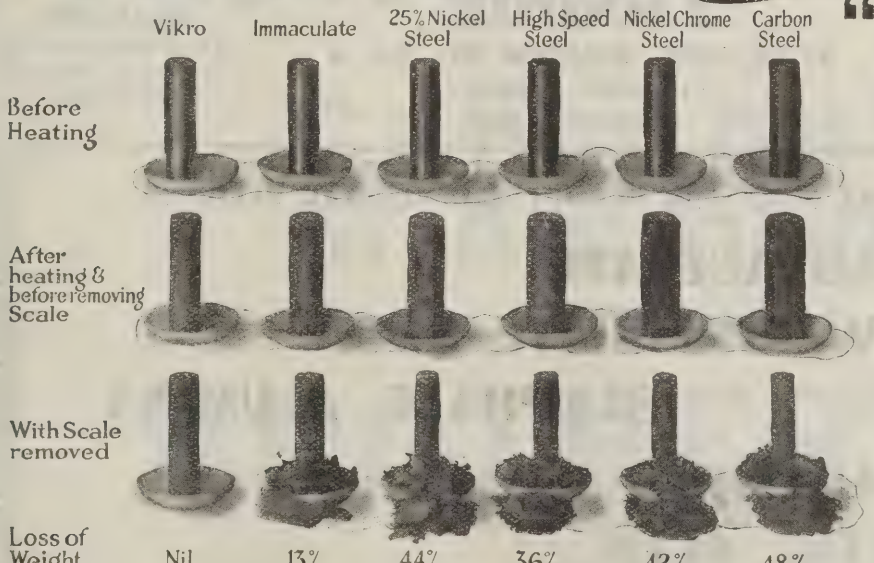

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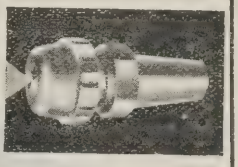

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Index to Advertisers.

	PAGE
Adlam, Geo., and Sons, Ltd.	9
Allen, Marcus & Sons, Ltd.	18
Australian Alum Co., Ltd.	27
Baldwin, J., and Co.	5
Barter Trading Corporation, Ltd.	33
Bayley, F. S., Clanahan & Co.	27, 32
Benker & Millberg	5
Berk, F. W., and Co., Ltd.	17
Blackwell, G. G., Sons & Co., Ltd.	1
Blagden, V., and Co., Ltd.	6
Blair, Campbell & McLean, Ltd.	1, 14
Blythe, Wm., and Co., Ltd.	23
Boake, A., Roberts & Co., Ltd.	1, i
Borax Consolidated, Ltd.	1, 31
Bottomley, J. C., and Emerson, Ltd.	32
British Hydrogen Co., Ltd.	1
British Oxygen Co., Ltd.	43
Brothers Chemical Co. (1922), Ltd.	32
Brotherton & Co., Ltd.	i, 34, 35
Brown, H. G., and Co.	22
Brown, J. M.	22, 34, 35
Bruce, W. T., and Co.	34
Brunner, Mond & Co., Ltd.	42
Buckley Brick and Tile Co., Ltd.	31
Burton, Wm., and Sons, Ltd.	43
Bush, Beach & Gent, Ltd.	17
Buyer's Guide	36, 37, 38, 39
Cannington, Shaw & Co., Ltd.	5
Capper, Pass & Son, Ltd.	1, 35
Castner, Kellner Alkali Co., Ltd.	41
Chance & Hunt, Ltd.	13
Christie & Co.	33
Christopherson, C., and Co.	4
Collett, J. M., and Co., Ltd.	35
Compagnie Commerciale du Nord	33
Cortin, J., Ltd.	2
Crone & Taylor, Ltd.	15
Crook, W. J.	39
Cruickshank, R., Ltd.	30
Daglish, R., and Co., Ltd	1
Douglas, W., and Sons, Ltd.	8
Electro Bleach and By-Products, Ltd.	8
Elektrokemiska Akt.	22
Everitt & Co., Ltd.	32
Follows & Bate, Ltd.	43
Frickers Metal Co., Ltd.	23, 34
Fuller, W. M., junr.	5
Gardner, H., and Co., Ltd.	2
Gardner, William, and Sons, Ltd.	40
Garroway, R. & J.	6
Grey & Martin, Ltd.	31
Griffiths Bros. & Co. (London), Ltd.	1
Guthrie & Co.	8
Hadfield, J., & Co.	1
Hallams Ltd.	34
Hanley, A.	4
Harrison Blair & Co., Ltd.	39
Harrison, W., and Co., Ltd.	35
Hathern Station Brick and Terra Cotta Co., Ltd.	7
Heymann, Harry	iii
Hickson and Partners, Ltd.	21
Hind & Lund, Ltd.	4
Holman, Michell & Co., Ltd.	33
Honeywill Bros., Ltd.	22
Houlder, W., Son & Co.	32
Huncoat Plastic Brick Works	7
Hunt, J. T., and Son, Ltd.	34
Huntington, Heberlein & Co., Ltd.	40
Igranic Electric Co., Ltd.	29
International Electrolytic Plant Co., Ltd.	7
Jenkyns, Claudius P.	iii
Johnson & Sons Manufacturing Chemists, Ltd.	12
Johnson, S. H., and Co., Ltd.	21
Kenyon, Wm., and Sons, Ltd.	11
Kestner Evap. and Eng. Co., Ltd.	20
Le Bas, Ed., and Co., Ltd.	34
Leigh, R. & H., and Sons, Ltd.	2, 44
Leitch, J. W., and Co., Ltd.	14
Lennox Foundry Co., Ltd.	30
Lever Bros., Ltd.	23
Levermore, Aug., and Co., Ltd.	35
Locke, Blackett & Co., Ltd.	43
London & North Eastern Rly.	3
Lowe, Chas., and Co.	27
Major & Co., Ltd.	3
Manchester Oxide Co., Ltd.	28
Manlove, Alliott & Co., Ltd.	28
Mann, Egerton & Co., Ltd.	4
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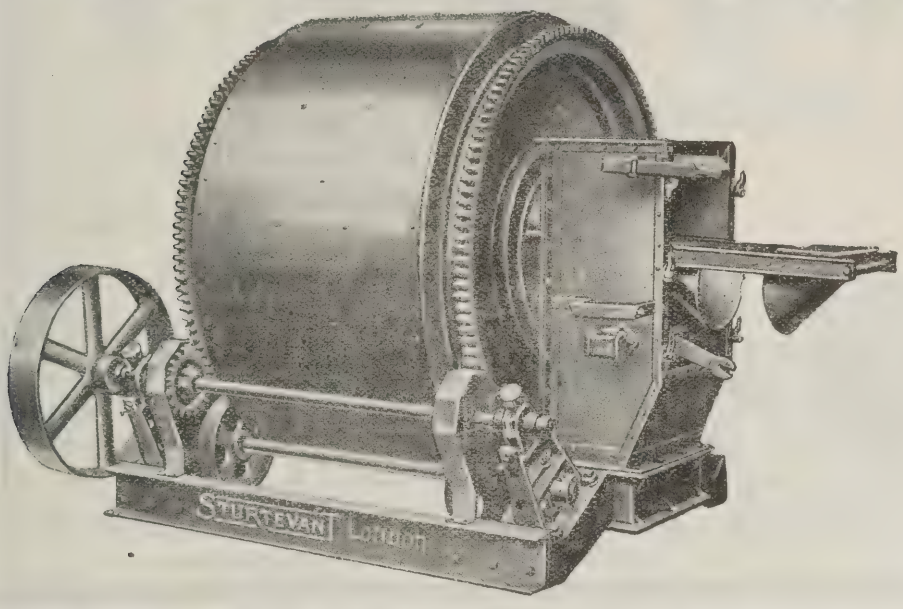

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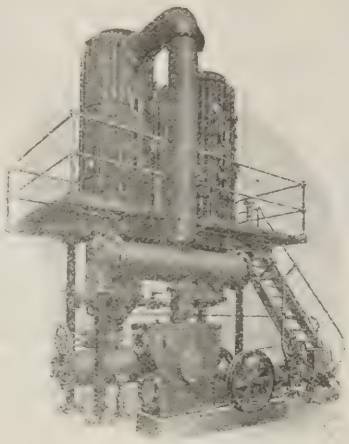

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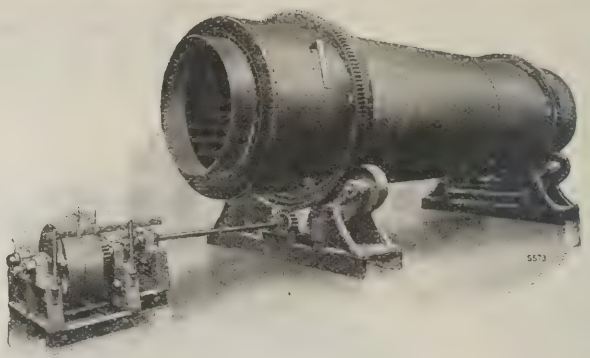

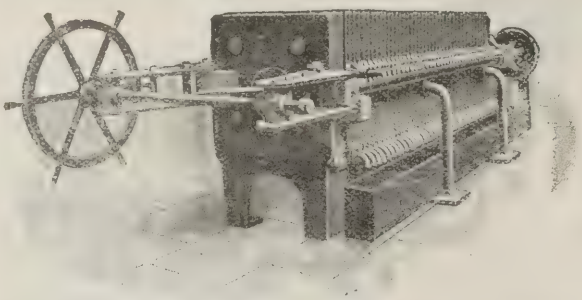

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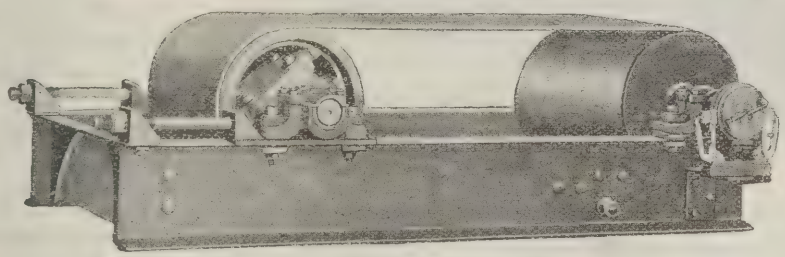

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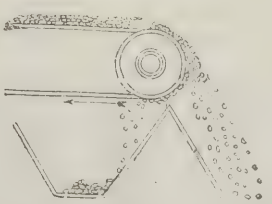

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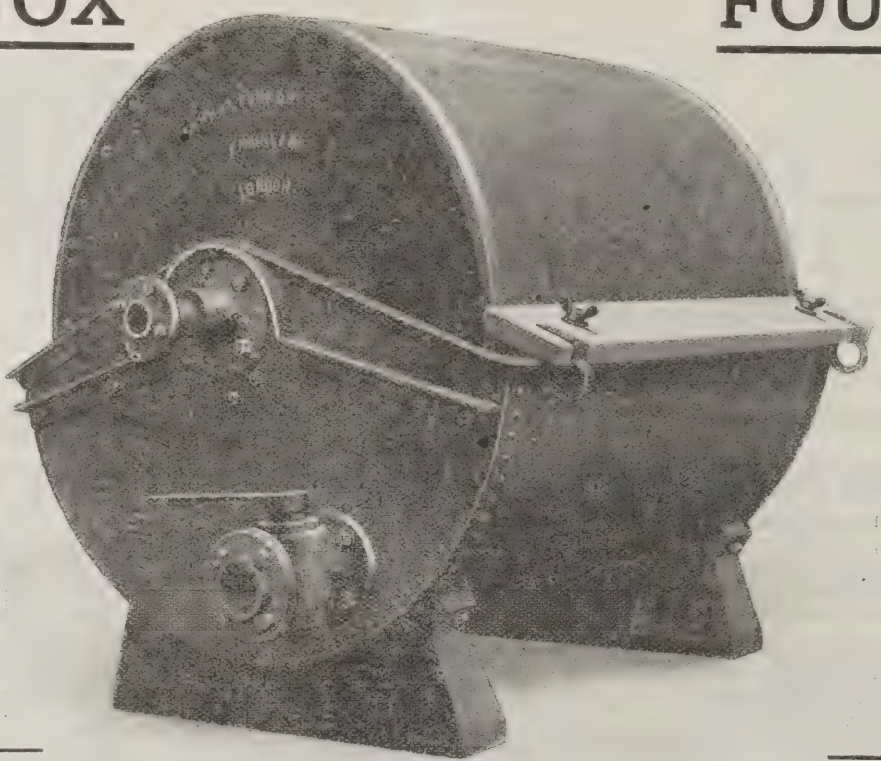

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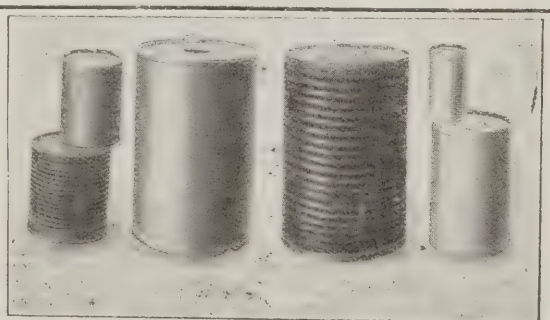

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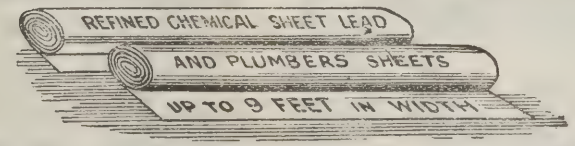

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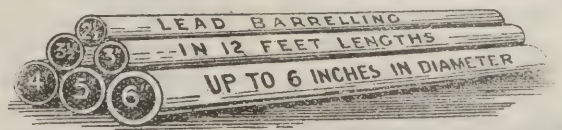

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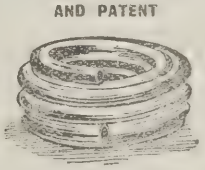

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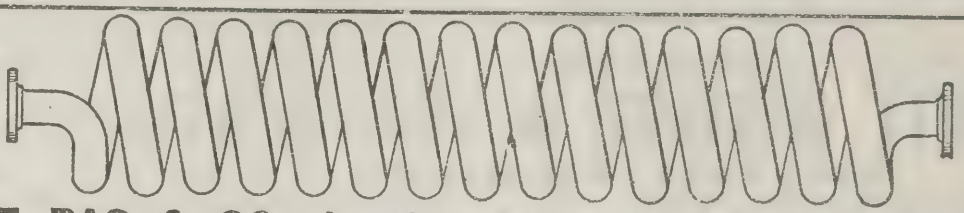

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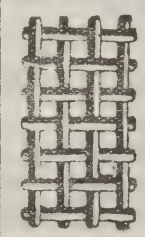

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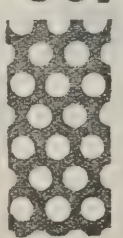

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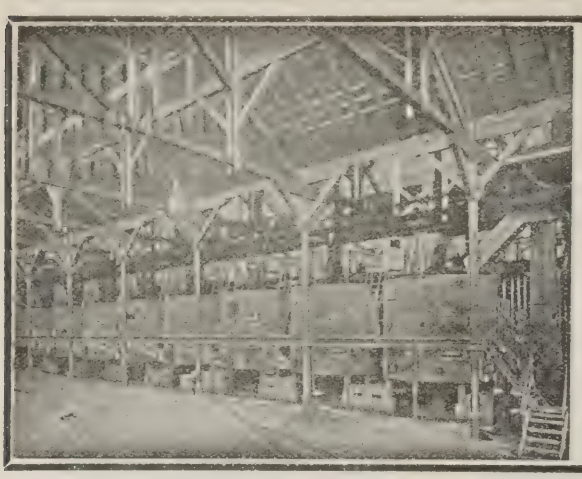

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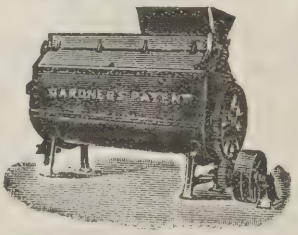

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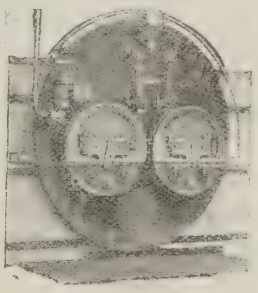

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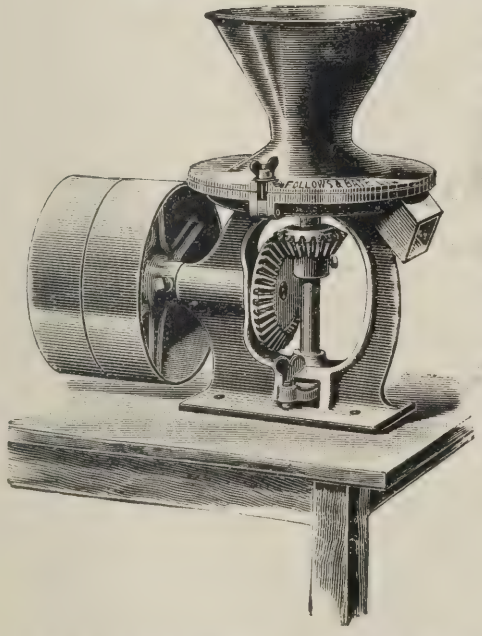

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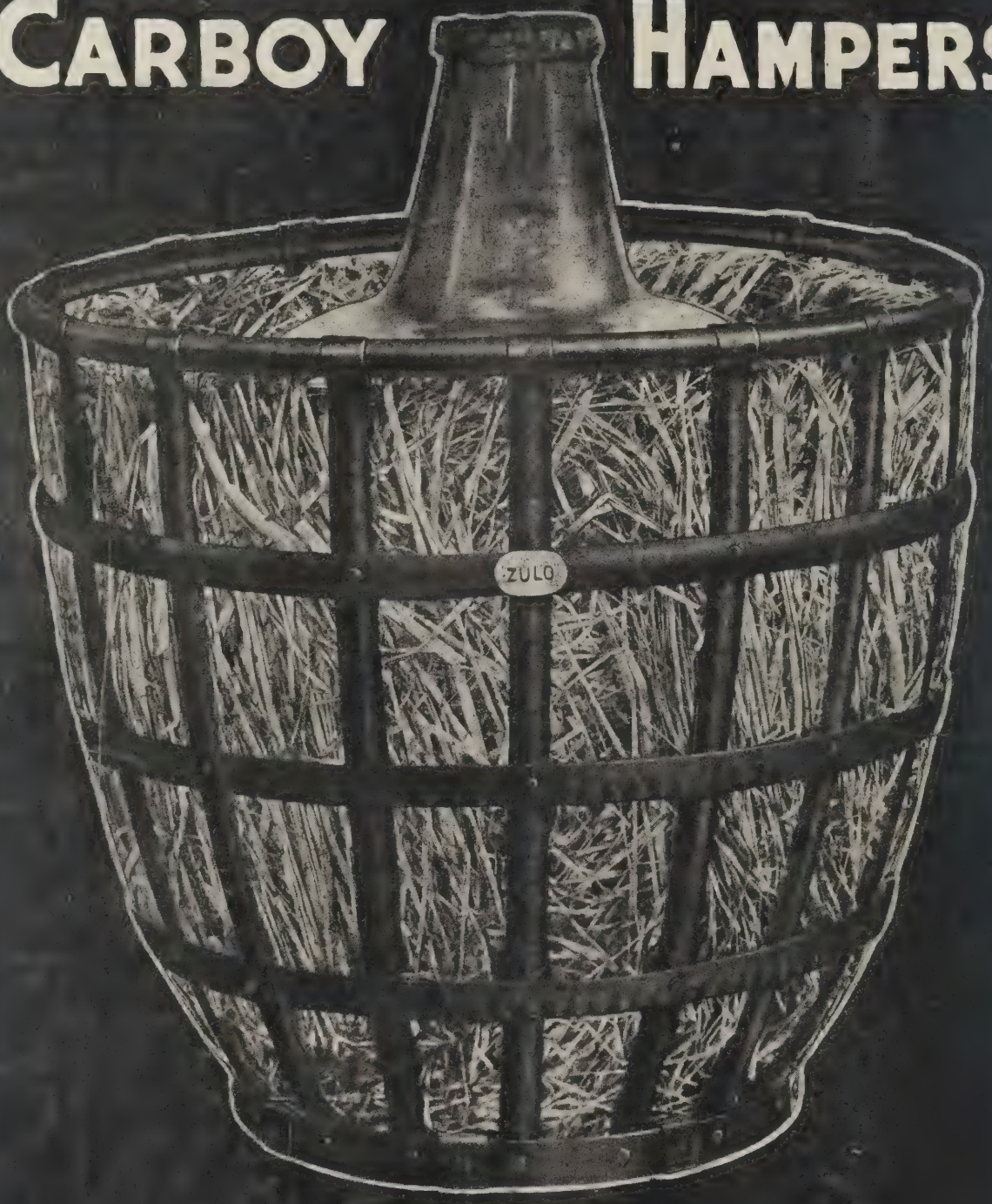

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